

GENERAL SITE INFORMATION, CHARACTERISTICS, AND STATUS

Project Name	<u>LAVACA BAY - PROJECT 1 (Treatability Study)</u>	ProjectID: 06-03
Last Updated:	08/23/04	
City:	Point Comfort	
County:	Calhoun	
State:	TX	
Country:	USA	
Bodies of Water:	Lavaca Bay (including Cox Lake, Cox Marsh, and portions of Matagorda Bay)	
US EPA Region:	VI	
Status (Active, Complete, or Monitoring Only):	Complete	
Date On NPL:	1994	
ROD/ESD Date:	None	
Operable Unit:	N/A	
Areas of Concern (length or acres):	80,000 acres of Lavaca Bay (includes 2,500 acres with fisheries closed); 400-acre man-made dredge spoils island.	
Other Characteristics of Water Body:	<p>The Alcoa Industrial Channel provides access from Lavaca Bay for ships and barges into the Point Comfort dock facilities. The channel is approximately 3,800-ft long. The southern portion of the channel area is routinely dredged every 18 to 24 months using a hydraulic dredge with the dredged material pumped to upland Dredge Disposal Areas. The northern portion is dredged less frequently. While the maintenance dredging focuses on the Channel, other areas between the Channel and the plant shoreline and the Channel and Dredge Island have elevated mercury concentrations and are not routinely dredged.</p> <p>Dredge Island is man-made, 400 acres, and includes a 91-acre gypsum lagoon and a five-lagoon dredge spoil area covering about 50 acres.</p>	
Contaminants of Concern:	mercury	
Source of Contamination:	Wastewater discharges containing mercury from a now defunct chlor-alkali production plant which used mercury electrodes in the electrolytic process. Discharges were made through outfalls located in an off-shore gypsum lagoon on nearby Dredge Island.	
Contaminated Area Physical Characteristics:	<p>The treatability study targeted a northern and a southern subarea for dredging, both being located between the shoreline adjacent to the Alcoa facility and the navigational channel. Mercury levels in surface sediments in the northern subarea averaged 0.71 ppm with a maximum concentration of 0.98 ppm. Highest at depth concentration was 4.47 ppm mercury (20-30 cm depth). Surficial mercury concentrations in the southern subarea ranged from 0.46 to 119.9 ppm, with the non-geographic weighted average being 11.4 ppm. Subsurface samples varied considerably both aurally and with depth. The maximum mercury concentration at depth was 137.4 ppm (55-56 cm depth).</p>	
Type of Regulatory Action:	Superfund. Interim.	
Overall Status Summary:	<p>A draft RI report and Baseline Risk Assessment were submitted by Alcoa to USEPA in August 1998 and an interim cleanup was initiated in mid-1998. The interim cleanup was performed as a dredging treatability study for the industrial channel. For the treatability study, several contiguous areas adjacent to the Alcoa facility were selected that contained sediments with elevated levels of mercury. During the study it was estimated that 73,000 cy of contaminated sediments would be removed, a total of 103,000 cy including sediments removed due to overdredging. The treatability study was designed to test a variety of dredging conditions. The areas selected were located along the eastern shore of the channel along the facility</p>	

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shoreline and included areas with both deep and shallow water and various structures to dredge around. Areas selected for dredging included 1) a shallow draft barge mooring area, 2) a contaminated pipe trench area, 3) sloped areas bordering the navigation dredging areas, and 4) an area adjacent to the former chlor-alkali facility which was contaminated from ground water influx. The contamination profiles for these areas included elevated mercury concentrations at surface and at depth as well as higher concentrations at depth and lower concentrations at the surface.

The treatability study was performed in combination with a larger navigational dredging project. The deep water areas were targeted as Phase I of the study in conjunction with maintenance dredging of the navigational channel using a 20-inch hydraulic cutterhead dredge. Phase II was performed in the shallow water areas using a 12-inch hydraulic cutterhead dredge. The Phase II area was originally to be at the northern end of the previously targeted eastern channel area but was eventually moved to the western side of the channel near the northern tip of Dredge Island due to sensitive habitat identified in the original area.

