Five-Year Review Report

Second Five-Year Review Report
for
Bayou Bonfouca Superfund Site
Slidell, St. Tammany Parish, Louisiana

June 2001

PREPARED BY:

CH2M HILL
Contract Number 68-W6-0036
Work Assignment Number 048-FRFE-06ZZ

PREPARED FOR:

Region 6
United States Environmental Protection Agency
Dallas, Texas

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FIVE-YEAR REVIEW

Bayou Bonfouca Superfund Site
EPA ID# LAD980745632
Slidell, St. Tammany Parish, Louisiana

This memorandum documents EPA's performance, determinations, and approval of the Bayou Bonfouca Superfund Site Second Five-Year Review, including the attached Five-Year Review Report prepared by CH2M Hill, Inc., on behalf of EPA.

Summary of Five Year Review Findings

The remedy completed at the Bayou Bonfouca site appears to continue to be protective of human health and the environment. The site is well-maintained, and remedial actions performed at the site have had a positive effect on the community and the environment. No deficiencies were noted that currently impact the protectiveness of the remedy. It was noted, however, that the groundwater quality monitoring program does not currently include water quality or hydraulic monitoring specifically designed to ensure that full capture is achieved and that migration of contaminants within and from the shallow artesian aquifer to either Bayou Bonfouca or previously unaffected groundwater continues to be controlled. In addition, the groundwater point of compliance requirement set forth in the ROD (cleanup to background or an Alternate Concentration Limit beyond the compliance boundary) has not been formally addressed. Also, although the landfill cap appears well-maintained and in good condition, the Draft O&M Plan does not include procedures for conducting and documenting regular landfill cap inspections.

Actions Needed

The groundwater monitoring program should be updated to provide monitoring necessary to ensure migration within and/or from the shallow artesian aquifer to either Bayou Bonfouca or previously unaffected groundwater continues to be controlled. In addition, the groundwater point of compliance requirement set forth in the ROD (cleanup to background or an Alternate Concentration Limit beyond the compliance boundary) should be formally addressed. Regular landfill cap inspections and documentation of such inspections should be built into the O&M Plan for the site.

Determinations

I have determined that the remedy for the Bayou Bonfouca Superfund site is protective of human health and the environment, and will remain so provided the action items identified in the Five Year Review Report are addressed as described above.

Pamela Phillips, Acting

7/10/2001

Myron O. Knudson, P.E.
Director, Superfund Division
U.S. Environmental Protection Agency, Region 6

Date

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CONCURRENCES

FIVE-YEAR REVIEW

Bayou Bonfouca Superfund Site
EPA ID# LAD980745632

By: _____ Date: 6/8/01
Katrina Coltrain, U.S. EPA
Remedial Project Manager

By: _____ Date: 6/11/01
James L. Turner, U.S. EPA
Senior Attorney, Office of Regional Counsel

By: _____ Date: 6/11/01
Mary Kemp, U.S. EPA
Acting Chief, Louisiana Programs Section

By: _____ Date: 6/13/01
Wren Stenger, U.S. EPA
Chief, Louisiana/New Mexico Branch

By: _____ Date: 06/29/01
Mark Peycke, U.S. EPA
Chief, Office of Regional Counsel Superfund Branch

By: _____ Date: 7/9/01
Pam Phillips, U.S. EPA
Deputy Director, Superfund Division

By: _____ Date: 7-2-2001
June Buzzell, U.S. EPA
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Executive Summary

The second five-year review of the Bayou Bonfouca site located in Slidell, St. Tammany Parish, Louisiana was completed in April 2001. The results of this five-year review indicate that the remedy is protective of human health and the environment. Overall, the remedial actions performed appear to be functioning as designed, and the site has been maintained appropriately. As a result of the first five-year review, significant improvements have been made to the groundwater extraction system, including the installation of additional groundwater extraction wells to improve capture. Three deficiencies were noted that do not directly impact the protectiveness of the remedy at this time.

Remedial actions at the Bayou Bonfouca Superfund Site were handled under two operable units (OUs). The first OU, the source control remedy, involved the excavation of soils and bayou sediments contaminated with polynuclear aromatic hydrocarbons (PAHs), incineration of these materials in an onsite incinerator, and disposal of the ash in an onsite landfill. Activities associated with the source control portion of the remedial action were completed in 1995. The second OU involves the continued extraction and treatment of groundwater contaminated with dissolved phase PAHs and dense non-aqueous phase liquids (DNAPLs) associated with creosote contamination in the shallow artesian aquifer. The contaminated groundwater and DNAPL are extracted through three separate extraction arrays and conveyed through piping to an onsite wastewater treatment facility, where the water and DNAPL are separated. The DNAPL is shipped offsite for disposal, and the groundwater is treated then discharged to the bayou. The construction portions of the remedy selected for the site have been fully implemented, and currently the site is in Long Term Remedial Action (LTRA). LTRA at the site consists of the continued operation and maintenance of the groundwater/DNAPL extraction system, and maintenance of the onsite landfill cap.

The remedial actions for the site originally set forth in the Record of Decision (ROD) and associated decision documents have been implemented as planned, including updates to the groundwater extraction system recommended by the first five-year review, and the remedy appears to continue to be protective of human health and the environment. Implementation of increased monitoring to demonstrate that migration of DNAPL and contaminated groundwater is being controlled through operation of the extraction system, and addition of regular documented landfill cap inspections to the O&M Plan will ensure the remedy continues to be protective.

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Attachments

List of Acronyms

ARARs	Applicable or Relevant and Appropriate Requirements
BOD	Biological Oxygen Demand
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COD	Chemical Oxygen Demand
CWA	Clean Water Act
DNAPL	Dense Non-Aqueous Phase Liquids
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
LDAF	Louisiana Department of Agriculture and Forestry
LDEQ	Louisiana Department of Environmental Quality
LDHH	Louisiana Department of Health and Hospitals
LDRs	Land Disposal Restrictions
LDWF	Louisiana Department of Wildlife and Fisheries
LTRA	Long Term Remedial Action
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NESHAPs	National Emissions Standards for Hazardous Air Pollutants
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance
OSHA	United States Occupational Health and Safety Administration
OUs	Operable Units
PAHs	Polynuclear Aromatic Hydrocarbons
PER	Performance Evaluation Report
PNAs	Polynuclear Aromatic Hydrocarbons
PPE	Personal Protective Equipment
ppm	parts per million
PRP	Potentially Responsible Party
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SIP	State Implementation Plan
SWAMP	Slidell Working Against Major Pollution (community group)
TBCs	To Be Considered
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
TSDs	Transportation, Storage, and Disposal facilities
TSS	Total Suspended Solids
USACE	United States Army Corps of Engineers

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Five-Year Review Summary Form

SITE IDENTIFICATION

Site name (from WasteLAN): Bayou Bonfouca

EPA ID (from WasteLAN): LAD980745632

Region: EPA Region 6	**State:** LA	**City/County:** Slidell/St. Tammany Parish

SITE STATUS

NPL Status: : Final 9 Deleted 9 Other (specify):

Remediation status (choose all that apply): 9 Under Construction : Operating 9 Complete

Multiple OUs? : Yes 9 No	**Construction completion date:** March 2000

Has site been put into reuse? : Yes 9 No (Portions of the site)

REVIEW STATUS

Reviewing agency: : EPA 9 State 9 Tribe 9 Other Federal Agency:

Author: EPA Region 6, with support from RAC6 contractor CH2M HILL

Review period: September 1996 through March 2001

Date(s) of site inspection: February 20, 2001

Type of review:
: Statutory
9 Policy
9 Post-SARA 9 Pre-SARA 9 NPL-Removal only
9 Non-NPL Remedial Action Site 9 NPL State/Tribe-lead
9 Regional Discretion

Review number: 9 1 (first) : 2 (second) 9 3 (third) 9 Other (specify):

Triggering action:
9 Actual RA Onsite Construction
9 Actual RA Start
9 Construction Completion
: Recommendation of Previous Five-Year Review Report
9 Other (specify):

Triggering action date (from WasteLAN): September 1996

Due date (five years after triggering action date): September 2001

Five-Year Review Summary Form

Deficiencies:
No deficiencies were noted that currently impact the protectiveness of the remedy. It was noted, however, that the groundwater quality monitoring program does not currently include water quality or hydraulic monitoring specifically designed to ensure that full capture is achieved and that migration of contaminants within and from the shallow artesian aquifer to either Bayou Bonfouca or previously unaffected groundwater continues to be controlled. In addition, the groundwater point of compliance requirement set forth in the 1987 ROD (cleanup beyond the compliance boundary to background concentrations or an Alternate Concentration Limit) has not been formally addressed. Also, although the landfill cap appears well-maintained and in good condition, the Draft O&M Plan does not include procedures for conducting and documenting regular landfill cap inspections.

These deficiencies do not currently affect the protectiveness of the remedy, but they should be formally addressed to provide documentation that the remedy continues to be protective.

Recommendations and Follow-up Actions:
The groundwater monitoring program should be updated to provide monitoring necessary to ensure migration within and/or from the shallow artesian aquifer to either Bayou Bonfouca or previously unaffected groundwater continues to be controlled. In addition, the groundwater point of compliance requirement set forth in the ROD (cleanup beyond the compliance boundary to background concentrations or an Alternate Concentration Limit) should be formally addressed. Regular landfill cap inspections and documentation of such inspections should be built into the O&M Plan for the site.

Protectiveness Statement(s):
The remedy for the source control operable unit has been completed, and is protective of human health and the environment because the waste has been treated, and waste that remains at the site has been contained under a landfill cap. The remedy for the groundwater operable unit has been implemented, and it is also believed to be protective based on the system that provides for ongoing pumping and treating of the groundwater and DNAPL. The recommended follow-up actions are necessary to verify and monitor the continued protectiveness of the remedy, and if implemented, will ensure that the remedy remains protective of human health and the environment in the future.

Other Comments:
The site appears to be well-maintained, and the operators are effectively implementing and maintaining the system as designed and installed. The various parties involved with the site are satisfied overall with the remedy, although additional/more effective public communication regarding continued operations is desired.

Second Five-Year Review Report
Bayou Bonfouca

The United States Environmental Protection Agency Region 6 has conducted a five-year review of the remedial actions implemented at the Bayou Bonfouca site located in Slidell, St. Tammany Parish, Louisiana for the period since the first five-year review was completed, in September 1996. The purpose of a five-year review is to determine whether the remedy at a site remains protective of human health and the environment. This report documents the results of the review for this site, conducted in accordance with EPA guidance on five-year reviews. EPA RAC6 contractor CH2M HILL provided support for preparation of this Five-Year Review Report.

Existing EPA guidance on five-year reviews includes the following:

- Office of Solid Waste and Emergency Response (OSWER) Directive 9355.7-02 (May 23, 1991), *Structure and Components of Five-Year Reviews* (introduced five-year review requirements).
- OSWER Directive 9355.7-02FS1 (August 1991), Fact sheet: *Structure and Components of Five-Year Reviews*.
- OSWER Directive 9355.7-02A (July 26, 1994), *Supplemental Five-Year Review Guidance* (introduced level of review considerations for sites where response is ongoing).
- OSWER Directive 9355.7-03A (December 21, 1995), *Second Supplemental Five-Year Review Guidance* (identified three purposes of five-year review and emphasized that reviews must include a signed protectiveness determination, along with recommendations to correct deficiencies).

Guidance provided in these documents has been incorporated into the five-year review performed for this site, as have the concepts outlined in the *Draft Comprehensive Five-Year Review Guidance*, October 1999, OSWER Directive 9355.7-03B-P.

