LAGOON AREA – BASIS OF DESIGN

CONTINENTAL STEEL SUPERFUND SITE
Kokomo, Indiana

Remedial Design

WA No. 222-RDRD-05BW / Contract No. 68-W6-0025

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B Engineering Narrative
C M-CACES Cost Estimate
D Floodplain Evaluation of the Lagoon Area

Abbreviations and Acronyms

ACM	asbestos-containing material
amsl	above mean sea level
ARAR	Applicable or Relevant and Appropriate Requirements
BOD	Basis of Design
CAA	Clean Air Act
CAMU	Corrective Action Management Unit
CCI	CH2M HILL Constructors, Inc.
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
CLP	contract laboratory program
COC	contaminant of concern
CQAP	Construction Quality Assurance Plan
CSSS	Continental Steel Superfund Site
CWA	Clean Water Act
DCR	Design Criteria Report
DOT	Department of Transportation
FML	flexible membrane liner
HGCL	hydraulic gradient control layer
HMTA	Hazardous Materials Transportation Act
HSWA	Hazardous and Solid Waste Amendments of 1984
HZE	Hub-Zone Enterprise
IAC	Indiana Administrative Code
IDEM	Indiana Department of Environmental Management
LBP	lead-based paint
LCS	leachate collection system
LDR	Land Disposal Restriction
LDS	leak detection system
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
msl	mean sea level
NCP	National Contingency Plan
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
O&M	operations and maintenance
OSHA	Occupational Safety and Health Administration

OU	Operable Unit
PAH	polyaromatic hydrocarbon
PCB	polychlorinated biphenyl
POTW	publicly owned treatment works
ppm	parts per million
RCRA	Resource Conservation and Recovery Act of 1976
RD/RA	Remedial Design/Remedial Action
RISC	Risk Integrated System of Closure
RI/FS	Remedial Investigation and Feasibility Study
ROD	Record of Decision
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act of 1986
SBE	Small Business Enterprise
SDBE	Small Disadvantaged Business Enterprise
SDWA	Safe Drinking Water Act
SMP	site management plan
SOW	Statement of Work
START	Superfund Technical Assistance Response Team
SVE	soil vapor extraction
SVOC	semivolatile organic compound
TCLP	toxicity characteristic leaching procedure
TSCA	Toxic Substances Control Act
UCL	upper confidence limit
USACE	Unite States Army Corps of Engineers
USC	United States Code
USEPA	United States Environmental Protection Agency
UTS	Universal Treatment Standard
VOC	volatile organic compound
WOB	Women Owned Business
yd^3	cubic yard

Introduction

This Basis of Design (BOD) Report for the Continental Steel Superfund Site (CSSS) Lagoon Area has been prepared for the United States Environmental Protection Agency (USEPA) by CH2M HILL under Contract No. 68-W6-0025 in accordance with the Statement of Work (SOW) in the Record of Decision[1] (ROD) issued in September 1998 and the Remedial Design/Remedial Action (RD/RA) Handbook issued in June 1995[2]. This BOD Report is divided into the following sections:

- Introduction
- Project Delivery Strategy
- Design Approach, Assumptions, and Parameters
- Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)
- Construction Schedule
- Cost Estimate
- Biddability, Constructibility, and Operability Review
- Tables
- Figures
- Appendixes

The appendixes provide supplemental information integral to the design of the selected remedy, and consist of the following:

- Appendix A—Asbestos Survey Report—a copy of the asbestos survey report for the Lagoon Area water treatment plant
- Appendix B—Engineering Narrative—a narrative summary of engineering design and analysis calculations conducted in support of the revised RA design for the Lagoon Area
- Appendix C—M-CACES Cost Estimate—a cost estimate within an accuracy of plus 15 percent to minus 5 percent in M-CACES format

Design specifications, drawings, and other supporting documents accompanying this report are bound as separate submittals. All drawings referred to in this BOD Report are included in the separate drawing submittal.

Site Description

The CSSS is an uncontrolled hazardous waste site in Kokomo, Indiana. The Indiana Department of Environmental Management (IDEM) was the lead agency responsible for conducting the Remedial Investigation and Feasibility Study (RI/FS) at the site under a cooperative agreement with USEPA in accordance with the Comprehensive Environmental

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[1] USEPA/IDEM. *Record of Decision: Continental Steel Corporation Superfund Site.* Kokomo, Howard County, Indiana. September 1998.

[2] USEPA: *Remedial Design/Remedial Action Handbook (EPA 540/R-95/059).* June 1995.

Response, Compensation, and Liability Act of 1980 (CERCLA), commonly known as Superfund.

The CSSS is located on West Markland Avenue in the City of Kokomo, Township 23 North, Range 3 East, and Township 24 North, Range 3 East, of Howard County, Indiana (Figure 1). The site encompasses an area of 183 acres and consists of an abandoned steel manufacturing facility (Main Plant), pickle liquor treatment lagoons (Lagoon Area), a former waste disposal area (Markland Avenue Quarry), and a former waste disposal and slag processing area (Slag Processing Area). The site is located within a mixed residential, commercial, and industrial area zoned mainly for general use. Residential properties lie predominantly east and southeast of the site, mixed residential and industrial areas lie to the north and west, and industrial properties are located to the south. The residences closest to the plant are within 100 feet east of the site, near the property fence line along South Leeds Street, and south of the Main Plant across Kokomo Creek. Highland Park, a public recreation area for local residents, lies south of the Main Plant just across Kokomo Creek and immediately adjacent to the CSSS property south of Kokomo Creek.

The Lagoon Area is located approximately 0.3 mile west of the Main Plant along the south side of West Markland Avenue. The area covers approximately 56 acres and includes five polishing lagoons, two acid (hazardous waste storage) lagoons, and three sludge-drying beds. These lagoons were originally permitted as Resource Conservation and Recovery Act of 1976 (RCRA) surface impoundments for treatment of wastewater generated from operations at the Continental Steel Plant.

Site History

A detailed description of the history of Continental Steel can be found in the RI/FS and the ROD. Throughout its history, the facility produced nails, wire, and wire fence from scrap metal. Operations included reheating, casting, rolling, drawing, pickling, annealing, hot-dip galvanizing, tinning, and oil tempering. The steel manufacturing operations included the use, handling, storage, and disposal of hazardous materials. For purposes of the RI/FS and the RD/RA, the site was divided into six operable units (OUs) as follows:

- OU1—Sitewide Groundwater
- OU2—Lagoon Area
- OU3—Kokomo and Wildcat Creeks
- OU4—Markland Avenue Quarry
- OU5—Main Plant
- OU6—Slag Processing Area

Selected Remedy—Lagoon Area (OU2)

Record of Decision

The purpose of USEPA's ROD was to select the final remedial action for the CSSS. The final remedy will control the sources of contamination and prevent further migration of contaminants. The selected remedy for the Lagoon Area is to:

- Close the RCRA surface impoundments
- Excavate contaminated solids and consolidate onsite
- Collect and contain shallow groundwater with an expanded interception trench system, and dispose of offsite
- Impose deed and groundwater use restrictions

The proposed remedy consists of RCRA impoundment closure and construction of a groundwater interceptor trench system. It provides for more protective contaminated solids excavation with disposal in an onsite landfill known as a Corrective Action Management Unit (CAMU). It also provides shallow groundwater collection to shorten the time for shallow groundwater to achieve cleanup goals or drinking water standards. However, sitewide groundwater will be addressed under a separate RD/RA contract.

Description of the ROD-Selected Remedial Action

According to the ROD, all contaminated solids outside the lagoon impoundments will be excavated and disposed of in an onsite landfill (CAMU). This involves the excavation, to depths of 4 to 10 feet across the site, of 93,000 cubic yards (yd^3) of material,[3] which includes waste piles, solids contaminated with volatile organic compounds (VOCs), and contaminated solids outside the footprint of the RCRA surface impoundment closure. Most of the polyaromatic hydrocarbon- (PAH), polychlorinated biphenyl- (PCB), and metals-contaminated solids fall within the RCRA impoundment confines and will be addressed through the RCRA closure and solidification effort. Excavated areas will be backfilled with clean soil to existing grades, except where floodway compensatory storage depressions are constructed.