The dredge spoils were discharged either to an existing upland dredge material disposal lake typically used for navigational dredge spoils (Phase I) or to Dredge Island (Phase II).

The Phase I project was completed in 3 weeks and removed between 60,000 and 80,000 cy containing an estimated 1,500 pounds of mercury at a total cost of \$1,840,000. The project resulted in the removal of mercury contaminated sediments in an area considered subject to sediment suspension via ship and barge traffic. Comparison of pre- and post-dredge surface mercury data indicated significant variability in the results. In some areas with moderate pre-dredge mercury levels (surface and at depth), significant reductions in sediment mercury levels were achieved. In these areas the impacted sediments were typically interlaid with a hard virgin clay, which was used to define the depth of dredging. In other areas which exhibited high mercury concentrations at depth, post-dredge surficial mercury concentrations were in some cases significantly elevated over pre-dredge concentrations.

Monitoring (oyster study) during dredging indicated no significant dispersion of dredged material downcurrent for either total or dissolved mercury. Some elevated mercury levels were observed during water column readings. Resuspension of dredge material and resuspension losses were minimized by using silt curtains, a shield over the cutterhead, slow advance rate for the dredge, slow cutterhead speed (5 rpm), and slow lateral movement of the cutterhead.

A smaller scale pilot dredging project (Phase II) was conducted as part of the treatability study in a shallow water area adjacent to Dredge Island. Phase II resulted in removal of an estimated 9,500 cy of contaminated sediments at a total cost of \$251,000. Dredging, using a 12-inch hydraulic cutterhead, began the week of January 18, 1999 and ended February 4, 1999. The contamination profile for this area showed increasing mercury concentrations with depth. Spoil material was placed in an impounded area on the adjacent Dredge Island. Pre- and post-monitoring of sediment, oysters, and water column mercury levels was conducted. Sediment verification sampling data indicated that post-dredge surficial concentrations were generally not significantly reduced from pre-dredge concentrations. Water column, oyster, and sediment monitoring outside of the dredge area showed no significant resuspension or transport of contaminants outside the silt curtain area during dredging.

A ROD was issued in 2001 that describes the long-term cleanup of sediments in Lavaca Bay. This project is described in the MCSS Database as Lavaca Bay - Project 2 (the Bay), Project ID 06-05.

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Remedial Action Planned: ☒

Risk Assessment: ☐

Remedial Action Implemented: ☒

Status of Dredging ☐

PRPs: ☒

Contacts: ☒

References: ☒

Modeling: ☒

Fishing Advisory: ☒

Key Conditions: confined disposal facility, dredging, hydrodynamic modeling, more-harm-than-good, post monitoring, navigational dredging component, pilot/demonstration test, tidal fluctuations