1.0 Introduction

This five-year review for the Bayou Bonfouca site is required by statute.

Statutory reviews are required for sites where, after remedial actions are complete, hazardous substances, pollutants, or contaminants will remain onsite at levels that will not allow for

unrestricted use or unrestricted exposure. This requirement is set forth by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Statutory reviews are required only if the ROD was signed on or after the effective date of the Superfund Amendments and Reauthorization Act of 1986 (SARA). CERCLA §121(c), as amended by SARA, states:

> If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

Under the NCP, the Code of Federal Regulations (CFR) states, in 40 CFR §300.430(f)(4)(ii):

> If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

This is the second five-year review for the Bayou Bonfouca site. The triggering action for this statutory review is the completion of the previous five year review, dated September 1996. This review is required because contaminants are or will be left onsite above levels that allow for unlimited use and unrestricted exposure.

2.0 Site Chronology

A chronology of significant site events and dates is included in **Table 1**, provided at the end of the report text. Sources of this information are listed in **Attachment 1** (Documents Reviewed).

3.0 Background

The Bayou Bonfouca Superfund Site is located near the north shore of Lake Ponchartrain in Slidell, St. Tammany Parish, Louisiana (**EPA, 1997**). The site includes the former American Creosote Works Plant and a portion of the bayou that adjoins the site (Bayou Bonfouca). The site is located south of West Hall Avenue and north of and adjacent to the bayou. The site is bordered on the west by a creek, on the east by a drainage ditch, and on the south by Bayou Bonfouca (**EPA, 2000**). Bayou Bonfouca flows south from the site about seven miles to Lake Pontchartrain, and is a navigable waterway (**EPA, 1996**). The site encompasses more than 54 acres of land and the associated bayou sediments (**EPA, 2000**). A site map is provided as **Figure 1**.

At the time the Record of Decision (ROD) was signed, the surrounding land use to the north was described as heavily wooded, to the east was described as commercial, and to the southwest was described as residential subdivision (**EPA, 1987**). This land use was confirmed at the time of the five-year review site inspection conducted in February 2001. Also observed during the site inspection were several houses and businesses along the road north of the site. Between the site and most of the commercial property to the east is a wooded area. The northeastern portion of the site has been redeveloped as a city maintenance facility, with some vacant land still present. At the time the ROD was signed, about 750 residents were reported to live within one mile of the site (**EPA, 1987**). The nearest drinking water well is reported to be located approximately 0.5 miles northeast of the site (**EPA, 2000**).

Through the various investigations conducted, three aquifers have been identified at the site: a surficial aquifer, a shallow artesian aquifer, and a deep artesian aquifer. The primary aquifer used by the town of Slidell is the Pontchatoula aquifer, which occurs about 1,500 feet below ground surface (**EPA, 1987**). Most of the site is situated within the one hundred year flood plain, and the ground elevation is about 9 feet above mean sea level (**EPA, 2000**).

Since the late 1800s, the site was used for commercial wood-treating operations involving creosote. In 1882, a creosote plant began operating at the site and over the years, it operated under several owners including the New Orleans and North Eastern Railroad, Southern Creosoting Company, Gulf States Creosoting, American Creosote Company, and American Creosote Works, with final ownership residing with the Braselman Corporation. During the plant's operation, numerous releases of creosote occurred (**EPA, 2000**). In the early 1970s, a fire occurred at the plant; during the fire several large storage tanks were ruptured, causing creosote to flow onto the site and into the bayou (**EPA, 1996**).

Between 1970 and 1972, the plant was disassembled, leaving behind a few building shells and foundation slabs. In 1976 and 1978, the Coast Guard, EPA, and the National Oceanic and Atmospheric Administration undertook studies of the waterway. The site was included on the National Priorities List (NPL) in December of 1982 (**EPA, 1996**).

The first Remedial Investigation/Feasibility Study (RI/FS) began in 1983, and in 1984 the EPA decided to take an operable unit (OU) approach to the site. The Focused FS was completed in May of 1985; this study addressed the surface contamination at the site. To complete the determination of the extent of soil contamination associated with the site, a Supplemental Phase II RI was completed in March of 1986. The Phase II FS was completed in June 1986 (**EPA, 1996**).

The principal pollutants found at the site were creosote compounds, composed mostly of polynuclear aromatic hydrocarbons (PAHs). These constituents were identified in surface soils, onsite groundwater, offsite groundwater, and in the bayou sediments. Dense non-aqueous phase Liquids (DNAPL) were also identified in the groundwater across the southern portion of the site, underneath the east drainage ditch, and across the bayou under portions of the residential subdivision (**EPA, 1996**). A stretch of the bayou about one and one-half miles long was found to

be biologically sterile due to creosote contamination in the sediments and the water column. The contamination was so severe that it had caused second degree burns to divers, injured or killed aquatic animals and waterfowl, and posed a significant recreational hazard (**EPA, 2000**). The areas of highest contamination were found within the creosote deposits and in surface soils near the creosote waste deposits (**EPA, 1997**). In July-August 1985, the site owner fenced the site under an EPA Administrative Order (**EPA, 2000**).

A Source Control ROD signed on August 15, 1985, called for the excavation and offsite land filling of creosote waste piles. The final ROD, which incorporated the Source Control ROD, was signed on March 31, 1987. Nine remedial alternatives were considered before the final remedy was chosen (**EPA, 1996**). The selected remedy included excavating contaminated sediments from the bayou in excess of 1,300 parts per million (ppm) or to a depth which would minimize threats to aquatic life, onsite incineration of waste piles and contaminated sediments, extraction and treatment of contaminated groundwater, reinjection of the treated groundwater, and capping onsite any incinerator residue and surface soils with total PAH concentrations in excess of 100 ppm (**EPA, 1990**).

Remedial design investigations performed in 1988 indicated that the volume of contaminated bayou sediments had been under-estimated. Previous investigations had indicated the presence of a clay layer, which was thought to be present at a maximum depth of five feet below the top of the bayou sediments. This clay layer was believed to act as a barrier against the vertical migration of contaminants. The previously drilled borings had been limited in their depth due to the possibility of drilling through the upper clay layer and introducing additional contamination into the shallow aquifer. Several of the borings drilled near the creosote plant in 1988 showed that this upper clay layer was not present. Also, borings drilled in the initial design investigation revealed that the contamination extended farther horizontally in the downgradient direction than had been believed (**EPA, 1990)**.

An Explanation of Significant Differences (ESD) was signed on February 15, 1990. The ESD concluded that an additional 103,500 cubic yards of sediment would need to be excavated from the bayou and incinerated. This changed the total volume of contaminated sediments from approximately 46,500 cubic yards, as stated in the ROD, to approximately 150,000 cubic yards. EPA also reevaluated the action levels of 100 ppm total PAHs for surface soils and 1,300 ppm PNAs for sediments and found them to still be acceptable. Initially, it was thought that the DNAPL contamination in groundwater existed as one continuous plume. The initial remedial action to address this plume consisted of groundwater and DNAPL extraction and treatment. Remedial design investigations concluded that the groundwater contamination was present as 3 separate plumes (two onsite and one offsite) instead of one continuous plume, and that it was not feasible to reinject treated groundwater because of the geological properties of the aquifer. The ESD determined that the two onsite plumes would be treated as one operable unit. Since direct contact between the shallow artesian aquifer and contaminated bayou sediments was identified, it was decided that the dredging of the sediments would need to be completed before the groundwater plume in the residential neighborhood across the bayou would be addressed (**EPA, 1990**).

Excavation and incineration began in November 1993 and was completed eighteen months ahead of schedule on July 28, 1995. The incinerator was also used for the incineration of wastes from the nearby Southern Shipbuilding superfund site in accordance with the ROD Amendment of July 20, 1995 (**EPA, 1997**). The incinerator was removed in December of 1996 after operations at Southern Shipbuilding were completed. A Preliminary Closeout Report for the Source Control Remedial Action involving sediment excavation and incineration was issued on September 30, 1997 (**EPA, 2000**). Over 170,000 cubic yards of sediments were incinerated, and the ash was stored in an onsite Resource Conservation and Recovery Act (RCRA) compliant landfill (**EPA, 1997**).

A statutory 5-year review of the groundwater cleanup was completed in September 1996. The 5-year review recommended continued groundwater recovery and treatment, and further evaluation of the system's performance. EPA completed a Performance Evaluation Report (PER) for the system in September of 1997. It identified the limiting conditions on the current remedy's effectiveness to be that the original pumping equipment was near the end of its life and repair parts were no longer readily available, there were not enough extraction and monitoring wells to adequately address the creosote contamination, and there was insufficient recharge into the aquifer taking place to offset the drawdown induced by pumping. It also recommended that the Operations and Maintenance (O&M) program be revised based on the knowledge and experience gained through the previous 6 years of daily operations at the site. (**CH2M Hill, 1997**).

Upon the completion of the source control actions by the EPA, the site was deeded to the City of Slidell by the Braselman Corporation for future use as a city maintenance yard, sewage control facility during flood events, or possibly a park (the use of the site as a city maintenance yard has been implemented, and a boat ramp has been installed by the city just south of the site). Keys to the property were transferred to the City in January of 1997 (**EPA, 2000**). The remedial actions undertaken at the site are described in more detail in Section 4.0. Operation of the groundwater/DNAPL extraction and treatment system is ongoing.

4.0 Remedial Actions

Remedial actions performed at the Bayou Bonfouca site since completion of the last five-year review completed in September 1996 are addressed in this five-year review. Because the source control remedy was not completed prior to the 1996 five-year review, that five-year review focused on the groundwater remedy. This section provides a description of the original groundwater remedy objectives, selection, and implementation. It also describes the process through which updates to the groundwater remedy were designed and implemented, the ongoing O&M, and the progress made at the site since the previous five-year review.

4.1 Original Remedy Selection

The remedial action objectives related to groundwater were to reduce or eliminate the potential for exposure to carcinogens through ingestion of groundwater and to control the migration of dissolved phase PAHs and DNAPL in the aquifers. The selected remedy included groundwater and DNAPL extraction from the aquifer to the maximum extent technically practicable. The extracted groundwater and DNAPL were to be treated in an onsite wastewater treatment facility. DNAPL separated from the groundwater was to be sent offsite for recycling/reuse or disposal, and the treated groundwater was to be reinjected into the aquifer to enhance DNAPL recovery. A monitoring system was to be established to minimize subsidence of the land surface (**EPA, 1987**).

4.2 Remedy Implementation

The 1987 ROD specified the groundwater remedy as extraction and treatment of contaminated groundwater and DNAPL with reinjection of the treated groundwater. Due to the findings of two remedial design investigations in 1988, it was determined that the groundwater plume located offsite would not be addressed until the contaminated bayou sediments had been dredged. The ESD signed in 1990 concluded that the groundwater contamination was present as three separate plumes instead of one continuous plume (**EPA, 1990**). On July 10, 1991, EPA began operation of the long term remedial action for groundwater. The State of Louisiana will assume responsibility for O&M at the site in July 2001.

The first five year review of the site recommended that the groundwater continue to be recovered and treated, with further evaluation of the system's performance. The Performance Evaluation Report (PER) completed in 1997 concluded that modifications to the system were necessary. It recommended that the current system be expanded and improved to capture creosote from underneath the onsite landfill and the offsite plume, a pilot study be performed to determine whether or not treated water could be used as a recharge source for the aquifer to enhance

recovery and that Array 2 be converted to a more efficient controller-less system (**CH2M Hill, 1997**).