The lagoons were operated under an interim RCRA permit that established guidelines for final closure of the surface impoundments. RCRA guidelines for lagoon closure require an impermeable cap, postclosure monitoring of potential leachate and groundwater quality, and postclosure care of the facility. Waivers from some closure elements are anticipated, given that the material will be stabilized to increase its compressive strength and it does not leach at levels above drinking water standards, based on treatability testing results from the USEPA Superfund Technical Assistance Response Team (START) laboratory. The consolidation of sludge and soil from the various lagoons into one large lagoon will reduce costs by decreasing the total surface area requiring an impermeable cap, the extent of leachate controls, and the extent of postclosure monitoring requirements.

Once the in-place closure was determined to be appropriate, consideration was given to combining the RCRA surface impoundment closure with construction of the onsite landfill under the CAMU process. Since closure of a surface impoundment requires many of the same long-term monitoring components as a landfill and precludes further site development, the ability to situate waste containment from the other CSSS source areas on top of the impoundment closure will reduce costs by eliminating duplicate waste containment areas, liner costs, and monitoring costs.

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[3] This volume is based on RI/FS data and has been revised during the Remedial Design.

Establishing a CAMU and constructing a landfill will lower the remedial costs associated with the overall site cleanup, since proposed remedial activities could be performed more efficiently. Solidification of the waste, which decreases the permeability of the material, could allow it to be used as the bottom for the CAMU landfill, although a separate RCRA cap may be required based on testing results. The RCRA cap, if required, could serve as the bottom liner, since it could be placed beneath the CAMU material. It is assumed that the lagoon waste will be consolidated within the proposed footprint of the CAMU to maximize benefits. A bottom liner to the CAMU landfill may not be necessary, since the lagoons will have monitoring wells; the lagoon sludge does not leach constituents at levels of concern; and the material managed under the CAMU will be placed above the water table, capped, and likely not leach at levels above groundwater standards.

As part of the combined CAMU and RCRA closure, the lagoon sludge will first be consolidated within the CAMU footprint. This results in placing 5 to 10 feet of stabilized sludge as the base layer within the CAMU. Part of the sludge removal will penetrate the Wildcat Creek floodplain by about 4 feet. The areas where sludge will be excavated from the floodway to the southwest will be used to construct compensatory storage depressions, which will significantly minimize the effect of a 100-year flood on the CAMU. Damage control measures will be incorporated in the CAMU design to minimize the effects of a 100-year flood. The final location of the CAMU in the Lagoon Area will be determined by the RD for OU2, based on final quantities of contaminated material needing onsite disposal. The intent will be to maximize compensatory floodway storage and reuse options for the property, and minimize the effects of a 100-year flood on the CAMU.

The landfill will be designed consistent with RCRA guidance; however, waivers could be sought for certain RCRA guidelines (for example, located outside of floodplain, bottom liner if groundwater controls implemented or stabilized sludge shown to have adequate permeability), since this is a CERCLA site. The design of the landfill will be based on the characterization of waste materials for conformance with RCRA or the Toxic Substances Control Act (TSCA) requirements and guidelines. RCRA guidelines suggest the use of the following components: a double liner base; a low permeability cap; a leachate detection, collection, and treatment system; and a groundwater monitoring system. During the remedial design, 40 Code of Federal Regulations (CFR) 264.18(b) and 40 CFR 270.14(b)(11)(iv) impacts on the construction of a CAMU in a 100-year floodplain will be reviewed and observed. It will be necessary to meet TSCA requirements for PCBs above 50 parts per million (ppm).

The corridor adjacent to Wildcat Creek has elevated contaminant concentrations. Drums, debris, and fill material were noted in this area. The areas with elevated contaminant concentrations will be excavated to depths of 2 to 4 feet and disposed of in the CAMU.

2001 Revised Description of the Selected Remedial Action

Initial Preliminary Design

CH2M HILL submitted a Design Criteria Report (DCR) in August 2001 and attended a meeting with USEPA and IDEM on September 5, 2001, to discuss the Preliminary Design. The initial Preliminary Design was based on the information in the FS and the ROD, and called for excavated sludge to be stabilized and used as the base of the CAMU, followed by

the construction of two cells: a VOC/PCB containment cell and a non-VOC containment cell. However, during the meeting, the possibility of lining the entire CAMU footprint with a flexible membrane liner (FML) system was discussed. CH2M HILL performed a preliminary cost evaluation and determined that lining the entire CAMU footprint would be cost effective and more protective of human health and the environment. USEPA, in concurrence with IDEM, instructed CH2M HILL to revise the CAMU design to include a single cell with a FML system, and a revised DCR was prepared and submitted in January 2002.

Revised Preliminary Design

The proposed liner system design, as presented in the revised DCR and as described in this document, modifies the design presented in the ROD, but does not modify the remedy, and is above and beyond what is required by the ROD and state and federal regulations. However, the reduced cost and unique location of the CAMU (i.e., within a 100-year floodplain and less than 50 feet to the groundwater table) are strong arguments for the enhanced liner design. The proposed liner design has been discussed in detail with USEPA and IDEM personnel, and CH2M HILL has been instructed to proceed with the design.

The CAMU will be constructed with a double-composite liner, a leachate collection system (LCS), and a leak detection system (LDS). Upon closure of the CAMU, a RCRA-type composite liner cap will be constructed under a separate contract. As directed by the ROD, the CAMU will be located within the Lagoon Area and, hence, within the floodplain of Wildcat Creek. As a protection against impacts due to floodwaters and groundwater, a hydraulic gradient control layer (HGCL) will be constructed below the base of the CAMU liner. The normal groundwater level is located below the bottom of the CAMU. In addition, the containment berm of the CAMU will be constructed with a top elevation more than 20 feet above the 100-year flood elevation.

All contaminated solids from within and outside the lagoon impoundments will be excavated and then consolidated in the CAMU. The CAMU will be sited within the existing Lagoon Area, and will be constructed upon excavation and stockpiling of all contaminated lagoon sludge and soils from beneath the footprint of the CAMU. Upon construction of the CAMU liner system, stockpiled and excavated soils will be consolidated in the CAMU.

The sludges, soils, and sediments to be consolidated in the CAMU contain various concentrations of VOCs, semivolatile organic compounds (SVOCs), PAHs, PCBs, and metals. The comprehensive design of the CAMU will provide effective long-term separation of these materials from subsurface soils and groundwater. However, the location of the CAMU within the Lagoon Area will require some variance with applicable regulations for disposal of certain materials. Regulatory variances required for the CAMU construction are summarized in the Compliance with ARARs section of this BOD Report, along with the proposed methods to attain acceptance of the variances.

Solids (sludge and soil) with VOC concentrations greater than 1,000 micrograms per kilogram (μg/kg) will be disposed of in the CAMU. The ROD stated that these soils may require treatment prior to disposal in the CAMU. Although not an ARAR for the disposal of soils in the CAMU, the recent revisions to the CAMU regulations (see Compliance with ARARs section) will be used as the treatment objectives. These revisions require the greater

of either a 90 percent reduction in the mass of VOCs that are considered principal hazardous constituents (i.e., those that are a threat from leaching or pose a risk greater than a 1×10^{-3} excess lifetime cancer risk, or a noncancer risk exceeding 10 times the reference dose), or 10 times the Universal Treatment Standard (UTS). VOC-impacted solids will be stockpiled for treatment with SVE before placement in the CAMU. Treatment, if needed, will consist of installation and operation of a soil vapor extraction (SVE) system, and will be designed and installed upon completion of a pilot test on the VOC-impacted materials.

Interim Cover

Upon completion of consolidation of all lagoon waste materials in the CAMU, an interim cover (e.g., geomembrane) will be installed over the CAMU. It will be used to cover the waste between RA contracts and will remain in place until the final cover (i.e., a functional equivalent of a RCRA Subtitle C cover) is designed and installed.

Compensatory Flood Storage Area

A large portion of the excavated Lagoon Area to the west of the CAMU will be designated as a compensatory flood storage area. In this area, the clean base of the excavation will be graded to generally drain to the northwest. This base will be graded to a minimum elevation of 778 feet mean sea level (msl), to keep the base above the expected average static groundwater elevation after RA implementation. Additional fill material may need to be imported to complete this grading, depending on the final volumes of excavated material.