REMEDIAL ACTION PLANNED

Project Name	<u>LAVACA BAY - PROJECT 1 (Treatability Study)</u>	ProjectID: 06-03
Last Updated:	01/31/00	
Target Sediment Cleanup Standards (TSCS):	No agreed upon sediment cleanup standard although a steady low-level mercury concentration of 0.7 ppm was used to estimate removal volumes.	
How TSCS Established:	Objectives were based on removing mercury impacted sediments down to a depth where sediment concentrations reached a steady low-level mercury concentration. Based on previous core data, the maximum concentration corresponding to the low-steady levels was 0.7 ppm.	
Target Bank and Floodplain Cleanup Levels (if applicable):	N/A	
Other Target:	N/A	
Environmental Sample Data References:	<ul style="list-style-type: none">• Sediment:• Water:• Fish: Reference A-305	
Estimated Target Volume:	Originally 150,000 cy total from two separate locations; this was later revised to 103,000 cy (22,000 from the northern area [Phase II] and 51,000 from the southern area [Phase I], plus 30,000 cy from over dredging in both areas). The area selected for Phase II of the project was subsequently moved to a new location across the channel near the northern tip of Dredge Island.	
Planned Disposal Method:	<p>Alcoa currently maintains two upland dredged sediment disposal areas, identified as Dredge Disposal Area I (DDA 1) and Dredge Disposal Area 2 (DDA 2). DDA 1 is approximately 93 acres in size and has historically (since 1975) been used to dispose of sediments dredged from the Alcoa Channel. DDA 2 was constructed in 1995 and is approximately 70 acres in size and has received both new dredge sediments and sediments that were secondarily dredged from DDA 1. During active dredging the "dredged material will be managed as follows:</p> <ul style="list-style-type: none">• Pumping of dredge spoil into DDA 2;• Decanting supernatant from DDA 2 through the decant pipe at the western end of the unit; and• Routing the decant through the DDA I primary discharge structure to either Outfall 001 (during active dredging) or the discharge outfall south of the R-10 dock (postdredging)." <p>"If the results of modeling indicate that additional measures are required for maintenance of decant water quality, alternative decant management techniques will be evaluated."</p>	
Estimated Calendar Time to Implement Remedy:	Begin March 1998 in conjunction with the start of navigational dredging.	
Estimated Time to Implement Remedy:	3.5 months	
Estimated Cost to Implement Remedy:	Not available	
Stated Remedial Action Objectives (and Source):	(Source: Reference A- 305): "The overall objective of the study will be to develop information to support the technical and economic evaluation of remedial actions for mercury in Lavaca Bay sediments. Specific objectives of the study are to evaluate the effectiveness of dredging equipment on removal of mercury impacted sediments in the study area, to evaluate the potential impacts of dredging on mercury mobilization, and to evaluate the impacts of dredging on	

REMEDIAL ACTION PLANNED

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	mercury levels in Bay biota."	
Measures of Success to be Used:	Removal of targeted sediment mass based on pre-and post-remediation bathymetric surveys.	
Planned Monitoring and Restoration:	<ul style="list-style-type: none">• The effectiveness of both the dredge equipment and the operator in removing targeted sediments will be evaluated by comparing both pre- and post-dredging bathymetric surveys and pre- and post-dredging surficial sediment samples. Sediment samples will be collected immediately following dredging of a subarea (both core and grab samples of surface sediments). In addition, sediment samples will be collected outside the area dredged to assist in evaluating resuspension and transport of sediments from the dredged area.• Turbidity levels will be monitored outside of the silt curtain in a fan array. The TSS notification level is 150 mg/L and the threshold level to cease dredging operations is 500 mg/L at the 50-meter station.• Nearfield and farfield water sampling (total Hg and TSS) will be conducted.• Sampling will be performed for sediment influent entering the Dredge Disposal Area (% solids, % moisture, total Hg [filtered and unfiltered], methyl Hg [filtered and unfiltered], and TSS) and for dredge decant as it leaves either DD2 or at the Dredge Decant location south of R-10 Dock (total Hg [filtered and unfiltered], methyl Hg [filtered and unfiltered], TSS, and VSS).• Biological monitoring will be conducted; it will consist of deploying oysters, harvesting them at regular intervals, and measuring tissue uptake of mercury.	
Agency Position on Sediment Removal (and Source):		