The two original arrays that were installed were Array 1, constructed in the former plant operations area, and Array 2, constructed parallel to the former eastern drainage channel (**CH2M HILL, 1997**). Source area remediation at Array 1 was discontinued on May 1, 1993 when its pumping was stopped to make way for construction of the onsite landfill, but Array 2 remained in place and operational (**CH2M HILL, 1998a**). In the PER, it was concluded that two additional arrays needed to be constructed to more efficiently capture DNAPL from the offsite plume (Array 3), and potentially capture DNAPL underneath the landfill to prevent migration (Array 1a). Array 1a included 12 new extraction wells located around the southwestern perimeter of the landfill, and Array 3 included 10 new extraction wells and five additional monitoring wells located offsite on private property in the residential neighborhood on the west side of the bayou (**IT, 2000d**). Remedial activity began on January 17, 2000, which included the installation of additional recovery wells along the bayou (**EPA, 2000**).

In June of 1999, the Army Corps of Engineers (USACE) awarded IT/OHM a task order contract for the Phase 2 Modifications at Bayou Bonfouca, based on recommendations from the Performance Evaluation Report for Shallow Artesian Aquifer Remediation, Phase I Design Investigation Report, and Preliminary Design Submittal. The contract awarded them the design, construction, LTRA, and shakedown phases of the project. The modifications specified in the task order have been completed and are described in more detail below (**IT, 2000d**).

Three different types of pumps which could have possibly been used in the Array 2 upgrades were pilot tested in the Phase I Design Investigation (**CH2M HILL, 1998a**). In September of 1999, the extraction well pumps in Array 2 were replaced. At this time, new air regulators, check valves, and exhaust need valves were also installed. The installation of Array 1a along the

landfill and Array 3 and five new monitoring wells offsite was completed in March of 2000. The installation of a subsurface pipeline and leak detection system to service the wells has been completed, as well as the installation of an underground pipeline extending across Bayou Bonfouca, complete with a leak detection sensor, for fluid and air conveyance. Five existing monitoring wells were designated to be abandoned. This was done by grouting the boreholes according to the Louisiana Department of Environmental Quality's (LDEQ) guidelines. An automated monitoring system (AMS) was added to provide groundwater elevation data to aid in the subsidence monitoring program.

An automated Total Organic Carbon (TOC) monitoring system has been put into use at the onsite wastewater treatment facility as well (**IT, 2000d**). The treatment plant structure and tanks have been rehabilitated as suggested. An iron removal test was also performed at the site. It was found that a two-micron filter removed enough iron to produce discharge within the effluent standards. At the time of their December 2000 report, IT was awaiting approval from USACE to use filtration instead of their current iron removal method of injecting a chelating agent into the water to treat it. After evaluating the effectiveness of the oil/water separator once the new arrays had been added, it was found to still be within the performance range (**IT, 2000d**).

The well installation and groundwater treatment plant upgrades have been completed (**EPA, 2000**). The discharge is currently to Bayou Bonfouca. This change was made to return the system back to the original design and discontinue discharge to the western drainage canal Beginning in July 2001, O&M activities will be conducted by the state at the site for a minimum of 30 years, after which the need for further O&M and monitoring will be evaluated (**EPA, 1997**).

4.3 Operations and Maintenance

The groundwater treatment system at Bayou Bonfouca involves a treatment train. Groundwater and DNAPL are extracted from the shallow artesian aquifer and conveyed to the wastewater

treatment facility through piping. Components of the wastewater treatment facility include an oil/water separator, filter feed tank, sand filters, oleophilic filters, granular activated carbon, post-aeration tank, backwash tank, recovered/skimmed oil tank, storm water sump, air compressors, air dryer system, and air blower. The goal of the recovery system is to recover as much DNAPL as possible from the shallow aquifer, while preventing subsidence by limiting drawdown in the monitoring wells. Land surface elevations are used to evaluate the effect of drawdown on settlement and adjust pumping rates (**IT, 2000b**).

At the time the O&M plan was written, no land surface elevation changes of more than 0.2 feet had been observed. The plan states that drawdowns shall be limited to four feet. If the water level in any monitoring well is below -4 feet mean sea level (MSL), the extraction well closest to it will be shut down and pumping rates will be adjusted (**IT, 2000b**).

At the time of the site inspection, the State of Louisiana was preparing to accept bids to award a contract for continued O&M at the site. Detailed O&M costs were not made available, but it was stated during the site visit that the O&M costs are between $30,000 and $40,000 per month. No significant unexpected costs for O&M activities were noted by the onsite staff. It is not believed that costs associated with O&M at the site are an issue in relation to the performance of the remedy.

4.4 Progress Since Previous Five-Year Review

The first five-year review recommended that groundwater continue to be treated at the site and a detailed technical evaluation of the groundwater treatment system and recovery array be performed by a specialist in groundwater remediation. The purpose of this investigation was to determine if recovery and treatment options could be maximized by installing additional recovery wells at different locations and depths and to see if treated water could be recycled instead of being discharged to the bayou (**EPA, 1996**).

Additional groundwater investigations have been performed, and the associated reports, including the Performance Evaluation Report for Shallow Artesian Aquifer Remediation, the Phase I Design Investigation Report, and the Preliminary Design Submittal, recommended additional modifications be made to the system to ensure that the requirements of the ROD and ESD were met (Phase 2 Modifications). In June of 1999, the USACE awarded IT/OHM a task order contract for the design, construction, O&M, and shakedown phases of this project. The modifications specified in the task order have been completed (**IT, 2000d**).

A Phase I Design Investigation was completed in 1998 which concluded that there was no indication of creosote under the landfill advancing toward the bayou, but that there was a potential for re-contamination of the bayou, as groundwater containing dissolved phase PAHs is discharged to the bayou from both sides. This was concluded to be a possible threat to benthic organisms over a period of 5-10 years as the PAHs bind to soil particles in the water and build up in the sediments. The other major concern expressed in this report was that remediation of the offsite plume had not been initiated (**CH2M Hill, 1998a**).

According to the Preliminary Design Submittal, one of the requirements of the ESD was that the need for a slurry wall be considered at a later date. No further research into the benefits of this technology was conducted during the investigation, and the report recommended that this decision be deferred. This was due to the fact that slurry walls are very costly and are not very compatible with the goals of creosote recovery and groundwater extraction at the site **(CH2M Hill, 1999a**).

Many modifications to the system were made in 1999 & 2000 to improve performance as a result of the update recommendations. These changes included the installation of Arrays 1a and Array 3 and upgrades to the wastewater treatment facility. These changes were made in accordance with suggestions of the PER, Phase I Design Inventory Report, and the Preliminary design submittal (**IT, 2000d**). These changes appear to have improved the overall performance of the

system. Since June 1991, approximately 16,700,000 gallons of groundwater have been extracted and treated, with approximately 43,000 gallons of free phase creosote recovered. On average, approximately 500 gallons of free-phase creosote are recovered per month (**IT, 2000a** & **2000c**).

5.0 Five-Year Review Process

This five-year review has been conducted in accordance with EPA's Comprehensive Five-Year Review Guidance, Draft, dated October 1999 (**EPA, 1999**). Interviews were conducted with relevant parties, a site inspection was conducted at the site, and a review of applicable data and documentation covering the period of the review was evaluated. The findings of the review are described in the following section.

6.0 Five-Year Review Findings

The information collected during the interviews, the site inspection, the standards review, and the data review are described in the following subsections.

6.1 Interviews

Interviews were conducted with representatives from the site (Jim Montagut/USACE and Rick Tibbs/IT-OHM), LDEQ (Rich Johnson/LDEQ), and the community (Bob Perkins/resident and Carl Helwig and Anne Sobol from the community group Slidell Working Against Major Pollution, or SWAMP), beginning on February 20, 2001. An Interview Record Form was also mailed to Martin Bruno/City of Slidell and a reply was received. Interview Record Forms which document the interviews are provided in **Attachment 2**.

Overall impressions from the interviews were that the various parties are pleased with the work done at the site, the improvements made since the last five-year review, and the people who worked to implement the remedial actions. The only concern raised was about ongoing communication -- SWAMP indicated they would like to see more public attention given to the

ongoing groundwater remediation and its progress, and the contamination that remains at the site.

6.2 Site Inspection

A site inspection was conducted at the site on February 20, 2001. The site inspection checklist is provided in **Attachment 3**. Photographs taken during the site visit are provided in **Attachment 4**. The site inspection included a tour of each extraction array, the groundwater treatment system, and a walkover of the landfill.

Site access is restricted by a fence (Photograph 31), and entry to the site is through a single gate located on the north end of the site (Photograph 53). The front gate was open at the time of the site inspection. Another gate is located next to Bayou Bonfouca on the south side of the site, but this gate is not connected to any roads, and it only allows access to the portion of the site next to the bayou. This gate was closed and locked at the time of the inspection. The fence was well maintained and in good condition. A warning sign was posted on the front and back gates, but no warning signs were seen along any other portion of the fence.

The groundwater treatment system and control building appeared well maintained (Photographs 6-9, 22-32, 34, 35). The system was operating at the time of the inspection. The treatment system, located outside the control building, contained adequate secondary containment, and no leaks were noted during the inspection. A sump was present to collect any leaks and return the leaked material to the treatment system. The treatment system is completely automated, and can be monitored and operated remotely from the control building. The system appeared to be functioning properly at the time of the inspection.

Each extraction array was located during the inspection (Photographs 1, 13-21, 36-46, 49-50). The entire system can be monitored remotely from the control building, and it was stated that the offsite array (Array 3) is physically inspected daily. The well vaults for Array 1A and 3 are completed flush with the surface. The vaults at Array 3 were not casually visible in the backyard

at the residence. The wells for Array 2 were completed above the surface. All well vaults were closed and locked at the time of the inspection. Several of the vaults were opened and inspected. Some minor leaking was noticed in the vaults, but it was stated that the wells are designed to route leaks back into the well. An odor could be detected when the well vault was opened. Also, no leaking was observed in the above-ground portions of the piping connected to Array 2. Odors could also be detected when standing near some of the wells at Array 2. The wells appeared to be well maintained and in good condition. One of the exit points for the bayou-crossing pipeline was also inspected. The vault was locked, and when opened, no leaking into the vault was noticed. It was stated by site personnel that no leaking of the pipeline had occurred, however, the leak detection system for the pipeline was down for repairs at the time of the inspection. It was also stated that the leak detection system had recently been malfunctioning, and it was frequently in need of repair. It was further stated that spare parts were available at the site to make minor repairs to the extraction system as needed.

The surface of the landfill was also inspected as part of the site inspection (Photographs 47-48, 51-52). The cover of the landfill appeared to be in good condition. No signs of erosion, slumping, bulging, cracking, or settlement were noticed. The vegetation on the cover was well established, and only a few bare spots were noticed.

6.3 Standards Review

Applicable or Relevant and Appropriate Requirements (ARARs) for this site were identified in the ROD dated March 31, 1987. This Five-Year Review included identification of and evaluation of changes in these ARARs to determine whether such changes may affect the protectiveness of the selected remedy.

The Bayou Bonfouca ROD identified the following ARARs as having an impact on the proposed remedy:

1. RCRA requirements for treatment, storage, and disposal facilities (TSDs), as regulated under 40 CFR 264 and 265.

2. RCRA manifesting requirements for the offsite transportation of hazardous wastes, as regulated under 40 CFR 262.

3. Permitting requirements for discharges of dredged or fill materials into waters of the United States, as regulated under 33 USC §1344.