2006 Revised Proposed Remedial Action

The proposed RA presented in the BOD Report[4] is being further revised. The proposed RA described in this document differs from the previous design (September 2002) in that a permeable soil cover is proposed over the Lagoon Area and impacted soils and sediment from the Lagoon Area (OU2), Wildcat and Kokomo Creeks (OU3), and Markland Quarry (OU4) will be disposed of at offsite facilities instead of placement in a CAMU within the Lagoon Area.

A preconstruction soils investigation will be performed to better delineate the extent of soils impacts in the Lagoon Area drum storage area above the 1,000 µg/kg total VOCs remediation goal. Soils with impacts over the remediation goal that are identified during the preconstruction soils investigation will be excavated and disposed of at an approved offsite disposal facility. Once the VOC hot spots are removed, the remaining soils and sludges do not pose a threat of leaching contaminants to groundwater at concentrations of concern.

The permeable soil cover will be constructed with a 1/4 percent slope to promote drainage and prevent ponding. The cover elevation will drop to the west and south, to an elevation of 792 feet above mean sea level (amsl) at the bank of Wildcat Creek. The high point of the cover will have an elevation of approximately 795 feet amsl at the northeast corner of OU2. Due to the compressibility of the sludge in the Lagoons Area, it is anticipated that differential settling will occur. As a result, the Lagoon Area will be preloaded for approximately 5 years to allow the sludge to compress and settling to occur. After the preloading, additional fill will be placed in the Lagoon Area to correct the

[4] CH2M HILL. *Lagoon Area Basis of Design Report: Continental Steel Superfund Site.* September 2002.

grade after any settling has occurred and a vegetative cover will be established over the area for erosion control and aesthetics.

The details of the design are described in the following section under the following components of the remedy:

- Preconstruction soils investigation
- Mobilization
- Site preparation
- Wastewater treatment plant demolition
- Soils excavation and disposal
- Excavation and grading
- Lagoon area preloading
- Settlement monitoring
- Final grading
- Lagoon area restoration
- Postconstruction activities
  - Institutional controls
  - Environmental monitoring and maintenance
  - Five-year site reviews

Project Delivery Strategy

This section presents the project delivery strategy for the Lagoon Area RA. The contracting strategy and primary components of the RA are summarized below. Key project delivery strategies, relative to a specific RA component, are noted below in their respective sections.

Contracting Strategy

CH2M HILL proposes a subcontracting approach to maximize the use of Small Business Enterprises (SBE), Small Disadvantaged Business Enterprises (SDBE), Women-Owned Businesses (WOB), Hub-Zone Enterprises (HZE), and Veteran's Preference Businesses to the greatest extent possible. The contract documents are being prepared based on the understanding that CH2M HILL is the construction contractor. Separate bid packages will be prepared for each subcontract.

CH2M HILL proposes to issue a minimum of three subcontracts, which may include the following:

- Water treatment plant demolition (including asbestos abatement)
- Earthwork
- Construction quality assurance

CH2M HILL will be searching for qualified SDBEs for the water treatment plant demolition and has already identified a qualified SDBE for the construction quality assurance subcontract. The earthwork construction subcontract will be competitively bid through an invitation-only process that will include a number of qualified large business enterprises located in the State of Indiana and several qualified out-of-state SDBEs.

Final Design

Detailed design drawings and specifications are provided for the RA components. The final design package consists of the following:

- BOD Report, which includes the Value Engineering Results, Cost Estimate, and Biddability, Operability, and Constructibility Reviews
- Request for Bid Documents, which includes Specifications, Drawings, Bidding Process, and Contract Terms
- CQAP
- O&M Manual

Remedial Action—Lagoon Area (OU2)

Descriptions of the primary components of the RA are presented below in their expected construction sequence. The design details and construction methods for each of these components are presented in the following section.

- **Preconstruction Soils Investigation.** Prior to construction activities, CH2M HILL will conduct a soils investigation using the TRIAD approach within the drum storage area in the southwest corner of the Lagoon Area. The purpose of the investigation is to better delineate the extent of soils impacts above the 1,000 µg/kg total VOCs remediation goal. A sampling plan will be developed to address both preconstruction and verification sampling.

- **Mobilization.** Before mobilization to the site, the subcontractor shall verify it has obtained or is in compliance with the substantive requirements of all necessary permits (such as, but not limited to, permission to perform work in a floodplain and approval for construction activities from IDEM). In addition, the subcontractor shall deliver all necessary preconstruction submittals to CH2M HILL for approval before mobilization. Mobilization will include construction of all temporary facilities (such as field trailers [for the subcontractor(s) and CH2M HILL]), utilities, and material storage and decontamination facilities, and all necessary construction equipment.

- **Site Preparation.** Erosion control measures will be installed before disturbing any soil or vegetation at the site. Select clearing and grubbing will be completed in areas designated for excavation, filling or grading. Standing water will be removed from the Lagoon Area.

- **Wastewater Treatment Plant Demolition (including asbestos abatement).** In order to better integrate the site into the existing surroundings and minimize risks to potential receptors, all buildings will be demolished. To minimize demolition costs, salvageable materials will be recovered. Any identified hazardous materials, including asbestos, will be properly managed, stored, and disposed of offsite at an approved disposal facility.

- **Soil Excavation and Disposal.** Soils identified during the preconstruction soils investigation with impacts over the remediation goal of 1,000 µg/kg total VOCs will be excavated and disposed of at an approved offsite disposal facility. Confirmation sampling will be performed to verify the soils above the remediation goal have been removed prior to the area being backfilled.

- **Excavation and Grading.** To construct a soil cover with a minimum 2-foot thickness over the Lagoon Area, the areas of higher elevation, such as berms and the northwest portion of the site, will be excavated to 2-feet below the proposed preloading and final grade. The excavated materials will be placed within low-lying areas of the Lagoon Area as fill material and subsequently covered with a minimum of 2-feet of clean fill.

- **Lagoon Area Preloading.** The permeable soil cover will be constructed with a 1/4 percent slope to promote drainage and prevent ponding. The cover elevation will drop to the west and south, to an elevation of 792 feet amsl near Wildcat Creek. The high point of the cover will have an elevation of approximately 795 feet amsl at the northeast corner of OU2. Due to

the compressibility of the sludge and variable sludge thickness in the Lagoons Area, it is anticipated that differential settling will occur. As a result, the Lagoon Area will be preloaded for approximately 5 years to allow the sludge to compress and settling to occur.

- **Settlement Monitoring.** Settlement plates will be installed throughout the Lagoon Areas to monitor sludge consolidation after preloading. Topographic surveys (including settlement plates) will be performed throughout the Lagoon Area to monitor overall consolidation of the cover and settlement rates and locations. Settlement monitoring will be used to evaluate the preloading duration and areas requiring additional fill and final grading.
- **Final Grading.** After preloading, additional fill will be placed in the Lagoon Area to correct the grade after any differential settling has occurred.
- **Lagoon Area Restoration.** After the final grading over the Lagoon Area is complete, the finished grade will be stabilized with vegetation over the area for erosion control and aesthetics. The final elevation and grading of the Lagoon Area will allow the area to serve as a compensatory flood storage area for Wildcat Creek.
- **Postconstruction Activities.** Several postconstruction activities will be conducted under Contract 1. These include the following:
  - Institutional control development
  - Environmental monitoring and maintenance
  - Five-year site reviews

Design Approach, Assumptions, and Parameters

This section presents the technical details of the Lagoon Area RA design. Methods of construction for each component of the RA are described in this section, as are performance standards that must be met during construction. As described previously, the components of the Lagoon Area RA consist of the following, presented in their expected project delivery sequence:

- Preconstruction soils investigation
- Mobilization
- Site preparation
- Wastewater treatment plant demolition
- Soil excavation and disposal
- Excavation and grading
- Lagoon Area preloading
- Settlement monitoring
- Final grading
- Lagoon Area Restoration
- Postconstruction activities
  - Institutional controls
  - Environmental monitoring and maintenance
  - Five-year site reviews

Preconstruction Soils Investigation

Description of Preconstruction Soils Investigation

Prior to construction activities, CH2M HILL will conduct a soils investigation within the drum storage area in the southwest corner of the Lagoon Area. The purpose of the investigation is to better delineate the extent of soils impacts above the 1,000 µg/kg total VOCs remediation goal. A sampling plan will be developed to address both preconstruction and verification sampling.