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Physical Target:	<p>(Source: Reference A-305) "The actual depth of sediment removal at any location in the subareas will be determined by identifying the depth at which the peak concentration of mercury returns to a steady low-level concentration, and then adding a conservative over-dredge factor of an additional 6 inches to that depth. Six inches was selected because that depth was defined by the dredgers as one where they have a reasonable degree of accuracy with their dredge equipment."</p> <p>For the shallow water dredging conducted in Phase II, the selected work area had similar levels of surface contamination as the surrounding areas, thus the area to be dredged was defined based on a target volume of 10,000 cy and a targeted dredging depth. The area was intended to be representative of similar areas that may be considered for dredging at a later date (shallow nearshore areas with similar low mercury levels [about 1 ppm]). The vertical extent of mercury contamination was defined by collecting long cores in plastic tubes and slicing them into 10 cm sections for analysis. In most if not all areas, overdredge was required to obtain bathymetry to move the dredge forward (4.5 ft of water was required to float the dredge in an area that becomes exposed during low tide events and had contamination depths that typically were 1 to 3 feet).</p>	
Goals:	<p>(Source: Reference A-480)</p> <p>"The overall objectives of the proposed dredging treatability program are to:</p> <ul style="list-style-type: none">• understand the capability and effectiveness of dredging equipment in removing contaminated sediments;• understand the need for and methods to control decant water quality;• evaluate mercury fate during dredging operations and understand the impacts of dredging on mercury mobilization; and• use the opportunity created by the treatability study to understand the impact of targeted mercury-contaminated sediment removal on mercury concentrations in biota." <p>"Within these overall objectives, the treatability study can be separated into evaluating the effectiveness of dredging as it relates to various components of the program such as equipment, residual sediment concentration, disposal/decant operations, and the biota-related effects."</p>	
Primary Contractor:	King Fisher (Texas) (dredging contractor)	
Other Contractors:	Parametrix, MFG, and Anchor Environmental	
Generic Remediation Method:	Hydraulic dredging	
Equipment:	Hydraulic cutterhead dredges; for Phase I, a 20-inch with 16,000 ft long 20-inch diameter transport pipe with an 18-inch discharge and, for Phase II, a 14-inch diameter suction pipe with a 10-inch pump and 2,500 ft long 9-inch diameter HDPE transport pipe; silt curtains	
Material Handling:	Dredge spoil pumping rate was estimated to be 1,500 to 2,000 gpm during use of the 20-inch cutterhead.	
Volume Removed:	Phase I: 70,000 cy (5.8 acres); Phase II: 9,500 cy (1.2 acres).	
Calendar Time:	Phase I: August 7 to August 27, 1998; Phase II: Began January 18, 1999 and ended February 4, 1999.	
Time To Implement:	Phase I: 3 weeks working 24 hours/day, 7 days/week (to optimize use of 20-inch hydraulic cutterhead and reduce unit costs)	

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	Phase II: 2.5 weeks working 10.5 hours/day, 5.5 days/week (early quit on Saturday; limited to daylight hours for safety)	
Total Cost:	Not available	
Dredging Cost:	Phase I: \$1,840,000 (between \$23 and \$31 per cy); Phase II: \$251,000 (\$26 per cy)	
Disposal of Sediment:	One existing upland dredge sediment disposal area (DDA 2) for Phase 1. DDA 2 was constructed in 1995 and up to this time had been used only to receive sediments secondarily dredged from DDA 1. A spoil area located on Dredge Island (Dredge Island gypsum lagoon) was used for spoils from Phase II dredging.	
Volume of Water:		
Method of Water Treatment:	Gravity Settling	
Water Discharge Limit:		
Air Monitoring During Remediation:		
Water Monitoring During Remediation:	Monitoring consisted of turbidity monitoring, then correlating the turbidity values to TSS, and collecting and analyzing water samples for mercury. Action levels were established for turbidity levels that represented 150 ug/L and 500 ug/L TSS at 165 ft downstream of the silt curtain. Similar methodology was used for Phase II dredging. Samples were obtained downstream of the dredging operation and analyzed for total mercury; slightly elevated mercury levels were shown to occur periodically.	
Outcome:	<p>The Phase I project was completed in 3 weeks and removed ~70,000 cy containing an estimated 1,500 pounds of mercury. The project targeted the removal of mercury contaminated sediments in an area considered subject to sediment suspension due to ship and barge traffic. Comparison of pre- and post-dredge surface mercury data indicated significant variability in the results. In some areas with moderate pre-dredge mercury levels (surface and at depth), significant reductions in sediment mercury levels were achieved. In these areas the impacted sediments were typically interlain with a hard virgin clay, which was used to define the depth of dredging. In other areas that exhibited high mercury concentrations at depth, post-dredge surficial mercury concentrations were in some cases significantly elevated over pre-dredge concentrations. In one instance, pre-dredge surface sediment mercury concentrations were 0.6 ppm; following removal of 7 ft of sediment, the post-dredge surface sediment mercury concentration was 68 ppm.</p> <p>Monitoring (oyster study) during Phase I dredging indicated no significant dispersion of dredged material downcurrent for either total or dissolved mercury. Some elevated mercury levels were observed during water column readings. Resuspension of dredge material was minimized by using silt curtains, a shield over the cutterhead, slow advance rate for the dredge, slow cutterhead speed (5 rpm), and slow lateral movement of the cutterhead.</p> <p>A smaller scale pilot dredging project (Phase II) was conducted in a shallow water area adjacent to Dredge Island. Phase II dredging targeted the removal of an estimated 10,000 cy of contaminated sediments and was performed beginning the week of January 18, 1999 and ending February 4, 1999. The contamination profile for this area showed increasing mercury concentrations with depth. Spoil material was placed in an impounded area on the adjacent Dredge Island. Pre- and post-monitoring of sediment, oysters and water column mercury levels was conducted. Sediment verification sampling data indicated that post-dredge surficial concentrations were generally not</p>	