4. Requirements to evaluate the potential impacts to flood plains as regulated under the Executive Order on Floodplain Management, Executive Order No. 11988.

5. Requirements to evaluate and avoid adverse impacts to wetlands, as regulated under the Executive Order on the Protection of Wetlands, Executive Order No. 11990.

6. Requirements for the emission of hazardous air pollutants during incinerations, as regulated under the Clean Air Act (CAA) Section 112, the State Implementation Plan (SIP) for Louisiana, and the National Emissions Standards for Hazardous Air Pollutants (NESHAPs) regulations.

7. Requirements for intergovernmental review where alternatives require federal or state funds, or a cooperative agreement between state and federal agencies, as regulated at 40 CFR 29.

8. Occupational Safety and Health Administration (OSHA) requirements for the protection of workers, as regulated under 29 CFR 1910.

9. Substantiative requirements for effluent discharges to Bayou Bonfouca, as regulated under the Clean Water Act (CWA) Section 402, and the National Pollutant Discharge Elimination System (NPDES) at 40 CFR 122 and 125, Subchapter N.

10. Federal Standards for Toxic Pollutant Effluent, as regulated at 40 CFR 129.

11. Requirements for the transportation of hazardous materials, as regulated under 49 CFR 170 to 179.

12. Requirement under the Fish and Wildlife Coordination Act for agency consultation prior to modifying any body of water.

13. State of Louisiana hazardous waste regulations under Act 449 (EPA, 1987).

The ROD does not specifically list RCRA requirements for groundwater monitoring at TSDs as an ARARs, but in the discussion of ARARs in the ROD, the RCRA requirement for groundwater monitoring at TSDs is discussed. The requirement for groundwater monitoring is also mentioned in the discussion of the selected remedy in the ROD. The ROD specifically states that the 30 year requirement for groundwater monitoring at closure is applicable to the site, and the ROD stipulates that the point-of-compliance is the site boundary (**EPA, 1987**). No new changes to these RCRA requirements have been made.

All remedial actions at the site are complete, except for the continued O&M of the groundwater extraction and treatment system. The bayou is no longer being modified as part of actions taken at the site. Therefore, the requirements under Executive Order No. 11988 (flood plains), Executive Order No. 11990 (wetlands), the Fish and Wildlife Coordination Act, and the requirements for discharges of dredged or fill materials into waters of the United States at 33 USC §1344 no longer apply to the site remedy. Also, incineration and excavation activities are

no longer occurring at the site, and the requirements of the CAA and the NESHAPs regulations no longer apply to the remedy at the site.

The requirements for wastewater treatment and discharges, as regulated under the CWA and 40 CFR Parts 122, 125, and 129 are still applicable to the site. The State of Louisiana has set discharge limitations for wastewater discharges at the site, and no new substantiative changes in the regulations have occurred that would call into question the protectiveness of the remedy.

Also, wastes are still generated at the site through O&M activities. The regulations for TSDs at 40 CFR 264 and 265 do still apply to the site remedy. Also, the regulations pertaining to the transportation of these wastes at 40 CFR 262 and 49 CFR 170-179 still apply to the site remedy. No new substantiative changes to these regulations have occurred that would question the protectiveness of the remedy.

The OSHA requirements at 29 CFR 1910 are addressed by a site specific health and safety plan. This plan is written and updated to address any changes in OSHA standards that may impact working at the site.

The requirements of 40 CFR 29, requiring intergovernmental review where actions will require federal or state funds, or a cooperative agreement, still apply to the site remedy. This requirement does not directly impact the protectiveness of the remedy.

Although not included in the ROD, the draft O&M plan (**IT, 2000c**) lists additional regulations that should be included as ARARs or "to be considered" (TBCs) for the site remedy. These additional regulations include:

1. Requirements of 40 CFR 261 for the classification of hazardous wastes. These regulations apply to wastes generated from the treatment of extracted groundwater, residual wastes generated through O&M activities, and used personal protective equipment (PPE).

2. Tank management standards at 40 CFR 262 and 264. Tanks must be labeled as hazardous wastes, inspected daily, and managed in a manner such that releases and spills are collected within 24 hours of detection.

3. Land Disposal Restrictions (LDRs) at 40 CFR 268. Some of the wastes generated at the site are restricted from land disposal without meeting treatment standards. These wastes must meet the treatment standards, and offsite shipments of these wastes to a RCRA-permitted TSD must contain a notice that the wastes are restricted from land disposal without treatment.

4. EPA's offsite policy, as stated at 40 CFR 300.440. This regulation stipulates that hazardous wastes generated from CERCLA cleanups must go to RCRA-permitted TSDs that are in compliance with RCRA and state rules and do not have releases to the environment.

6.4 Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics

Based on the standards review and the data review, no changes in exposure pathways, toxicity, or other contaminant characteristics were identified that affect the cleanup levels originally established for the site, or affect the protectiveness of the remedy.

6.5 Data Review

Monthly operational reports submitted by the IT Corporation include data on the number of days the system was operational, total gallons of extracted groundwater, total gallons of storm water treated, total gallons of water treated and discharged, total pounds of carbon consumed, total number of sand filter back washes, average influent flow rate, total gallons of recovered oil, total gallons of city water used, and total amount of electricity used. The reports also contain

information on drawdown in the wells, groundwater elevations, monthly subsidence monitoring, daily operations, and daily well inspections. One of the monthly reports reviewed also included sampling data for semivolatile organic compounds and volatile organic compounds, biological oxygen demand (BOD), chemical oxygen demand (COD), total suspended solids (TSS), total dissolved solids (TDS), total organic carbon (TOC), turbidity, oil and grease, and metals (**IT, 2000a**).

Two of the monthly operational reports, for the months of November and December 2000, were reviewed as part of this five-year review. These reports document the groundwater extraction system and the wastewater treatment plant are operating as designed. Based on these two reports, the amount of free-phase creosote recovered monthly is over 500 gallons with a cumulative total of almost 43,000 gallons since remedial action started. A total of 16,665,317 gallons of groundwater had been extracted during that time. Discharges from the wastewater treatment facility are in compliance with the limits established by the LDEQ. Monitoring shows that settlement has not been a problem at the site. The reports show that individual wells within each array are operated on a rotational basis, with each well in operation every other day. Site O&M staff stated that this arrangement was necessary to maximize extraction while meeting the drawdown requirements necessary to prevent subsidence (**IT, 2000a and 2000c**). Although the extraction arrays currently operate either even or odd wells, this arrangement may change based on changes in drawdown values.

7.0 Assessment

The remedy appears to be functioning as intended by the decision documents, and no new information has come to light that alter the assumptions made in selecting the remedy for the site. The incinerated source control wastes are contained by the onsite landfill, access to the site is restricted, and affected groundwater and DNAPL are being extracted and treated/disposed through the extraction and treatment system. Overall, the facility appears to be well-maintained

and operating effectively. There have been no changes in chemical-, action-, or location-specific standards or requirements that would call into question the protectiveness of the actions that have been or continue to be conducted. Since the implementation of the changes to the system recommended by the last five-year review, the volume of extracted groundwater and DNAPL have increased, and potential adverse impacts related to land subsidence have been avoided via the controls implemented. The facility is able to operate within its designed parameters, and effluent discharges meet the surface water discharge requirements established by the state.

These conclusions support a determination that the remedy at the site is functioning as designed and is expected to continue to be protective of human health and the environment. However, there are some O&M activities that should be implemented to ensure the remedy continues to be protective.

The draft O&M plan for the site describes the O&M requirements for the groundwater extraction and treatment system, but does not include formal periodic inspections of the landfill cap. The landfill currently appears to be in good condition and well-maintained, and the onsite personnel have obviously maintained the cap as required, however, requirements for regular inspections of the landfill cap by onsite personnel should be incorporated into the O&M Plan and the performance of such inspections documented. Inspection of the landfill cap will also continue to occur every five years as part of the five-year review process.

In addition, the 1987 ROD specifies that RCRA requirements for monitoring of groundwater at the point-of-compliance are to be met for this site. The point of compliance is defined as the facility property line, and as described by the ROD, the groundwater beyond this point is required to be cleaned to background or an alternate concentration limit (ACL) -- the 1987 ROD indicates that the target cleanup level for groundwater was not being set at that time because it was unknown at the time how feasible groundwater extraction would be at this site (**EPA, 1987**). In terms of setting the point-of-compliance as the property boundary, it is known that the

groundwater/DNAPL contamination extends beyond the property boundary into the residential area offsite; this area is addressed by the extraction Array 3. As such, it is not practicable at this time to recommend implementation of a cleanup goal of background for all groundwater beyond the property boundary, however, the intent of the ROD was to implement a remedy that would control migration. Another component of the groundwater monitoring issue is that the remedy at the site is intended to prevent the further migration of DNAPL and dissolved phase contamination into the bayou. The Performance Evaluation Report documented that the potential existed for dissolved phase contamination to migrate to the bayou (**CH2M HILL, 1997**).

To document such control, a groundwater quality and water level monitoring program should be designed appropriate to document that the groundwater extraction system controls further migration in the shallow artesian aquifer, and the ROD goal of monitoring at the point-of-compliance to meet background concentrations or an ACL should be formally addressed. It should be noted that the shallow artesian aquifer is not known to be used as a water supply and is not considered a viable source of groundwater (**EPA, 1990**). Although as mentioned above, water levels are currently monitored to protect against subsidence, water level monitoring is not done for the purposes of evaluating the degree to which the extraction system provides capture for the groundwater contamination at the site. No monitoring of the water level or quality conditions in the bayou are currently conducted -- and no water quality data has been collected in the bayou adjacent to the site since the end of the source removal remedial action in 1995.

However, the State of Louisiana Department of Health and Hospitals (LDHH), in conjunction with the LDEQ, routinely tests fish samples and issues fish consumption and swimming advisories to help ensure the safe enjoyment of Louisiana's water resources. The Louisiana Department of Wildlife and Fisheries (LDWF) and the Louisiana Department of Agriculture and Forestry (LDAF) are also consulted during the course of advisory development and dissemination. The following websites provide detailed information regarding contaminant, mercury and swimming advisories (including those established for Bayou Bonfouca):

http://www.deq.state.la.us/surveillance/mercury/fishadvi.htm
http://www.wlf.state.la.us/apps/netgear/index.asp?cn=lawlf&pid=35

In December 1998, LDHH/OPH rescinded the November 1987 ban on fish consumption based on fillet samples taken between 1996 and 1997. The swimming and sediment contact advisory remains in effect based on the sediment samples collected in 1997.

8.0 Deficiencies

As described in the previous section, the remedial actions at the site appear to have been implemented as planned and appear to be operating as designed. The site appears to be well-maintained and to be operated effectively. Deficiencies associated with the current status of the remedy are not sufficient to warrant a finding of not protective, but are required to be addressed to provide further documentation that the remedy is protective, and that it remains protective.

First, no monitoring is currently set up to ensure that the groundwater extraction system effectively prevents further migration of DNAPL and/or dissolved phase contamination into previously unaffected groundwater, or from the shallow artesian aquifer into the bayou. The ROD requirement to monitor the point-of-compliance is not being met or addressed.

Also, there are no procedures set forth in the draft O&M plan to ensure regular inspections of the landfill cap and documentation of such inspections. Although at the time of the February 2001 five-year review site inspection the landfill cap appeared to be well-maintained and in good condition, regular inspections and documentation of such inspections are appropriate to ensure it remains in good condition.