Areas Requiring Preconstruction Soils Investigation

The investigation will focus on the area of high VOC concentrations in the former drum storage area located in the southwest corner of the Lagoon Area.

Construction Details Including Design and Construction Technical Factors

The samples will be analyzed for VOCs. Testing will be conducted in a mobile laboratory provided by the USEPA so results can be obtained quickly and compared to the final remedial goal of 1,000 µg/kg. If necessary, additional samples will be collected to further

define the excavation area. The contract laboratory program (CLP) is proposed as an alternate means of analysis if the mobile laboratory is unreliable.

Mobilization

Description of Mobilization

Permits

Before mobilization to the site, the subcontractor shall verify it has obtained or is in compliance with the substantive requirements of all necessary permits (such as, but not limited to, permission to perform work in a floodplain and approval for construction activities from IDEM). CERCLA response actions do not need to comply with the administrative requirements, such as permitting, or applicable or relevant and appropriate environmental laws and regulations. The substantive requirements, however, must be met. The permits applicable to the Lagoon Area include, but may not be limited to the following:

- Markland Avenue Easement—to be obtained by the Subcontractor from the City of Kokomo.
- Notification Requirement—adjoining land owners or occupants will be notified by IDEM.
- Notice of Intent (NOI)—to be completed by CH2M HILL and IDEM. Separate NOIs will be issued for Lagoon Area cover construction, asbestos abatement, and building demolition, if necessary.
- Soil Erosion Control Plan—to be submitted by the Subcontractor to CH2M HILL for approval. After the plan is approved by CH2M HILL, it will be forwarded concurrently to IDEM and the Howard County Soil and Water Conservation District.
- Indiana Air Pollution Control Regulations (Indiana Administrative Code [IAC] Title 326)—requirements of IAC Title 326 are potentially applicable to remedial actions that result in air emissions, such as construction and treatment activities. Mitigative measures to reduce air emissions during fill and grading activities will be adhered to as part of the construction plan. Compliance with IAC Title 326 will be verified prior to construction.
- Indiana Water Pollution Control Regulations (IAC Title 327)—requirements of IAC Title 327 are potentially applicable to remedial actions that require discharge of water to either a publicly owned treatment works (POTW) or surface water body. Compliance with IAC Title 327 will be verified prior to construction and if necessary, the substantive requirements of a National Pollutant Discharge Elimination System (NPDES) permit or pretreatment discharge permit will be determined for the construction and operation of a wastewater pretreatment facility.
- United States Army Corps of Engineers (USACE) 404 Permit and IDEM 401 Water Quality Certificate—to be completed by IDEM.
- Flood Control Act Permit—to be completed by IDEM.

In addition, the subcontractor shall deliver all necessary preconstruction submittals to CH2M HILL for approval before mobilization. Mobilization will include construction of all temporary facilities such as field trailers (for the subcontractor(s) and CH2M HILL), utilities, and material storage and decontamination facilities, and all necessary construction equipment.

General Mobilization Requirements

Preconstruction Kick-off Meeting

A preconstruction kick-off meeting, to be held at the site prior to the start of construction, will include the Subcontractor, CH2M HILL, USEPA, IDEM representatives, representatives of the local police and fire departments, and pertinent representatives of local utilities and health services. The purpose of the meeting is to inform local officials of the nature and extent of the work to be performed and coordinate safety procedures.

Preconstruction Subcontractor Submittals

A generalized list of permits to be acquired by the subcontractor before mobilization is included in the specifications. Before mobilization, the subcontractor will prepare and submit all necessary submittals to CH2M HILL for approval. Requirements on the contents of these submittals are included in the specifications.

Temporary Construction Facilities

Temporary facilities will be installed during the mobilization phase, before commencement of any other work at the site. Detailed temporary facility requirements are included in the specifications, and will be reflected in the subcontractor's site management plan (SMP). Temporary facilities will generally include items such as construction field office trailers, utility connections, material storage facilities, and decontamination facilities. Decontamination of equipment and personnel prior to leaving the site is required to prevent the contaminants from being carried offsite.

Following installation of the temporary facilities, equipment and materials may be mobilized to the site, and other remedial action components may commence. A topographic survey will be conducted across the entire Lagoon Area during mobilization activities, for future use in calculation of fill volumes.

Performance Standards

Exact locations and layout of the temporary facilities have not been specified. Rather, only general areas have been recommended. The subcontractor's SMP will specify its proposed facility layout. Likewise, specific requirements for some of the facilities (such as decontamination and material storage facilities) will be left to the subcontractor, but must meet performance requirements listed in the specifications.

Site Preparation

Description of Site Preparation

Erosion control measures will be installed before any soil or vegetation at the site is disturbed. Select clearing and grubbing will then be completed in fill and grading areas. Impacts to existing vegetation will be minimized in other areas. Standing water will be removed from the Lagoon Area prior to earthwork activities in that area.

Construction Details Including Design and Construction Technical Factors

Erosion Control Measures

Before any soil disturbance at the site, temporary construction erosion control measures will be established. These measures will be described in the subcontractor's SMP, and must comply with standard USEPA guidance. Specific erosion and sediment control features implemented at the site during construction may include the following:

- Silt fencing—install at the downgradient edge of all construction and stockpile areas.
- Stormwater ditches—install wherever necessary to prevent run-on/runoff from/to stockpiles and construction areas. Ditches may include dikes, check dams, or sediment traps to reduce sediment mobility.
- Wood chips or mulch—install over relatively flat slopes or barren flat areas upon completion of filling.
- Crushed rock—install at transitions from paved to unpaved areas, where construction traffic is expected.

Clearing and Grubbing

Upon installation of initial erosion control measures, clearing and grubbing of work areas will commence. Vegetative matter removed during clearing and grubbing activities may be shredded onsite and used as erosion control mulch, subject to CH2M HILL approval.

Dewatering

If present, standing water will be removed from the Lagoon Area with a trash pump, or similar equipment, prior to earthwork activities in that area. The pump will be placed in standing water and pumped to a water treatment system if treatment is necessary prior to discharging to Wildcat Creek. A water treatment system will be in the Lagoon Area during dredging and sediment dewatering activities for Wildcat and Kokomo Creeks (OU3) and Markland Quarry (OU4).

Performance Standards

Periodic visual inspections will ensure the initial erosion control measures are performing as specified, and as described in the subcontractor's SMP. Visual inspections will also be used to verify standing water is not present prior to earthwork activities.

Wastewater Treatment Plant Demolition

Description of Wastewater Treatment Plant Demolition

All existing structures within the Lagoon Area will be demolished to and below ground level along with removal of all concrete slabs and associated utilities. To the extent possible, demolished buildings and metal scrap will be salvaged. Material with no salvage value, excluding liquid material, will be disposed of at an approved offsite disposal facility. Before commencement of demolition activities, all existing utilities will be located and designated for either removal or protection.

Hazardous Materials

The presence of asbestos-containing material (ACM) is suspected in the window glaze, pipe insulation, and clarifier insulation at the water treatment plant, and will require special handling procedures. A preliminary asbestos survey was conducted May 21, 2002, by CHC Technologies, Inc. The results of the survey are included in Appendix A.

Lead-based paint (LBP) may have been used at the facility, and PCBs may be present in the transformer oil located in the transformer on the back (west) side of the treatment building. Any such hazardous materials discovered will be properly handled during demolition activities, and will be properly disposed of at an approved offsite disposal facility.

During treatment building demolition, asbestos abatement will be conducted before the demolition of building structures. The treatment building contains a basement area that is currently filled with water. After this area is pumped out, additional ACM and/or LBP may be identified, and will be handled appropriately.