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	significantly reduced from pre-dredge concentrations. Sampling performed after dredging was complete indicated that surface sediment concentrations had gradually returned to near pre-dredge levels as discussed in Reference A-1131 as follows:	
	“The predredge surface mercury concentration ranged from 0.65 to 1.14 mg/kg. During dredging (after an initial pass), surface concentrations generally ranged from as low as 0.07 mg/kg to 1.01 mg/kg, with some isolated spots with concentration around 2 mg/kg and 4.5 mg/kg. About 2 to 3 weeks after dredging was completed, surface concentrations ranged from 0.22 mg/kg to 2.28 mg/kg. Samples collected 2-1/2 months after dredging were around 1 mg/kg (ranged from 0.82 to 1.09 mg/kg). In general, the immediately-dredged surface may demonstrate slightly lower mercury concentrations, but after time the surface concentrations seem to return to the pre-dredge values.”	
	Water column, oyster, and sediment monitoring outside of the dredge area showed no significant resuspension or transport of contaminants outside the silt curtain area during the dredging.	
Restoration and Post-Monitoring:	No restoration required; post-monitoring will be performed for sediment, water column, and Bay biota.	
Site-Specific Difficulties:	<ul style="list-style-type: none">• Additional dredging was required in a pipe trench area to achieve a depth elevation that was greater than originally delineated for the area.• Significant debris that clogged the dredge pump was encountered in areas adjacent to dock facilities. This resulted in significant downtime in selected areas.• The area selected for Phase II dredging required relocation just prior to commencement of dredging due to the unknown presence of an oyster reef and shell hash in the initial area.• Dredging was performed in a tidally influenced estuarine system, resulting in upstream and downstream flow patterns and requiring full perimeter installation of silt curtains. Silt curtains were tied to structures on shore.• In the Phase II area, overdredging was required to obtain sufficient bathymetry to move the dredge forward; the dredge required 4.5 ft of water to float; dredged areas were typically exposed during low tide and were contaminated to a depth of 1 to 3 feet.• The cutterhead dredge used in Phase II was outfitted with a hood for the first five days of dredging. The hood was then cut off the cutterhead, since it appeared that sediments were accumulating on the hood as the swing moved into the bank slopes, and were then sloughing off as the cutter proceeded through the remainder of the arc.	
Monitoring Data		
References:	<ul style="list-style-type: none">• <i>Sediment</i>• <i>Water:</i>• <i>Fish:</i>	

POTENTIALLY RESPONSIBLE PARTIES

Project Name LAVACA BAY - PROJECT 1 (Treatability Study)

ProjectID: 06-03

PRP Name: PRP INFORMATION NOT RELEASED

PRPID:

Street Address:

City:

State:

KEY CONTACTS

Project Name LAVACA BAY - PROJECT 1 (Treatability Study)

ProjectID: 06-03

Last Name: KEY CONTACT INFORMATION NOT RELEASED

Contact ID:

First Name:

Title:

Company:

Address:

City:

State:

Postal Code:

Work Phone # :

Other Phone #:

Fax # :

Email Address:

REFERENCES

Project Name LAVACA BAY - PROJECT 1 (Treatability Study)

ProjectID: 06-03

Reference Type: A

ReferenceID: 305

Title: **RI Workplan for the Alcoa (Point Comfort /Lavaca Bay Superfund Site: Volume M4: Industrial Channel Dredging: Treatability Study Workplan (Draft)**

Location: AEM

Category: Contaminated Sediments: Investigation/Delineation

Prepared by/Author:

Preparer/Author Address:

Prepared For: ALCOA (State Highway 35, Point Comfort, TX)

Date Published: October 1997

Key Words and Phrases:

Reference Type: A

ReferenceID: 478

Title: **Workplan Refinement Notice
Volume M4: Industrial Channel Dredging Treatability Study
Workplan
Refinement Notice Number: M4-RN01**

Location: AEM

Category: Remedial Action Plan/Work Plan

Prepared by/Author: ALCOA

Preparer/Author Address:

Prepared For: US EPA Region VI

Date Published: July 15, 1998

Key Words and Phrases:

REFERENCES

Project Name LAVACA BAY - PROJECT 1 (Treatability Study)

ProjectID: 06-03

Reference Type: A

ReferenceID: 479

Title: **Workplan Refinement Notice**
Volume M4: Industrial Channel Dredging Treatability Study
Workplan
Refinement Notice Number: M4-RN02

Location: AEM

Category: Remedial Action Plan/Work Plan

Prepared by/Author: ALCOA

Preparer/Author
Address: Point Comfort, TX 77978

Prepared For: US EPA Region VI

Date Published: December 9, 1998

Key Words and
Phrases:

Reference Type: A

ReferenceID: 480

Title: **RI Work Plan for the ALCOA (Point Comfort)/Lavaca Bay**
Superfund Site
Volume M4: Industrial Channel Dredging Treatability Study
Workplan

Location: AEM

Category: Remedial Action Plan/Work Plan

Prepared by/Author: ALCOA Environmental

Preparer/Author
Address:

Prepared For: Alcoa, Inc.

Date Published: November 1997

Key Words and
Phrases:

REFERENCES

Project Name LAVACA BAY - PROJECT 1 (Treatability Study)

ProjectID: 06-03

Reference Type: A

ReferenceID: 481

Title: ***RI Work Plan for the ALCOA (Point Comfort)/Lavaca Bay
Superfund Site
Volume M4: Industrial Channel Dredging Treatability Study
Workplan Addendum***

Location: AEM

Category: Remedial Action Plan/Work Plan

Prepared by/Author: ALCOA Environmental

**Preparer/Author
Address:**

Prepared For: Alcoa, Inc.

Date Published: March 1998

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 1131

Title: ***Treatability Dredge Study for the Alcoa (Point Comfort)/Lavaca
Bay Superfund Site (Draft)***

Location: AEM

Category: Close-Out Report

Prepared by/Author: Alcoa Environmental

**Preparer/Author
Address:**

Prepared For:

Date Published: January 2000

**Key Words and
Phrases:**

REFERENCES

Project Name LAVACA BAY - PROJECT 1 (Treatability Study)

ProjectID: 06-03

Reference Type: B
Title: *Alcoa/Lavaca Bay, Texas
EPA ID # TXD008123168*
Location: AEM
Category: Site Update
Prepared by/Author: US EPA Region VI
**Preparer/Author
Address:** Website
Prepared For: General Public
Date Published: July 28, 2004
**Key Words and
Phrases:**

ReferenceID: 1131

Reference Type: C
Title: *Alcoa removal mulled in Texas*
Location: AEM
Category: Site Update
Prepared by/Author:
**Preparer/Author
Address:**
Prepared For: Superfund Week
Date Published: April 18, 1997
**Key Words and
Phrases:**