9.0 Recommendations and Follow-up Actions

The groundwater monitoring program should be updated to provide monitoring necessary to ensure migration within and/or from the shallow artesian aquifer to either Bayou Bonfouca or previously unaffected groundwater continues to be controlled. In addition, the groundwater point of compliance requirement set forth in the ROD (cleanup to background or an Alternate Concentration Limit beyond the compliance boundary) should be formally addressed. Regular landfill cap inspections and documentation of such inspections should be built into the O&M Plan for the site.

It is anticipated that the next five-year review will assess the efficiency of the pump and treat system and consider other cost effective alternative remedies to support a more timely exit strategy. This review will encompass data from each of the three arrays over a minimum of a five-year period.

10.0 Protectiveness Statement

The remedy for the source control operable unit has been completed, and is protective of human health and the environment because the waste has been treated and waste that remains at the site has been contained under a landfill cap. The remedy for the groundwater operable unit has been implemented, and it is also believed to be protective based on the system that provides for ongoing pumping and treating of the groundwater and DNAPL. The recommended follow-up actions are necessary to verify and monitor the continued protectiveness of the remedy, and if implemented, will ensure that the remedy remains protective of human health and the environment in the future.

11.0 Next Review

The next five-year review, the third for the site, should be completed on or before September 2006 (fifteen years after the triggering action date of September 1991).

Table 1
Chronology of Site Events

Date	Event
1882	A creosote plant began operating at the site.
Early 1970s	There was a fire at the plant which ruptured several large storage tanks and caused a large quantity of creosote to flow across the site and into the bayou.
1970-1972	The plant was disassembled, leaving behind only a few building shells and foundation slabs.
1976	The Coast Guard undertook a study of the waterway.
1978	The Coast Guard, EPA, and the National Oceanic and Atmospheric Administration undertook a study of the waterway.
December 1982	The site was included on the NPL.
1983	The first Remedial Investigation/Feasibility Study begins.
1984	EPA decides to take an operable unit approach to the site, one operable unit for source control and one for groundwater.
July - August 1985	The PRP fenced the site under an EPA Administrative Order.
August 15, 1985	The Source Control Record of Decision (ROD) was signed, calling for the excavation and offsite landfilling of creosote waste piles.
March 1986	A Supplemental Phase II Remedial Investigation was performed to better define the extent of the soil contamination.
June 1986	The Phase II Feasibility Study was completed.
March 31, 1987	The final ROD was signed, incorporating the previous Source Control ROD (the selected alternative was onsite incineration).
1988	Two remedial design investigations determined that the extent of the contamination was underestimated.
February 15, 1990	EPA prepared an Explanation of Significant Differences to the ROD, which described that an additional 103,500 cubic yards of sediment would need to be incinerated and the groundwater contamination was present in three separate plumes.
July 10, 1991	Operation of the long term remedial action for groundwater began under the control of the EPA.
May 1, 1993	Pumping at Array 1 was discontinued to make way for construction of the onsite landfill.

Table 1
Chronology of Site Events

Date	Event
November 1993 - July 28, 1995	Incineration took place onsite.
July 20, 1995	ROD Amendment signed calling for the use of the incinerator on the nearby Superfund Site of Southern Shipbuilding's wastes.
March 11, 1996	United States and Louisiana file CERCLA cost recovery actions against several former owners and operators, U.S. v. Braselman Corporation (E.D.L.A.)
December 1996	Incinerator was removed after operations at Southern Shipbuilding had ceased.
September 1996	A statutory 5-year review of the groundwater cleanup was completed, recommending continued groundwater recovery and treatment and further evaluation of the system's performance.
January 1997	Upon the completion of the source control actions by the EPA, the site was deeded to the City of Slidell by the Braselman Corporation, and the keys to the property were transferred to the City.
June 23, 1997	U.S. District Court enters consent decree resolving claims between U.S. and Kerr McGee Corporation, and Kerr McGee Chemical Corporation.
July 31, 1997	U.S. District Court enters consent decree resolving claims between U.S. and Fleming American Investment Trust, plc.
September 30, 1997	A Preliminary Closeout Report for the Source Control Remedial Action involving sediment excavation and incineration was issued.
September 1997	EPA completed a Performance Evaluation Report (PER) for the groundwater system and determined that modifications to the system were necessary.
October 1998	A Phase I Design Investigation was completed and determined that there was no indication of creosote under the landfill advancing toward the bayou, but that there was a potential for re-contamination of the bayou, as groundwater containing dissolved phase PAHs is discharged to the bayou from both sides.
June 1999	The Army Corps of Engineers awarded IT/OHM a task order for the Phase 2 Modifications at the site. The modifications specified at the site have been completed.
September 15, 1999	U.S. District Court enters consent decree resolving claims between the U.S., Louisiana, and the Alabama Great Southern Railroad Company.
September 1999	The extraction well pumps in Array 2 were replaced.

Table 1
Chronology of Site Events

Date	Event
January 17, 2000	Construction of additional groundwater extraction Arrays 1a and 3 began.
March 2000	Array 1(a), Array 3, and five new off-site monitoring wells were installed, and the updated system began operating.

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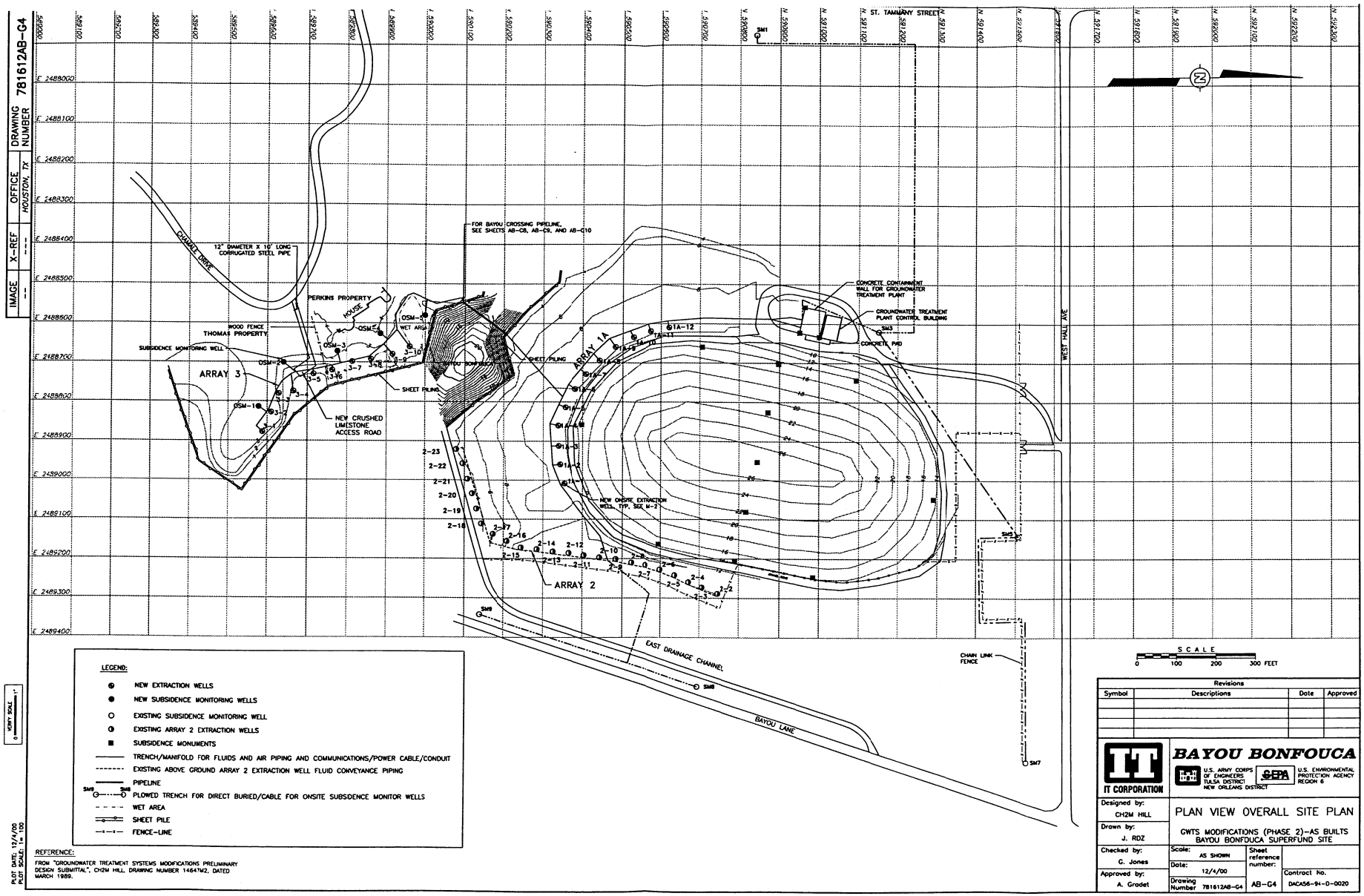

Figure 1
Site Plan and Monitoring and Extraction Well Locations
Bayou Bonfouca Superfund Site, Second Five-Year Review
Slidell, St. Tammany Parish, Louisiana

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Attachment 1

Documents Reviewed

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Attachment 1
Documents Reviewed

CH2M HILL, 1997. *Performance Evaluation Report for Shallow Artesian Aquifer Remediation, Bayou Bonfouca Superfund Site, Slidell, Louisiana*. Final Report. September 1997.

CH2M HILL, 1998a. *Phase I Design Investigation Report, Bayou Bonfouca Superfund Site, Slidell, Louisiana*. October 1998.

CH2M HILL, 1998b. *Design Criteria Report, Bayou Bonfouca Superfund Site, Slidell, Louisiana*. December 1998.

CH2M HILL, 1999a. *Preliminary (30%) Design Submittal, Bayou Bonfouca Superfund Site, Slidell, Louisiana*. March 1999.

CH2M HILL (EPA), 1999b. *Groundwater Extraction and Treatment System Modifications Preliminary Design Submittal, Bayou Bonfouca Superfund Site, Slidell, Louisiana*. May 1999.

IT Corporation, 2000a. *Bayou Bonfouca Groundwater Remediation Monthly Operational Report, Bayou Bonfouca Superfund Site, Slidell, Louisiana*. November 2000.

IT Corporation, 2000b. *Operation and Maintenance Plan, Groundwater Extraction Wells and Groundwater Treatment System Modifications (Phase 2), Bayou Bonfouca Superfund Site, Slidell, Louisiana*. Draft Final. November 2000.

IT Corporation, 2000c. *Bayou Bonfouca Groundwater Remediation Monthly Operational Report, Bayou Bonfouca Superfund Site, Slidell, Louisiana*. December 2000.

IT Corporation, 2000d. *Groundwater Extraction Wells and Groundwater Treatment System Modifications (Phase 2), Bayou Bonfouca Superfund Site, Slidell, Louisiana*. Final Report, December 2000.

National Academy Press, 1997. *Innovations in Ground Water and Soil Cleanup from Concept to Commercialization, Bayou Bonfouca Superfund Site, Slidell, Louisiana*. Publication Copy 1997.

Pace Analytical Services, Inc., March 1997. *Bayou Bonfouca Report of Laboratory Analysis and Quality Control Data, Bayou Bonfouca Superfund Site, Slidell, Louisiana*. Signed March 27, 1997.

Southern Regional Climate Center, May 1997. *Bayou Bonfouca Climatological Report, Bayou Bonfouca Superfund Site, Slidell, Louisiana*. May 27, 1997.

U. S. Environmental Protection Agency (EPA), 1987. *Record of Decision, Remedial Alternative Selection*. Final. March 31, 1987.