Structures to be Demolished

Treatment Building and Clarifiers

The treatment building and ancillary equipment (e.g., three mixing tanks, two filter presses), as well as the two clarifiers will be demolished. The treatment building dimensions are approximately 72 feet (L) x 60 feet (W) x 25 feet (H), and each clarifier is approximately 100 feet in diameter and 15 feet high. The two mixing tanks inside the treatment building are approximately 20 feet high and 15 feet in diameter.

The clarifier exterior surfaces are covered by insulation suspected of containing asbestos that will be removed and handled appropriately prior to demolition. The south clarifier contains approximately 10 feet of sludge ($\cong$ 3,000 yd^3) and the mixing tanks are coated with hardened sludge varying in thickness up to 1.5 feet. The sludge will be removed and disposed of at an approved offsite disposal facility.

Control Building

There is a small wood building at the northwest corner of Lagoon 3. This structure will be demolished and disposed of at an approved offsite disposal facility.

Pipe

All piping (above and below ground) that was used to transport the waste pickle liquor from the holding lagoons to the treatment building, and from the treatment building to the polishing lagoons, etc., will be decontaminated and removed from the site.

Construction Details Including Design and Construction Technical Factors

Hazardous Materials Survey

Before demolition activities begin, another survey for ACM and LBP will be conducted, including the lower level of the treatment building. Inspection of the lower level of the treatment building will require the area to be dewatered. The results of the survey will confirm the amount of abatement work to be completed as part of the demolition activities.

Building Demolition

During demolition activities, nonhazardous materials resulting from building demolition will be salvaged, if possible, or disposed of at an approved offsite disposal facility. Hazardous construction materials may be encountered in the treatment building, such as asbestos insulation and/or LBP. ACM will be removed and disposed of at an approved offsite disposal facility.

The main power center to the treatment building includes a large transformer that contains oil suspected of containing PCBs. Visual inspections should be performed to check the PCB transformer for leaks and the surrounding soil for staining. If soil staining is observed, the stained soils will be excavated, characterized, and disposed of at an approved off-site disposal facility. During demolition, the oil will be removed and disposed of offsite in accordance with applicable requirements. The transformers will also be properly decontaminated and disposed of in accordance with applicable requirements. Other treatment building equipment will be cleaned (i.e., sludge removed from surfaces) and salvaged as appropriate.

Clarifier Demolition

The clarifiers will be demolished after removal of the insulation surrounding the clarifiers (if required) and removal of the sludge in the south clarifier. The clarifier demolition debris will be salvaged or disposed of at an approved offsite disposal facility

Debris Disposal

Materials remaining from demolition activities will be designated for either salvage or disposal. Hazardous material will be disposed of at an approved offsite disposal facility. General demolition debris such as glass, plastics, insulation, shingles, and unsalvageable wood and metal will also be disposed of at an approved offsite disposal facility.

Soil Excavation and Disposal

Description of Soil Removal

Soils identified during the preconstruction soils investigation with impacts over the total VOC remediation goal of 1,000 µg/kg will be excavated and disposed of at an approved offsite disposal facility. Following the removal of the soil to the extent identified during the preconstruction soils investigation, confirmation samples will be collected from the excavation to determine if additional removal is necessary. A USEPA-supplied mobile laboratory will be used for analysis of these confirmation samples. The CLP is proposed as an alternate means of analysis if the mobile laboratory is unreliable.

Construction Details, Including Design and Construction Technical Factors

Conventional earthmoving equipment will be used to remove the soils identified for removal. The material will then be transported to an offsite disposal facility.

Performance Standards

The performance standard is a reduction in the total concentration of VOCs below the remediation goal of 1,000 µg/kg.

The closure verification sampling will be based on the methodologies used by the State of Indiana[5]. Systematic sampling procedures will be used in each area. The soils will be sampled at regular intervals throughout the area of treatment to determine whether remedial goals have been obtained or whether additional soils should be treated. The initial systematic sample location is chosen randomly so that bias is minimized. Soils will also be sampled at regular intervals around the perimeter of the treatment area to determine whether additional soils require treatment beyond the horizontal limits of the VOC-impacted area. The number of samples to be obtained will be determined based on the Risk Integrated System of Closure (RISC) Technical Guide, Table 6-2, and, for larger areas, equation 7-6, as follows:

$$n = ((Z_a + Z_b)^2 // (C_s - u_1)^2)\, v^2 + (Z_a^2/2)$$

where:

- n = the required number of samples
- Z_a = the "Z" value for a selected alpha
- Z_b = the "Z" value for a selected beta
- C_s = the contaminant of concern (COC) remedial goal
- u_1 = the population mean at the site (estimated by the sample mean)
- v^2 = the population variance (estimated by the sample variance)

Samples will be analyzed for VOCs by a mobile laboratory supplied by USEPA. The CLP is proposed as an alternate means of analysis if the mobile laboratory is unreliable. Additional treatment will be performed if the upper 95 percent confidence limit of the mean of any of the COCs exceeds the remedial goal. If the calculated upper confidence limit (UCL) marginally exceeds the remedial goal, additional soil samples will be analyzed and the UCL will be

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[5] Indiana Department of Environmental Management. *Risk Integrated System of Closure (R.I.S.C.) User's Guidance.* February 15, 2001.

recalculated. When the UCL exceeds the remedial goal, the sample results will be evaluated to determine where additional soil should be treated. The target area will be resampled following additional excavation, and the UCL will be recalculated. Excavation will be determined to be complete when the UCL is less than the remediation goal.

Excavation and Grading

Description of Excavation and Grading

To construct a soil cover with a minimum 2-foot thickness over the Lagoon Area, areas of higher elevation, such as berms and the northwest portion of the site, will be excavated to 2-feet below the proposed preloading and final grade. The excavated materials will be placed within low-lying areas of the Lagoon Area. After the excavation has been completed, a permeable soil cover will be constructed.

Construction Details Including Design and Construction Technical Factors

Conventional earthmoving equipment will be used to remove the soils to a depth of 2-feet below final grade of the soil cover. Excavated soils will then be placed within low-lying areas in OU2.

Performance Standards

The following performance standards will be implemented during the Lagoon Area excavation and grading activities:

- The performance standard is based on the depth of excavation to allow a 2-foot minimum soil cover and not on the achievement of a specific concentration. The elevations after excavation will be within ±0.1 foot of design grades.
- Airborne particulate and VOC monitoring will be conducted as specified in the Health and Safety Plan (HASP) to monitor wind transport from soil stockpiles.

Lagoon Area Preloading

Description of Preloading

A variable thickness of soil cover will be constructed over the lagoon sludges, which themselves vary in thickness. At the existing berm locations, the ground elevation is relatively high, and no compressible sludge is typically present; therefore, differential settlement is expected across the soil cover. Given the shallow grade of the cover (1/4 percent), areas of ponding and grade reversal will likely develop in the cover surface as a result of the differential settlement. To mitigate the problem, the cover soil will be rough graded and allowed to sit for an extended period of time before final grading. Using the average rate of consolidation properties for the sludge, 80 percent of the consolidation settlement will develop within approximately 5 years of loading. The evaluation of the anticipated settlement is provided in Appendix B.

Construction Details Including Design and Construction Technical Factors

A permeable soil cover will be constructed over the Lagoon Area. The cover will have a 1/4 percent slope to promote drainage and prevent ponding. A variable thickness of soil will be placed over the existing lagoon sludges to maintain the 1/4 percent slope, although the soil cover will be a minimum of 2 feet thick. The cover elevation will drop to the west and south, to an elevation of 792 feet amsl along Wildcat Creek. The high point of the cover will have an elevation of approximately 795 feet amsl at the northeast corner of OU2.

At the existing berm locations, the ground elevation is relatively high, and no compressible sludge is typically present. The berms will be excavated to 2-feet below the final grade during excavation and grading to allow for the construction of the soil cover. Grading of the berms will allow surface water runoff to flow towards Wildcat Creek and provide additional floodplain capacity.

The dewatering pad in Lagoon 6 will be incorporated into the cover after dredging activities for Wildcat and Kokomo Creeks and Markland Quarry are complete. The sediments will be removed from the dewatering pad and disposed of offsite at an approved disposal facility after the sediments have dewatered. The dewatering pad will then be filled as necessary and graded to the design elevations for the cover over the Lagoon Area.