ReferenceID: 34

Reference Type: C
Title: *EPA adds Alcoa site in Texas to NPL*
Location: AEM
Category: Site Update
Prepared by/Author:
**Preparer/Author
Address:**
Prepared For: Superfund Week
Date Published: February 25, 1994
**Key Words and
Phrases:**

ReferenceID: 174

REFERENCES

Project Name LAVACA BAY - PROJECT 1 (Treatability Study)

ProjectID: 06-03

Reference Type: C

ReferenceID: 197

Title: *EPA eyeing Lavaca Bay removals*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: November 3, 1995

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 300

Title: *Alcoa may do RI/FS in Texas*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: January 28, 1994

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 301

Title: *Alcoa/Lavaca Bay RI/FS ordered*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: September 23, 1994

**Key Words and
Phrases:**

REFERENCES

Project Name LAVACA BAY - PROJECT 1 (Treatability Study)

ProjectID: 06-03

Reference Type: C

ReferenceID: 519

Title: *Huge Removal Continues, Long-Term Decision Delayed at ALCOA in Texas*

Location: AEM

Category: Site Update

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For: Superfund Week

Date Published: October 1, 1999

**Key Words and
Phrases:**

Reference Type: E

ReferenceID: 139

Title: *Sediment Management Seminar February 9-10, 1998
Proceedings (Reference E-137)*

Location: AEM

Category: Dredging: Remedial (Contaminated Sediments)

Prepared by/Author: Blasland, Bouck & Lee, Inc.

**Preparer/Author
Address:** 6723 Towpath Road
P.O. Box 66
Syracuse, NY 13214

Prepared For: Attendees

Date Published: February 9-10, 1998

**Key Words and
Phrases:**

Reference Type: K

ReferenceID: 4

Title: *Photos of Dredging During 1998 Treatability Study*

Location: AEM

Category: Dredging: Remedial (Contaminated Sediments)

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For:

Date Published: 1998 circa - mid

**Key Words and
Phrases:**

REFERENCES

Project Name LAVACA BAY - PROJECT 1 (Treatability Study)

ProjectID: 06-03

Reference Type: M

ReferenceID: 277

Title: *Verification and Enhancement of TSS Source Strength Models for Cutter Dredges*

Location: AEM

Category: Resuspension

Prepared by/Author: Pei-Yao Wu, Donald F. Hayes

Preparer/Author Address: Department of Civil and Environmental Engineering
University of Utah

Prepared For: World Dredging Mining & Construction

Date Published: August 2000

Key Words and Phrases:

Reference Type: M

ReferenceID: 396

Title: *Evaluating Sediment Stability at Sites with Historic Contamination*

Location: AEM

Category: Modeling

Prepared by/Author: C. Kirk Ziegler

Preparer/Author Address: Quantitative Environmental Analysis, LLC
305 West Grand Avenue
Montvale, NJ 07645

Prepared For: Environmental Management

Date Published: May 2001

Key Words and Phrases:

Reference Type: R

ReferenceID: 27

Title: *Letter to PRP re: Case Histories: Contaminated Sediment Sites (with written response from ALCOA)*

Location: AEM

Category: Site Update

Prepared by/Author: AEM, Inc. with written response from ALCOA

Preparer/Author Address: Malvern, PA 19355

Prepared For: Alcoa, Inc., submitted to

Date Published: May 14, 1999

Key Words and Phrases:

MODELING

Project Name: LAVACA BAY - PROJECT 1 (Treatability Study)

ProjectID: 06-03

Last Updated: 02/25/00

Modeling Performed: Hydrodynamic and Mercury Fate and Transport

Modeling Objectives: Provide a basis for interpreting data and predicting impacts of storm events on contaminated bay sediments, and examine the relative contributions of historical discharges and ongoing sources of mercury to surface sediments.

Modeling Description:

Company Performing Modeling: Quantitative Environmental Analysis, LLC.