U.S. Environmental Protection Agency (EPA), 1990. *Explanation of Significant Differences, Bayou Bonfouca Superfund Site and St. Tammy Parish, Slidell, Louisiana*. Date Signed, February 5, 1990.

U.S. Environmental Protection Agency (EPA), 1991. *Startup of Groundwater Recovery and Treatment System, Bayou Bonfouca Superfund Site, Slidell, Louisiana*. September 30, 1991.

U.S. Environmental Protection Agency (EPA), 1996. *Groundwater Remedial Action Five-Year Review, Bayou Bonfouca Superfund Site, Slidell, Louisiana*. September 1996.

U. S. Environmental Protection Agency (EPA), 1997. *Preliminary Close Out Report, Bayou Bonfouca Superfund Site, Slidell, Louisiana*. September 1997.

U. S. Environmental Protection Agency (EPA), 2000. *Bayou Bonfouca, Louisiana*. Superfund Site Status Summary. October 27, 2000.

Attachment 2

Interview Record Forms

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
SUPERFUND DIVISION (6SF-L)
1445 ROSS AVENUE
DALLAS, TEXAS 75202

May 14, 2001

FAX #: (214) 665-6660
or #: (214) 665-6460

TO: Margaret O'Hare -602

FAX #: 972-385-0846

BUSINESS #: 972-980-2188 ext. 238

PAGES TO FOLLOW: 5

FROM: Katrina Coltrain

BUSINESS #: (214) 665-8134

REMARKS: The LDEQ response to interview questions for the 5-yr review.

State of Louisiana

Department of Environmental Quality

M.J. "MIKE" FOSTER, JR.
GOVERNOR

J. DALE GIVENS
SECRETARY

May 8, 2001

Katrina Coltrain
USEPA Superfund
Region 6 (6SF-LP)
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

RE: Receipt of e-mail Five-Year Review Record
Bayou Bonfouca Superfund Site **AI # 4716**
425 Westhall Avenue
Slidell, Louisiana, 70460
St. Tammany Parish

Dear Ms. Coltrain:

We have received the e-mail sent by your contractor CH2M HILL, entitled Five-Year Review Interview Record and we have the following responses to the questions:

1. What is your overall impression of the work conducted at the site since mid-1996 (the time of the last five-year review)?

   LDEQ RESPONSE:

   Since the system upgrade the system continues to work very smoothly with no complications.

2. From your perspective, what effect have continued remedial operations at the site had on the surrounding community?

   LDEQ RESPONSE:

   The surrounding community seems to be pleased with the results of the remedial operations.

3. Are you aware of any community concerns regarding the site or its operation and administration? Please provide details.

   LDEQ RESPONSE:

A local community activist group S.W.A.M.P. has some concerns that a plume of material still exists under the site.

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism, trespassing, or emergency response from local authorities? If so, please give details.

   LDEQ RESPONSE:

   Site operators did inform LDEQ of a possible offsite spill by an unknown party in which an unknown constituent (possibly lime) traveled through one of the drainage channels of the creek to the bayou. The unknown material was not oil and there was a slight ph change of short duration in the drainage channel.

5. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please describe purpose and results.

   LDEQ RESPONSE:

   LDEQ does visit the site from time to time unannounced to monitor operations at the site. All results have been positive.

6. Have there been any complaints, violation, or other incidents related to the site that required a response by your office?

   LDEQ RESPONSE:

   Only the incident related to in question four, reported by the facility operators.

7. Are you aware of any problems or difficulties encountered which impacted construction progress and implementability of the components of the remedy installed since 1996?

   Yes, in 1998, the EPA's remedial action contractor, CH2M Hill, recommended a design investigation be conducted to obtain current information on the distribution of creosote in the on-and off-site creosote plumes to assess the need for modifications to the groundwater Treatment System (GWTS). Recommendations included the construction of a new on-site and off-site well extraction network, and the installation of an Automated Monitoring System (AMS) for measurement of groundwater levels in existing on-site well and off-site wells. However, this system does not determine capture zone of the extraction well arrays and additional monitoring wells would help further delineate the plume and better evaluate cleanup progress.

8. From LDEQ's perspective, have any changes in site operation or maintenance requirements implemented since the time of the last five-year review (mid-1996) had an affect on the protectiveness or effectiveness of the remedy?

   LDEQ RESPONSE:

   Recent installation of a series of new recovery wells has increased the efficiency of the system. After a 1997 investigation, it was recommended that another array of extraction wells be installed to take the place of the original Array 1 wells. Array 1a, which consists of 12 wells, was installed in 1999 down gradient of the creosote plume underneath the onsite landfill. Array 3, which consists of 10 wells, was also installed to capture recoverable free phase oil and dissolved phase contaminants in the off-site area across the bayou.

9. Are you aware of opportunities to optimize the operation, maintenance, or sampling efforts at the site since the time of the last five-year review (mid-1996)?

   LDEQ RESPONSE:

   Yes, LDEQ concurs with a recent Remediation System Evaluation Draft Report, dated March 28, 2001 and performed by an EPA technical team suggesting the following recommendations for the treatment system:

   - A capture zone analysis, including the installation of additional peizometers, would help determine the present capture zone of the extraction wells arrays;
   - an expanded groundwater monitoring program with additional monitoring wells would help further delineated the plume and determine cleanup progress over time;
   - sampling of contaminants in four extraction wells can be eliminated without sacrificing effectiveness as this current sampling program does not delineated the plume or reveal the progress toward cleanup;
   - if allowable in the Record of Decision (ROD) the plant operator should reinvestigate the recycling of recovered creosote, which could save on disposal costs.
   - In addition LDEQ recommends the installation of a slurry-wall to insure no escape of any free phase or dissolved materials from the site. This would also allow for a clearer exit strategy.

10. LDEQ is slated to assume responsibility for groundwater monitoring beginning in July 2001. What is the status of the groundwater monitoring plan preparation? Do you have any concerns related to implementation of this program?

    LDEQ RESPONSE:

(See response to question 9) LDEQ agrees with comments made in the Technical Remediation System Evaluation Draft Report, dated March 28, 2001, that the ROD does not provide a clear exit strategy.

11. Do you feel well informed about the site's activities and progress?

LDEQ RESPONSE:

Yes, the current operator submits a monthly operational report. At this time, according to the superfund State contract between the LDEQ and the EPA, LDEQ is currently responsible for taking the lead for the operation and maintenance of the groundwater extraction and treatment system. LDEQ is currently preparing to solicit bids to provide the services required for these activities. The contract awardee will be slated to take over operation in July.

12. Do you have any comments, suggestions, concerns or recommendations regarding the site?

LDEQ RESPONSE

LDEQ agrees with the comments and recommendations made during the Remediation System Evaluation Inspection by EPA's. Technology Innovation Office (TIO) and Office of Emergency and Remedial Response (OERR) these comments and suggestions are briefly mentioned in LDEQ's response to question 9.

Please contact Rich Johnson a (225) 765-0487 with any questions. Any future correspondence regarding this matter should be submitted in triplicate and directed to:

Keith L. Casanova, Administrator
Remediation Services Division
P.O. Box 82178
Baton Rouge, LA. 70884-2178

One of the copies should be directed to my attention. Please include the Agency Interest (AI) number referenced above on all correspondence. Thank you for your cooperation.

Sincerely,

Rich Johnson
Environmental Scientist
Remediation Services Division

rpj

C: IAS File Room

Five-Year Review Interview Record Bayou Bonfouca Site Slidell, Louisiana	**Interviewees:** Jim Montagut/USACE (operator) Rick Tibbs/IT-OHM (contractor)

Site Name	**EPA ID No.**	**Date of Interview**	**Interview Method**
Bayou Bonfouca Superfund Site	LAD 980745632	2-20-2001	in person

Interview Contacts	**Organization**	**Phone**	**Email**	**Address**
Katrina Coltrain	US EPA Region 6	214-665-8143	coltrain.katrina@epamail.epa.gov	1445 Ross Avenue Dallas, Texas 75202
Margaret O'Hare	CH2M HILL, EPA Contractor	972-980-2170	mohare@ch2m.com	5339 Alpha Road, Ste 300 Dallas, Texas 75240
Darren Davis	CH2M HILL, EPA Contractor	972-980-2170	ddavis9@ch2m.com	5339 Alpha Road, Ste 300 Dallas, Texas 75240

Interview Questions (please address the time since the last five-year review, conducted in 1996).

1. What is your overall impression of the work conducted at the site since mid-1996 (the time of the last five-year review)?

Response: Since the last five-year review, they have upgraded the well arrays, doubled the number of wells, increased the capacity of the system significantly (doubled the production of oil). Part of Array 1 was removed for the landfill. All of the changes have improved the system.

2. From your perspective, what effect have continued remedial operations at the site had on the surrounding community?

Response: Removal of 44,000 gallons of NAPL has had a positive effect. The residents who own the property where the offsite groundwater arrays sit have been agreeable and supportive.

3. Are you aware of any community concerns regarding the site or its operation and administration? Please provide details.

Response: The biggest community concern was the presence of the incinerator – now that the incineration is complete and the incinerator is gone (removal completed during 1996), the community appears content, the site does not receive any complaints.

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism, trespassing, or emergency response from local authorities? If so, please give details.

Response: No incidents. Note: the City of Slidell uses the site for the 4th of July fireworks display.

5. Have any problems occurred that have resulted in significant changes in the O&M requirements, maintenance schedules, or sampling routines in the time since the last five-year review (mid-1996)? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.

Response: Any operating kinks in the plant were worked out in the first year of operation (as with any plant). All changes, including the updates and improvements made to the well arrays, have had a positive effect on the efficiency of the system.

6. Have there been opportunities to optimize the operation, maintenance, or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency.

Response: Installation of well array 3 is considered the main optimization effort implemented. The ongoing drought in the vicinity has been a controlling factor in how much they can pump.

7. Is there a continuous on-site O&M presence? If so, please describe staff and activities. If not, describe staff and frequency of site inspections.

Response: No 24-hour presence, but the site has low-level and high-level alarms. Walk-through check done at least once per day.

8. Where are operations-related documents maintained (including HSP, O&M Plan, and other waste management/contingency plans)? What procedures are in place to ensure compliance with these plans?

Response: Plans and procedures are maintained at the site and followed.

9. Please briefly describe the monitoring requirements and how/to whom the results are reported.

Response: Water levels for subsidence control, plant effluent to meet surface water discharge limits for Western Creek. Monthly subsidence report is submitted to EPA.

10. To allow a comparison in the five-year review of projected vs. actual O&M costs, please provide a summary of annual O&M related costs incurred since the time of the last five-year review (mid-1996).

Response: About $30K-40K per month, average about $360,000 per year.

11. Do you have any comments, suggestions, concerns, or recommendations regarding the site?

Response: No concerns. USACE feels they have a good relationship with their contractor IT/OHM, very cooperative. The site will be turned over soon to the State of Louisiana

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Five-Year Review Interview Record Bayou Bonfouca Site Slidell, Louisiana	**Interviewee:** Martin Bruno Organization: City of Slidell Phone: 504-646-4320

Site Name	**EPA ID No.**	**Date of Interview**	**Interview Method**
Bayou Bonfouca Superfund Site	LAD 980745632	03-08-01	written response

Interview Contacts	**Organization**	**Phone**	**Email**	**Address**
Katrina Coltrain	US EPA Region 6	214-665-8143	coltrain.katrina@epamail.epa.gov	1445 Ross Avenue Dallas, Texas 75202
Margaret O'Hare	CH2M HILL, EPA Contractor	972-980-2170	mohare@ch2m.com	5339 Alpha Road, Ste 300 Dallas, Texas 75240
Darren Davis	CH2M HILL, EPA Contractor	972-980-2170	ddavis9@ch2m.com	5339 Alpha Road, Ste 300 Dallas, Texas 75240

Interview Questions (please address the time since the last five-year review, conducted in 1996).