The soil cover will be constructed of imported clay. The clay will provide resistance to erosion if flooding should occur. After the rough grading is complete, the area will be hydroseeded to help minimize erosion of the cover. Silt fence or other erosion control measures will remain in place around the Lagoon Area during the preloading.

Performance Standards

The following performance standards will be implemented during the Lagoon Area preloading activities:

- The primary performance standard for the soil cover is to prevent direct contact with contaminated solids. The soil cover will also allow the required grade to be achieved to minimize ponding and to promote positive runoff without causing erosion problems.
- The elevations after rough grading will be within ±0.1 foot of design grades.
- Imported soil materials will be approved based on material gradation test data required as part of the subcontractor quality control submittals.
- Visual inspections will ensure that the erosion control measures prevent migration of sludge or soils to Wildcat Creek.
- Airborne particulate and VOC monitoring will be conducted as specified in the HASP to monitor wind transport from soil stockpiles.

Settlement Monitoring

Description of Settlement Monitoring

Settlement plates will be installed throughout the Lagoon Areas to monitor sludge consolidation after preloading. An initial survey will be performed after rough grading for preloading. Topographic surveys will be performed throughout the Lagoon Area every other year to monitor overall differential settlement of the cover and settlement rates and locations. Survey of the settlement plates will occur at the same time as the topographic survey and will monitor sludge consolidation. It is anticipated that 80 percent of the consolidation settlement will develop within approximately 5 years of preloading. Settlement monitoring will be used to evaluate the preloading duration and areas requiring additional fill and final grading.

Site inspections will also be performed as part of the settlement monitoring to identify if any erosion of the cover is occurring or maintenance of any erosion control measures is necessary.

Construction Details Including Design and Construction Technical Factors

The settlement plates will be constructed of a steel plate, a 3/4-inch-diameter steel survey pipe, a 2-inch-diameter galvanized steel cover pipe, and a flush-mount well cover. The steel plate will be placed on the sludge surface prior to placing the soil cover. The 3/4-inch-diameter steel survey pipe length shall extend vertically up from the liner to 6-inches below the top of the soil cover. An 8- or 10-inch-diameter cast iron flush-mount well cover shall protect the upper ends of the 3/4-inch- and 2-inch-diameter steel pipes.

Performance Standards

The following performance standards will be implemented during the settlement monitoring activities:

- Settlement plates will be surveyed after rough grading is complete and every other year thereafter to monitor for settlement throughout the Lagoon Area.
- Visual inspections will ensure that the erosion control measures prevent migration of sludge or soils to Wildcat Creek.

Final Grading

Description of Final Grading

After preloading is complete, approximately 5 years, additional fill will be placed in the Lagoon Area to correct the grade after any settling has occurred. The final grade of the cover will have a 1/4 percent slope to the west and south to promote drainage and prevent ponding.

Construction Details Including Design and Construction Technical Factors

The final grade of the cover will have a 1/4 percent slope to the west and south to promote drainage and prevent ponding. The final grade will be constructed by placing clay soils in areas of settlement. The final elevations will be within ±0.1 foot of design grades.

Performance Standards

- The primary performance standard for the soil cover is to prevent direct contact with contaminated solids. The soil cover will also allow the required grade to be achieved to minimize ponding and to promote positive runoff without causing erosion problems.
- The final elevations will be within ±0.1 foot of design grades.
- Visual inspections will ensure that the erosion control measures prevent migration of sludge or soils to Wildcat Creek.
- Imported soil materials will be approved based on material gradation test data required as part of the subcontractor quality control submittals.
- Airborne particulate and VOC monitoring will be conducted as specified in the SAP, to monitor wind transport from soil stockpiles or construction areas.

Lagoon Area Restoration

Description of Restoration Activities

The finished grade of the Lagoon Area will be stabilized with vegetation. Areas where settlement did not occur and final grading was not necessary will not be reseeded if adequate vegetation is present. Permanent erosion control features will also be installed, as needed.

Construction Details Including Design and Construction Technical Factors

All barren areas will be hydroseeded. The grass mix has been selected to include both quick-growth grasses for early stabilization, and longer-growth grasses that are more suitable to site conditions. Requirements for the seed mix, mulch, and matting are included in the specifications.

Performance Standards

Performance standards to be evaluated during restoration of the Lagoon Areas include the following:

- Erosion control methods during construction (before restoration of the Lagoon Area) must be described in the subcontractor's SMP.
- Performance will be evaluated by visual inspection.

Postconstruction Activities

Postconstruction activities associated with Contract 1 include:

- Institutional control development
- Environmental monitoring and maintenance (i.e., implementation of the O&M Plan)
- Five-year site reviews

Institutional Controls

Institutional controls will consist of land use restrictions for the Lagoon Area and groundwater use restrictions for the entire site, and be implemented by IDEM. Deed restrictions in the form of an enforceable restrictive covenant will be used to specify the following:

- Lagoon Area property boundaries
- Area is contaminated with VOCs, PAHs, PCBs, and metals
- Excavation within the site boundaries must comply with Occupational Safety and Health Administration (OSHA) requirements for health and safety protection
- Any excavated soils are to be managed in accordance with applicable laws
- Activities which threaten the long-term integrity of the soil cover are not permitted
- The common soil cover must be maintained and inspected
- No groundwater withdrawal other than for remediation and monitoring is to be allowed until the groundwater meets the cleanup objectives
- Land use restrictions do not allow residential use

Environmental Monitoring / Maintenance

Environmental monitoring will be performed to determine the effectiveness of the remedy. The details of environmental monitoring will be established in the site O&M Manual. Environmental monitoring will include the evaluation of cover integrity. Site inspection requirements will be specified along with types of corrective measures necessary when problems such as soil erosion are encountered.

A groundwater monitoring program will be developed later under Contract 5-Groundwater to include monitoring the existing groundwater contamination and the effectiveness of the groundwater collection system. Included will be the wells to be monitored, the frequency of sampling, analytical parameters, and the type of data evaluation to be performed. Groundwater monitoring will be performed on a semiannual basis during settlement monitoring to determine if any groundwater impacts result from the preloading and subsequent sludge consolidation. Groundwater monitoring will be performed at six shallow wells (EW-01, EW-03, EW-06, EW-09, EW-10, and EW-12) around the perimeter of the Lagoon Area. Groundwater samples will be analyzed for VOCs and metals.

Five-Year Site Reviews

Data collected under the monitoring program will be reviewed in 5-year intervals to determine whether human health and the environment continue to be protected and whether additional remedial action is warranted. Alternate remedial technologies will be considered if it is determined that remedial objectives are not being achieved.

Compliance with ARARs

Appendix G of the CSSS ROD summarized the following federal and state ARARs:

- CERCLA, including the Superfund Amendments and Reauthorization Act of 1986 (SARA) and subsequent amendments
- RCRA, including the Hazardous and Solid Waste Act Amendments of 1984 (HSWA)
- TSCA
- Clean Water Act (CWA) and Amendments
- Safe Drinking Water Act (SDWA)
- Clean Air Act (CAA)
- Protection of Wetlands/Floodplains Management Executive Order
- Hazardous Materials Transportation Act (HMTA)
- Indiana Water Quality Standards (IAC Title 327)
- Indiana Solid Waste Management Board Rules (IAC Title 329)
- Indiana Air Pollution Control Regulations (IAC Title 326)

The requirements of the CWA, SDWA, and the Indiana Water Quality Standards are not directly pertinent to the design of the Lagoon Area hot spot remediation and soil cover and are not discussed here. They will be addressed in the subsequent design of the groundwater collection system. However, the revised hot spot remediation and cover design will be protective of groundwater and will thus meet the requirements of the CWA, SDWA, and the Indiana Water Quality Standards. Each of the remaining laws and regulations are summarized below, and the significant requirements pertinent to the design of the Lagoon Area remedy are discussed. Table 1 presents the specific requirements, the design components that address the requirement, and whether an ARAR waiver is necessary.

The Comprehensive Environmental Response, Compensation, and Liability Act

CERCLA, last amended in October 1992, provides the USEPA Administrator the authority to respond to any past disposal of hazardous substances and any new uncontrolled releases of hazardous substances. Within CERCLA, a trust fund has been established for cleanup of abandoned past disposal sites and leaking underground storage facilities, as well as the authority to bring civil actions against violators of this act. The National Contingency Plan (NCP), which guides cleanup actions at Superfund sites, was developed subject to this act.

SARA of 1986 extensively amends CERCLA. The major goals of SARA were to include more public participation, and to establish more consideration of state cleanup standards, with an

emphasis on achieving remedies that permanently and significantly reduce the mobility, toxicity, or volume of wastes.

CERCLA requires the selected remedy to meet the substantive requirements of environmental rules and regulations that are ARARs unless a specific waiver of the requirement is granted. Waiver of ARARs may be requested (per NCP 300.430(f)(1)(ii)(C)), based on any one of six circumstances.

The Resource Conservation and Recovery Act

RCRA regulates the generation, transportation, treatment, storage, and disposal of hazardous wastes, as well as solid waste disposal facilities. RCRA applies to remedial actions selected that include disposal, treatment, storage, or transportation of regulated wastes. Remedies that include onsite disposal of hazardous wastes will be required to meet RCRA design, monitoring, performance, and closure standards. Offsite transportation of regulated wastes, whether as part of a remedial action or as generated during the investigation, will require use of the manifest system, a RCRA-licensed transporter, and proof of acceptance at a licensed facility approved for the particular wastes.

The HSWA of 1984 imposed new and more stringent requirements on hazardous waste generators, transporters, and owners/operators of treatment, storage, and disposal facilities. Land disposal restrictions, as described in 40 CFR 268, identify hazardous wastes that are restricted from land disposal, and define those limited circumstances under which an otherwise prohibited waste may continue to be land disposed.

The applicability or relevancy and appropriateness of RCRA is discussed first by summarizing the classification of wastes present in the Lagoon Area. The specific closure requirements are then presented for surface impoundments. The land disposal restrictions pertinent to hazardous wastes to be disposed of offsite are also discussed.

Classification of Wastes

Impoundment Sludges and Soil. The CSSS lagoons had interim status under RCRA as RCRA surface impoundments for the treatment, storage, and disposal of hazardous waste. Closure under RCRA had not been requested or performed while the facility was still operating. Therefore, closure of the lagoons must meet the closure requirements under RCRA, or a request for a specific waiver is needed.

The sludges and soils within the impoundments to be excavated and disposed of offsite should also be classified as to their RCRA status to determine whether other RCRA requirements are ARARs.

The first part of the RCRA applicability determination is to analyze whether or not the contaminated sludge or soil is a RCRA hazardous waste. The mixture rule within RCRA states that mixtures of hazardous waste and solid waste are to be considered hazardous waste. However, the mixture rule cannot apply to contaminated media such as soil because the media have not been "discarded" and are, therefore, not solid waste. To clarify how the mixture rule applies to contaminated environmental media, USEPA developed a "contained-in" policy which specifies that environmental media that "contain" hazardous waste must be managed as hazardous waste. This policy applies to contaminated

environmental media that exhibit a characteristic of a hazardous waste, such as toxicity, and to environmental media contaminated with a listed hazardous waste, such as F-listed solvents. To determine whether a contaminated environmental medium at a CERCLA site is a listed hazardous waste, the origin of the waste that contaminated the medium must be known. If the origin of the waste is not known or there is no documentation on the waste, the medium can be assumed not to contain a listed hazardous waste. To determine if a contaminated environmental medium at a CERCLA site is a characteristic waste, the medium can be tested, or professional judgment can be used to determine whether testing is necessary. Under RCRA, a waste generator is not required to test its waste, but can use knowledge of the waste constituents to make a characteristic determination.

The sludges in the lagoons were characteristic hazardous wastes according to IDEM. If sludges are removed for offsite disposal as part of the hot spot excavation they should be tested for the RCRA hazardous waste characteristics.

No specific information is available relative to disposal of listed hazardous wastes in the lagoons. As a result, the hot spot soils do not have to be managed as listed hazardous wastes. However the hot spot soils may be toxicity characteristic hazardous waste because of elevated VOC concentrations. Any hot spot soils excavated for offsite disposal should be tested for toxicity characteristics (toxicity characteristic leaching procedure [TCLP]) as well as corrosivity.

RCRA Surface Impoundments Closure Requirements

The Solid Waste Disposal Act, as amended (42 USC (United States Code) 6901, et seq.), Interim Status Standards for Owners and Operators of Hazardous Waste Treatment Storage, and Disposal Facilities Subpart K, Surface Impoundments (40 CFR 265.228), presents the closure requirements for RCRA Surface Impoundments. In addition, the requirements of Subpart G (general requirements) must be met.

These requirements are ARARs since the surface impoundments will be closed under 40 CFR Subpart K, Surface Impoundments (or IAC 329 3.1-10-1). The planned closure of the surface impoundments meets the majority of Subpart K closure requirements. However the following requirements will not be met:

- Have a permeability of less than or equal to the permeability of any bottom liner system or natural subsoil present
- Maintain and monitor the leak detection system in accordance with 40 CFR 265.221 and 40 CFR 265.226 and comply with all other applicable leak detection system requirements of this part

These requirements are not appropriate because, once the VOC hot spots are removed, the remaining soils and sludges do not pose a threat of leaching contaminants to groundwater at concentrations of concern. An NCP waiver of these requirements is necessary and may be requested (per the NCP 300.430(f)(1)(ii)(C)) based on any one of six circumstances. The fourth of these circumstances is as follows:

> "The alternative will attain a standard of performance that is equivalent to that is required under the otherwise applicable standard, requirement or limitation through use of another method or approach"

The removal of the VOC hot spots eliminates the only wastes within the Lagoon Area posing a threat from leaching to groundwater. As a result a cover of lower permeability than the underlying layer is not needed. The proposed cover will attain a standard of performance relative to preventing leaching equivalent to a cover of lower permeability than the underlying layer. For the same reason a leak detection system is not needed. A groundwater monitoring system is included and will function in an equivalent manner as a leak detection system.

RCRA General Closure Requirements—Subpart G, Closure and Postclosure

Subpart G requires that the Interim Status unit be closed in a manner such that it does two things:

- Minimizes the need for further maintenance
- Controls, minimizes, or eliminates, to the extent necessary to protect human health and the environment, postclosure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to ground or surface water or to the atmosphere

The proposed design of the cover meets the above requirements.

RCRA Requirements for Landfills Located in 100-Year Floodplains

A facility located in a 100-year floodplain must be designed, constructed, operated, and maintained to prevent washout or any hazardous waste by a 100-year flood (40 CFR 264.18(b). In addition, facilities located in the 100-year floodplain must provide the following information as part of the permit application 40 CFR 270.14(b)(11)(iv):

- Engineering analysis to indicate the various hydrodynamic and hydrostatic forces expected to result at the site as a consequence of a 100-year flood

- Structural or other engineering studies showing the design of operational units (e.g., tanks, incinerators) and flood protection devices (e.g., floodwalls, dikes) at the facility, and how these will prevent washout

The Lagoon Area cover will be designed to meet these requirements, and no ARAR waivers are necessary. In addition the creek bank will be provided with erosion protection as necessary to prevent washout.

Land Disposal Restrictions

Land Disposal Restrictions (LDRs) treatment standards were originally developed to apply to RCRA "as generated" hazardous waste and not environmental media such as soils and sediments contaminated with listed hazardous waste. However, USEPA recognized that remediation wastes presented different issues. As a result, USEPA published alternative LDR treatment standards for contaminated soil in 40 CFR 268.49. The LDR requirement is that treatment must achieve the larger of 90 percent reduction in total constituent

concentrations or 10 times the UTS for that constituent. The UTSs are identified in 40 CFR 268.48 (Table UTS). For example, the UTS for TCE is 6 milligrams per kilogram (mg/kg). Treatment of soil containing 500 mg/kg TCE would be required only to achieve 60 mg/kg (i.e., 10 times the UTS of 6 mg/kg), rather than 50 mg/kg (10% X 500 mg/kg). The LDRs apply to hot spot soils excavated for offsite disposal.