1. What is your overall impression of the work conducted at the site since the last five-year review conducted mid-1996?

Response: EXCELLENT

2. From your perspective, what effect have continued remedial operations at the site had on the surrounding community?

Response: NO ADVERSE IMPACT

3. Are you aware of any community concerns regarding the site or its operation and administration? Please provide details.

Response: NONE

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism, trespassing, or emergency response from local authorities? If so, please give details.

Response: NONE

5. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please describe purpose and results.

Response: SITE IS ACTIVE OPERATION FOR DEPARTMENT OF PUBLIC OPERATIONS

6. Have there been any complaints, violations, or other incidents related to the site that required a response by your office? If so, please give details of the events and results of the responses.

Response: NONE

7. Do you feel well-informed about the site's activities and progress?

Response: YES

8. Do you have any comments, suggestions, concerns, or recommendations regarding the site?

Response: NONE

Five-Year Review Interview Record Bayou Bonfouca Site Slidell, Louisiana	**Interviewee:** Bob Perkins, Resident

Site Name	**EPA ID No.**	**Date of Interview**	**Interview Method**
Bayou Bonfouca Superfund Site	LAD980745632	2/20/01	telephone

Interview Contacts	**Organization**	**Phone**	**Email**	**Address**
Katrina Coltrain	US EPA Region 6	214-665-8143	coltrain.katrina@epamail.epa.gov	1445 Ross Avenue Dallas, Texas 75202
Margaret O'Hare	CH2M HILL, EPA Contractor	972-980-2170	mohare@ch2m.com	5339 Alpha Road, Ste 300 Dallas, Texas 75240
Darren Davis	CH2M HILL, EPA Contractor	972-980-2170	ddavis9@ch2m.com	5339 Alpha Road, Ste 300 Dallas, Texas 75240

Interview Questions (please address the time since the last five-year review, conducted in 1996).

1. What is your overall impression of the work conducted at the site since mid-1996 (the time of the last five-year review)?

Response: Yes, very productive. There has been a dramatic change in the bayou. He is/was pleased with the people that worked on the project: ACE. They were professional, courteous, proficient, and did what they said they would do. He would like the wells removed, however understands that they are needed.

2. From your perspective, what effect have continued remedial operations at the site had on the surrounding community?

Response: There has been a dramatic change. The awful stink that used to be present is gone and there is an increase in the water quality. The wildlife have come back–birds, alligators, fish (has caught speckled trout), crab (has caught crabs), and otters (swimming in his pond on his property).

3. Are you aware of any community concerns regarding the site or its operation and administration? Please provide details.

Response: He is a member of the marina board and the water quality has changed making it a more enjoyable boating experience. The boats need to be cleaned more often due to the growth of algae. The water is not sterile and is returning to a natural state verses a chemical state.

Not related to the site: The city needs to investigate the area by the boat ramp–possible sewage leak. There is a bad odor.

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism, trespassing, or emergency response from local authorities? If so, please give details.

Response: Not aware of any.

5. Are you aware of routine communications or activities (site visits, inspections, reporting activities, public meetings, etc.) conducted by the city, LDEQ, or EPA regarding the site?

Response: Yes.

6. Do you feel well-informed about the site's condition and status?

Response: Yes.

7. Do you have any comments, suggestions, concerns, or recommendations regarding the site?

Response: Fine job. Also, Southern Ship was a great cleanup as well.

Five-Year Review Interview Record Bayou Bonfouca Site Slidell, Louisiana	**Interviewees:** Carl Helwig and Anne Sobol Organization: SWAMP email: cehelwig@bellsouth.net asobol@bellsouth.net

Site Name	**EPA ID No.**	**Date of Interview**	**Interview Method**
Bayou Bonfouca Superfund Site	LAD 980745632	2-20-2001	in person

Interview Contacts	**Organization**	**Phone**	**Email**	**Address**
Katrina Coltrain	US EPA Region 6	214-665-8143	coltrain.katrina@epamail.epa.gov	1445 Ross Avenue Dallas, Texas 75202
Margaret O'Hare	CH2M HILL, EPA Contractor	972-980-2170	mohare@ch2m.com	5339 Alpha Road, Ste 300 Dallas, Texas 75240
Darren Davis	CH2M HILL, EPA Contractor	972-980-2170	ddavis9@ch2m.com	5339 Alpha Road, Ste 300 Dallas, Texas 75240

Interview Questions (please address the time since the last five-year review, conducted in 1996).

1. What is your overall impression of the work conducted at the site since mid-1996 (the time of the last five-year review)?

Response: The presence of the incinerator was a concern, but SWAMP is now happy with the cleanup completed. During cleanup, they had a good working relationship with Mark Hansen/EPA RPM. However, in the time since the incineration was completed, they are concerned regarding how little attention is given to what remains at the site. They would like to hear more about the status of the groundwater remediation progress, and they are concerned about how far the groundwater contamination extends.

2. From your perspective, what effect have the continued remedial operations at the site had on the surrounding community?

Response: During the incineration, there were many complaints, but since then the community has not expressed concerns.

3. Are you aware of any community concerns regarding the site or its operation and administration? Please provide details.

Response: See response to Question 2. Also, there are some ongoing concerns regarding the sewage treatment plant installed by the city (not related to the site).

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism, trespassing, or emergency response from local authorities? If so, please give details.

Response: None since the first five-year review.

5. Have there been routine communications or activities (site visits, meetings, reporting activities, etc.) conducted by your organization regarding the site? If so, please describe purpose and results.

Response: There is a community bulletin published at milestone events. SWAMP indicated they know from this bulletin that things are happening at the site, and they would like more attention given these activities by the City.

6. Have there been any complaints, violations, or other incidents related to the site that required a response by your organization? If so, please give details of the events and results of the responses.

Response: No.

7. Do you feel well-informed about the site's activities and progress?

Response: Yes. They receive the informational bulletins, and they feel EPA has been very responsive when they have questions.

8. Do you have any comments, suggestions, concerns, or recommendations regarding the site?

Response: Only that they would like more communication/reassurance that the groundwater treatment and extraction system is good enough to address the contamination that remains at the site.

Attachment 3

Site Inspection Checklist

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Bayou Bonfouca
Five-Year Review Site Inspection Checklist

Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program. N/A means "not applicable."

I. SITE INFORMATION	
Site Name: Bayou Bonfouca	**EPA ID: LAD980745632**
City/State: Slidell, LA.	**Date of Inspection: 02/20/2001**
Agency Completing 5 Year Review: EPA	**Weather/temperature:** 70E, Partly Cloudy

Remedy Includes: (Check all that apply)
- : Landfill cover/containment
- : Access controls
- : Institutional controls
- : Groundwater pump and treatment
- 9 Surface water collection and treatment
- 9 Other:

Attachments: : Inspection team roster attached 9 Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager**:
   Name: Rick Tibbs
   Title: Plant Superintendent - IT Corp
   Date: 02/20/2001
   Interviewed: : at site 9 at office 9 by phone Phone Number:
   Problems, suggestions: : Additional report attached (if additional space required).

2. **O&M staff:**
   Name: Alan Gradet, Project Manager - IT Corp., Jim Montague, - US Army Corps of Engineers
   Title:
   Date: 02/20/2001
   Interviewed: : at site 9 at office 9 by phone Phone Number:
   Problems, suggestions: : Additional report attached (if additional space required).

3. Local regulatory authorities and response agencies (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency: Louisiana Department of Environmental Quality
Contact:
Name: Rich Johnson
Title:
Date:
Phone Number:
Problems, suggestions: : Additional report attached (if additional space required).

Agency: City of Slidell
Contact:
Name: Martin Bruno
Title: City Planner
Date:
Phone Number:
Problems, suggestions: : Additional report attached (if additional space required).

Agency:
Contact:
Name:
Title:
Date:
Phone Number:
Problems, suggestions: 9 Additional report attached (if additional space required).

Agency:
Contact:
Name:
Title:
Date:
Phone Number:
Problems, suggestions: 9 Additional report attached (if additional space required).

4. Other interviews (optional) 9 N/A : Additional report attached (if additional space required).

III. ONSITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. O&M Documents

: O&M Manual	: Readily available	: Up to date	9 N/A
: As-Built Drawings	: Readily available	: Up to date	9 N/A
9 Maintenance Logs	9 Readily available	9 Up to date	9 N/A

Remarks: The O&M Manual is currently being revised. The new plan will be in accordance with the upgrades made to the system. Maintenance logs were not asked for, but maintenance at the site occurs on a daily basis.

2. Health and Safety Plan Documents

: Site-Specific Health and Safety Plan	: Readily available	: Up to date	9 N/A
: Contingency plan/emergency response plan	9 Readily available	: Up to date	9 N/A

Remarks:

3. O&M and OSHA Training Records : Readily available : Up to date 9 N/A

Remarks:

4. Permits and Service Agreements

9 Air discharge permit	9 Readily available	9 Up to date	9 N/A
: Effluent discharge	: Readily available	: Up to date	9 N/A
9 Waste disposal, POTW	9 Readily available	9 Up to date	9 N/A
9 Other permits	9 Readily available	9 Up to date	9 N/A

Remarks: Discharge limits set by EPA, and they are not part of a formal permit

5. Gas Generation Records 9 Readily available 9 Up to date : N/A

Remarks:

6. Settlement Monument Records : Readily available : Up to date 9 N/A

Remarks: Settlement survey for entire site is conducted monthly

7. Groundwater Monitoring Records : Readily available : Up to date 9 N/A

Remarks: GW monitoring occurs in the form of water levels, four wells are sampled monthly, and records are kept on the volume of gw extracted.

8. Leachate Extraction Records 9 Readily available 9 Up to date : N/A

Remarks:

9. Discharge Compliance Records : Readily available : Up to date 9 N/A

Remarks:

10. Daily Access/Security Logs 9 Readily available 9 Up to date 9 N/A
Remarks: The access log could not be located when we arrived

IV. O&M Costs 9 Applicable 9 N/A

1. O&M Organization
9 State in-house 9 Contractor for State
9 PRP in-house 9 Contractor for PRP
: Other: Contractor for EPA. Responsibility for O&M will be transferred to the State of Louisiana in July 2001

2. O&M Cost Records
Cost was estimated by USACE at $30,000 to $40,000 per month depending on amount of maintenance. Onsite personnel and the EPA RPM present at the site inspection concurred with that amount.

9 Readily available 9 Up to date 9 Funding mechanism/agreement in place
Original O&M cost estimate: 9 Breakdown attached

Total annual cost by year for review period if available

From (Date):	To (Date):	Total cost:	9 Breakdown attached
From (Date):	To (Date):	Total cost:	9 Breakdown attached
From (Date):	To (Date):	Total cost:	9 Breakdown attached
From (Date):	To (Date):	Total cost:	9 Breakdown attached
From (Date):	To (Date):	Total cost:	9 Breakdown attached

3. Unanticipated or Unusually High O&M Costs During Review Period : N/A
Describe costs and reasons:

V. ACCESS AND INSTITUTIONAL CONTROLS : Applicable 9 N/A

A. Fencing

1. Fencing damaged 9 Location shown on site map 9 Gates secured 9 N/A
Remarks: Fence appeared in good condition. Gate was open and unattended when inspectors arrived at the site.