Clean Air Act

The CAA, with amendments through December 1991, was enacted to protect and enhance the quality of air resources to protect public health and welfare. The CAA is intended to initiate and accelerate national research and development programs to achieve the prevention and control of air pollution. Under the CAA, the federal agencies are to provide technical and financial assistance to state and local governments for the development and execution of their air pollution programs. USEPA is the administrator of the Act and is given the responsibility to meet the objectives of the Act. The Act establishes emission levels for certain hazardous air pollutants that result from treatment processes.

Requirements of the CAA are potentially applicable to remedial actions that result in air emissions, such as construction activities. Mitigative measures to reduce air emissions during construction will be adhered to as part of the construction plan.

Protection of Wetlands / Floodplain Management Executive Order

Executive Order 11990 requires federal agencies, in carrying out their responsibilities, to take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. The order emphasizes the importance of avoiding new construction located in wetlands unless there is no practicable alternative to that construction. The order also emphasizes minimizing the harm to the wetlands if the only practicable alternative requires construction in the wetland. The order requires that federal agencies provide early and adequate opportunities for public review of plans and proposals involving new construction in wetlands.

Executive Order 11988 requires federal agencies carrying out their responsibilities to take action to reduce the risk of flood loss; to minimize the impact of floods on human safety, health, and welfare; and to restore and preserve the natural and beneficial values served by floodplains. This order emphasizes:

- The importance of evaluating alternatives to avoid adverse effects and incompatible development in floodplains
- Minimizing the potential harm to floodplains if the only practicable alternative requires siting an action in a floodplain
- Providing early and adequate opportunities for public review of plans and proposals involving action in floodplains such as the Lagoon Area

The construction of the Lagoon Area cover will result in the addition of floodplain. As part of the construction of the cover, the existing berms will be graded to allow a larger area for flooding.

Appendix A of 40 CFR Part 6 describes the requirements for floodplain/wetlands review of proposed USEPA actions. These regulations are potentially applicable for work to be done in the creeks or other wetland areas, and for remedial activities within the floodplain, such as the Lagoon Area. These regulations will be reviewed and adhered to during work in the creeks and wetlands.

Hazardous Materials Transportation Act

The HMTA of 1981, as amended, was enacted to regulate the shipping, marking, labeling, and placarding of hazardous materials that are transported on public roadways. Pursuant to the HMTA, the Department of Transportation (DOT) has promulgated regulations pertaining to the transportation of hazardous materials. DOT also has jurisdiction over the packaging of hazardous materials before shipment.

Hazardous soils, residues, wastewaters, or wastes that are transported on public roadways from the CSSS will be handled according to HMTA and DOT regulations.

Indiana Air Pollution Control Regulations (IAC Title 326)

Indiana air pollution control regulations were developed pursuant to the Federal CAA. The regulations contain specific emission levels and requirements for monitoring emissions. They contain requirements for specific types of operations (such as burning) and for types of industry. There are also specific emissions standards for hazardous air pollutants.

Requirements of IAC Title 326 are potentially applicable to remedial actions that result in air emissions, such as excavation and treatment activities. Mitigative measures to reduce air emissions during construction will be adhered to as part of the construction plan.

Indiana Water Pollution Control Regulations (IAC Title 327)

Indiana water pollution control regulations were developed pursuant to the Federal CWA and specify requirements for surface water and groundwater quality. The regulations include rules for pretreatment requirements for discharges to POTWs and discharges to surface water (NPDES program).

Requirements of IAC Title 327 are potentially applicable to remedial actions that require discharge of water to either a POTW or surface water body. Compliance with IAC Title 327 will be verified prior to construction and if necessary, the substantive requirements of a NPDES permit or pretreatment discharge permit will be determined for the construction and operation of a wastewater pretreatment facility.

Indiana Solid Waste Management Board Rules (IAC Title 329)

These regulations specify requirements that apply to solid waste and hazardous waste facilities. These include Solid Waste Management Requirements, Hazardous Waste Management Permit Program and Related Hazardous Waste Management Requirements, and PCB Waste Management Requirements. The solid waste regulations include design and disposal regulations, as well as monitoring requirements and standards for groundwater protection applicable to solid waste land disposal facilities. The hazardous waste regulations were developed pursuant to the requirements of RCRA and pertain to

generators and transporters of hazardous waste and owners or operators of hazardous waste facilities.

In general, these requirements mirror the federal requirements discussed above. The main requirements are identical to the federal requirements as follows:

- RCRA Subpart S CAMUs—329 IAC 3.1-9-1
- RCRA General Closure Requirements Subpart G—329 IAC 3.1-9-1
- RCRA Interim Status Standards Subpart K Surface Impoundments—329 IAC 3.1-10-1
- RCRA Subpart N Landfills—329 IAC 3.1-9-1
- RCRA Land Disposal Restrictions—329 IAC 3.1-12-1

OSHA Requirements

A health and safety plan for construction activities that is in accordance with the OSHA requirements listed in 20 CFR 1910 and 20 CFR 1926 will be required.

Minimizing Environmental and Public Impacts

Environmental and public health and welfare impacts will be minimized through:

- Site access control
- Soil erosion control
- Air pollution control

Site Access Control

Access control to the site during remediation is necessary to prevent exposure of trespassers to contaminated soil during construction of the cover. Access will be controlled by the fencing currently in place and by a locked gate. Some improvements to the current fencing and routine fence maintenance will be necessary for effective control of site access.

During working hours, the gate will be unlocked but kept in the closed position. A sign will be posted at the entrance to notify visitors that they are required to sign in at the office trailer. The gate area will be monitored by personnel in the office trailer area adjacent to the gate. After work hours, the gate will be locked.

Soil Erosion Control

Silt fencing or hay bales will be used along the edge of the Lagoon Area adjacent to Wildcat Creek and along portions of the Lagoon Area during and following preloading and final grading until the area has been revegetated.

Groundwater Pollution Control

All groundwater associated with the CSSS site will be addressed later under a separate RD/RA contract.

Air Pollution Control

Earthwork during remediation will generate dust. Impacts on workers will be minimized through implementation of a worker health and safety plan specifying a photoionization

detector and a dust monitor. These instruments will also be used to monitor the air along the site boundaries to determine whether excessive emissions are occurring to offsite areas. Action levels for dust will be specified and, if exceeded, the area will be sprayed with clean water to reduce dust emissions. If VOC action levels are exceeded, appropriate action, as described in the health and safety plan, will be implemented.

Compliance with Permitting Requirements

CERCLA response actions do not need to comply with administrative requirements, such as permitting, of applicable or relevant and appropriate environmental laws and regulations. The substantive requirements, however, must be met.

The substantive requirements for impacts to wetlands required under Section 404 of the CWA will be followed. The requirements of the CWA for minimizing impacts and restoration will be followed.

An IDEM Storm Water Discharges Associated with Construction Activities Permit will be required for construction at the site.

Water discharged to Wildcat Creek through the existing outfall from Lagoon 5 will meet the substantive requirements of a NPDES permit.

Cost Estimate

The estimated cost for this remedial action based on the final design was calculated to be approximately $13.1 million, within an accuracy of plus 15 to minus 5 percent. The estimated cost in the M-CACES Gold format is attached (Appendix C).

The cost estimates shown, along with any resulting conclusions on project financial or economic feasibility or funding requirements, have been prepared for guidance in project evaluation and implementation from the information available at the time the cost estimate was prepared. The final costs of the project and resulting feasibility will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, and other variable factors. As a result, the final project costs will vary from the cost estimates presented herein. Because of these factors, project feasibility and funding needs must be carefully reviewed before making specific financial decisions or establishing project budgets to help ensure project evaluation and adequate funding.

Biddability, Constructibility, and Operability Review

Staff from CH2M HILL's affiliate, CH2M HILL Constructors, Inc. (CCI), reviewed the Draft BOD and draft plans and specifications with an emphasis on biddability and constructibility. In addition, this BOD report and all plans and specifications were reviewed by the project review team, and comments were incorporated as appropriate.

Construction Schedule

A draft construction schedule follows this page.