B. Other Access Restrictions

1. Signs and other security measures 9 Location shown on site map 9 N/A
Remarks: One sign was posted on the front gate, and another sign was posted on the fence along the bayou. No other signs were observed along the site fence

C. Institutional Controls

1. Implementation and enforcement

Site conditions imply ICs not properly implemented:	9 Yes	: No	9 N/A
Site conditions imply ICs not being fully enforced:	9 Yes	: No	9 N/A
Type of monitoring (e.g, self-reporting, drive by):			
Frequency:			
Responsible party/agency:			
Contact:			
Name:			
Title:			
Date:			
Phone Number:			
Reporting is up-to-date:	9 Yes	9 No	: N/A
Reports are verified by the lead agency:	9 Yes	9 No	: N/A
Specific requirements in deed or decision documents have been met:	9 Yes	9 No	: N/A
Violations have been reported:	9 Yes	9 No	: N/A

Other problems or suggestions: 9 Additional report attached (if additional space required).

2. Adequacy : ICs are adequate 9 ICs are inadequate 9 N/A
Remarks:

D. General

1. Vandalism/trespassing 9 Location shown on site map : No vandalism evident
Remarks:

2. Land use changes onsite 9 N/A
Remarks: Part of the property has been redeveloped into a city maintenance facility.

3. Land use changes offsite : N/A
Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads : Applicable 9 N/A

1. Roads damaged 9 Location shown on site map : Roads adequate 9 N/A
Remarks:

B. Other Site Conditions

Remarks: Site appears well-maintained

VII. LANDFILL COVERS

: Applicable 9 N/A

A. Landfill Surface

1. Settlement (Low spots)
Areal extent:
Remarks:
9 Location shown on site map
Depth:
: Settlement not evident

2. Cracks
Lengths:
Remarks:
9 Location shown on site map
Widths: Depths:
: Cracking not evident

3. Erosion
Areal extent:
Remarks:
9 Location shown on site map
Depth:
: Erosion not evident

4. Holes
Areal extent:
Remarks:
9 Location shown on site map
Depth:
: Holes not evident

5. Vegetative Cover
: Cover properly established : No signs of stress 9 Grass 9 Trees/Shrubs
Remarks:

6. Alternative Cover (armored rock, concrete, etc.)
Remarks:
: N/A

7. Bulges
Areal extent:
Remarks:
9 Location shown on site map
Height:
: Bulges not evident

8.	**Wet Areas/Water Damage**			: Wet areas/water damage not evident
	9 Wet areas	9 Location shown on site map	Areal extent:	
	9 Ponding	9 Location shown on site map	Areal extent:	
	9 Seeps	9 Location shown on site map	Areal extent:	
	9 Soft subgrade	9 Location shown on site map	Areal extent:	
	Remarks:			
9.	**Slope Instability**	9 Slides	9 Location shown on site map	: No evidence of slope instability
	Areal extent:			
	Remarks:			
B.	**Benches**			9 Applicable : N/A
	(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)			
1.	**Flows Bypass Bench**	9 Location shown on site map		9 N/A or okay
	Remarks:			
2.	**Bench Breached**	9 Location shown on site map		9 N/A or okay
	Remarks:			
3.	**Bench Overtopped**	9 Location shown on site map		9 N/A or okay
	Remarks:			
C.	**Letdown Channels**			9 Applicable : N/A
	(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)			
1.	**Settlement**	9 Location shown on site map		9 No evidence of settlement
	Areal extent:	Depth:		
	Remarks:			
2.	**Material Degradation**	9 Location shown on site map		9 No evidence of degradation
	Material type:	Areal extent:		
	Remarks:			
3.	**Erosion**	9 Location shown on site map		9 No evidence of erosion
	Areal extent:	Depth:		
	Remarks:			

4.	**Undercutting** Areal extent: Remarks:	9 Location shown on site map Depth:	9 No evidence of undercutting	
5.	**Obstructions** Type: Areal extent: Remarks:	9 Location shown on site map Height:	9 N/A	
6.	**Excessive Vegetative Growth** 9 Evidence of excessive growth 9 Location shown on site map Remarks:	9 No evidence of excessive growth 9 Vegetation in channels but does not obstruct flow Areal extent:		
D.	**Cover Penetrations**		: Applicable	9 N/A
1.	**Gas Vents** 9 Active : Passive 9 Properly secured/locked 9 Evidence of leakage at penetration Remarks:	9 Routinely sampled : Functioning 9 Needs O& M	: Good condition	9 N/A
2.	**Gas Monitoring Probes** 9 Routinely sampled 9 Properly secured/locked 9 Evidence of leakage at penetration Remarks:	9 Functioning 9 Needs O&M	9 Good condition	: N/A
3.	**Monitoring Wells** (within surface area of landfill) 9 Routinely sampled 9 Properly secured/locked 9 Evidence of leakage at penetration Remarks:	9 Functioning 9 Needs O&M	9 Good condition	: N/A
4.	**Leachate Extraction Wells** 9 Routinely sampled 9 Properly secured/locked 9 Evidence of leakage at penetration Remarks:	9 Functioning 9 Needs O&M	9 Good condition	: N/A
5.	**Settlement Monuments** Remarks: Monuments are located on the cap, but not routinely surveyed.	9 Located	9 Routinely surveyed	9 N/A

E.	**Gas Collection and Treatment**		**9** Applicable	**:** N/A
1.	**Gas Treatment Facilities** **9** Flaring **9** Thermal destruction **9** Collection for reuse **9** Good condition **9** Needs O& M Remarks:			**9** N/A
2.	**Gas Collection Wells, Manifolds and Piping** **9** Good condition **9** Needs O& M Remarks:			**9** N/A
3.	**Gas Monitoring Facilities** (e.g., gas monitoring of adjacent homes or buildings) **9** Good condition **9** Needs O& M Remarks:			**9** N/A
F.	**Cover Drainage Layer**		**9** Applicable	**:** N/A
1.	**Outlet Pipes Inspected** Remarks:	**9** Functioning		**9** N/A
2.	**Outlet Rock Inspected** Remarks:	**9** Functioning		**9** N/A
G.	**Detention/Sedimentation Ponds**		**9** Applicable	**:** N/A
1.	**Siltation** Areal extent: Remarks:	**9** Siltation evident Depth:		**9** N/A
2.	**Erosion** Areal extent: Remarks:	**9** Erosion evident Depth:		**9** N/A
3.	**Outlet Works** Remarks:	**9** Functioning		**9** N/A
4.	**Dam** Remarks:	**9** Functioning		**9** N/A
H.	**Retaining Walls**		**9** Applicable	**:** N/A
1.	**Deformations** Horizontal displacement:	**9** Location shown on site map Vertical displacement:	**9** Deformation not evident Rotational displacement:	

2.	**Degradation** Remarks:	9 Location shown on site map	9 Degradation not evident
I.	**Perimeter Ditches/Offsite discharge**		: Applicable 9 N/A
1.	**Siltation** Areal extent: Remarks:	9 Location shown on site map Depth:	: Siltation not evident
2.	**Vegetative Growth** Areal extent: Remarks:	9 Location shown on site map Type:	: Vegetation does not impede flow
3.	**Erosion** Areal extent: Remarks:	9 Location shown on site map Depth:	: Erosion not evident
4.	**Discharge Structure** : Functioning Remarks:	9 Location shown on site map : Good Condition	9 N/A

VIII. VERTICAL BARRIER WALLS

9 Applicable : N/A

1.	**Settlement** Areal extent: Remarks:	9 Location shown on site map Depth:	9 Settlement not evident
2.	**Performance Monitoring** 9 Performance not monitored 9 Performance monitored 9 Evidence of breaching Remarks:	Frequency: Head differential:	9 N/A

IX. GROUNDWATER/SURFACE WATER REMEDIES

: Applicable 9 N/A

A.	**Groundwater Extraction Wells, Pumps, and Pipelines**		: Applicable	9 N/A
1.	**Pumps, Wellhead Plumbing, and Electrical** : All required wells located Remarks:	: Good condition	9 Needs O& M	9 N/A

2. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances 9 N/A
: System located : Good condition 9 Needs O& M
Remarks:

3. Spare Parts and Equipment 9 N/A
: Readily available 9 Good condition
9 Requires Upgrade 9 Needs to be provided
Remarks:

B. Surface Water Collection Structures, Pumps, and Pipelines 9 Applicable : N/A

1. Collection Structures, Pumps, and Electrical 9 N/A
9 Good condition 9 Needs O& M
Remarks:

2. Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances 9 N/A
9 Good condition 9 Needs O& M
Remarks:

3. Spare Parts and Equipment 9 N/A
9 Readily available 9 Good condition
9 Requires Upgrade 9 Needs to be provided
Remarks:

C. Treatment System : Applicable 9 N/A

1. Treatment Train (Check components that apply)
9 Metals removal : Oil/water separation 9 Bioremediation
9 Air stripping : Carbon adsorbers : Filters (list type): sand, oleophilic
: Additive (list type, e.g., chelation agent, flocculent)
9 Others (list):
: Good condition 9 Needs O&M
: Sampling ports properly marked and functional
: Sampling/maintenance log displayed and up to date
: Equipment properly identified
9 Quantity of groundwater treated annually (list volume):
9 Quantity of surface water treated annually (list volume):
Remarks:

2. Electrical Enclosures and Panels (properly rated and functional) 9 N/A
: Good condition 9 Needs O& M
Remarks:

3. Tanks, Vaults, Storage Vessels 9 N/A
: Good condition : Proper secondary containment 9 Needs O&M
Remarks:

4. Discharge Structure and Appurtenances 9 N/A
: Good condition 9 Needs O& M
Remarks:

5. Treatment Building(s) 9 N/A
: Good condition (esp. roof and doorways) 9 Needs Repair
: Chemicals and equipment properly stored
Remarks:

6. Monitoring Wells (pump and treatment remedy) 9 N/A
: All required wells located : Properly secured/locked : Functioning 9 Routinely sampled
: Good condition 9 Needs O&M
Remarks: Used to monitor drawdown and for subsidence survey monitoring.

D. Monitored Natural Attenuation 9 Applicable : N/A

1. Monitoring Wells (natural attenuation remedy) 9 N/A
9 All required wells located 9 Properly secured/locked 9 Functioning 9 Routinely sampled
9 Good condition 9 Needs O&M
Remarks:

X. OTHER REMEDIES

9 Applicable : N/A

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.)

The purpose of the ongoing remedial action is to extract free-phase creosote and to prevent migration of dissolved-phase and free-phase contamination into the bayou. The extraction system appears effective at removing creosote from the subsurface. No monitoring is conducted to confirm lack of migration of dissolved phase or free-phase contamination to the bayou.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

LTRA activities at the site appear well-implemented. The procedures appear adequate to maintain the system, and keep the completed portions of the remedy protective.

C. Early Indicators of Potential Remedy Failure

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

The extraction system was recently upgraded to accomplish this task. The site has been operating with these upgrades for about seven months, and site operations at the site are now routine. No further optimization needs were observed.

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Attachment 3
Site Inspection Roster
Bayou Bonfouca Superfund Site
February 20, 2001

Name	Agency/Company	Phone Number	Email
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Attachment 4

Site Inspection Photographs

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Note: The photographs have been deleted from this electronic version of the report, to make the file size smaller for emailing. To see the photographs, please refer to the electronic version of the report on compact disc, or the paper copy of the report.

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