Modeling Status: Complete

Modeling Summary: As part of the Remedial Investigation/Feasibility Study (RI/FS) for the site, a number of studies were conducted directed at mercury fate within the bay. These studies focused on the impacts of storm-induced sediment transport on the erosion and transport of contaminated sediments, the contribution of ongoing sources to bay sediment contamination, the rate of recovery of bay sediments and the bioaccumulation of mercury by fish and shellfish. Detailed quantitative models of hydrodynamics, sediment transport, and mercury fate have been developed to provide a basis for interpreting data and predicting impacts of storm events. The models have been used to predict the degree to which a hurricane might uncover and transport contaminated sediments. Direct and indirect hits from hurricane storms similar to Hurricane Carla were simulated. The results indicate that conditions will not worsen as a result of hurricane conditions. In fact, the results of the study suggest that the concentrations of mercury in shallow sediments would be diminished by a large storm event.

In addition, a combination of data analysis and mathematical modeling were used to examine the relative contributions of historical discharges and ongoing sources to mercury contamination in surface sediments. This work involved mass balance analyses, modeling of mercury accumulation and burial in bay sediments, and modeling of mercury transport from source areas to the bay. The goal of this work was to determine the efficacy of various remedial options in accelerating the recovery of the bay. Extensive use of geographical information systems (GIS) enabled better understanding of the spatial aspects of the system. This GIS work included site characterization, data analysis, model input parameterization and final presentation.

Modeling and data analysis were also used to understand the pathways of mercury transport from water and sediment to fish and shellfish of concern, including red and black drum and blue crabs. This work focused on determining the probable response in the biota to reductions in mercury loading to the bay or to remedial actions directed to particular sediments within the bay.

FISH ADVISORIES

Project Name **LAVACA BAY - PROJECT 1 (Treatability Study)**

ProjectID: 06-03

<i>Advisory:</i>	Cox Bay (modified Area of Upper Lavaca Bay Advisory)	<i>AdvisoryID:</i> 1093
<i>Extent:</i>	The area of Cox Bay inshore of a line beginning at the southernmost point of land on the spoil island east of the Ship Channel northeast to Cox Point (Calhoun County)	
<i>Pollutant:</i>	mercury	
<i>Species:</i>	all fish	
<i>Population:</i>	NKZ	
<i>Population Definition:</i>	No-Kill Zones: Indicates it is illegal to take, kill or possess any fish from specified waters due to chemical contamination.	
<i>Advisory Type:</i>	Estuary	<i>Advisory Number:</i> 104233
<i>Status (Active or Rescinded):</i>	Rescinded	<i>Date Rescinded:</i>
<i>Contact Name:</i>	Kirk Wiles	<i>Contact Number:</i> 512-719-0215

<i>Advisory:</i>	Cox Bay (modified Area of Upper Lavaca Bay Advisory)	<i>AdvisoryID:</i> 1094
<i>Extent:</i>	The area of Cox Bay inshore of a line beginning at the southernmost point of land on the spoil island east of the Ship Channel northeast to Cox Point (Calhoun County)	
<i>Pollutant:</i>	mercury	
<i>Species:</i>	shellfish-crab	
<i>Population:</i>	NKZ	
<i>Population Definition:</i>	No-Kill Zones: Indicates it is illegal to take, kill or possess any fish from specified waters due to chemical contamination.	
<i>Advisory Type:</i>	Estuary	<i>Advisory Number:</i> 104233
<i>Status (Active or Rescinded):</i>	Rescinded	<i>Date Rescinded:</i>
<i>Contact Name:</i>	Kirk Wiles	<i>Contact Number:</i> 512-719-0215

FISH ADVISORIES

Project Name LAVACA BAY - PROJECT 1 (Treatability Study)**ProjectID:** 06-03

Advisory: Upper Lavaca Bay (Area Modified 01/13/2000, See Cox Bay) **AdvisoryID:** 306

Extent: That area of Lavaca Bay inshore of a line beginning at the last point of land at the northeastern approach of the Lavaca Bay Causeway, then in a southwest direction to Aquatic Life Marker A to Aquatic Life Marker B to Channel Marker #12, then in a southeastern direction to Aquatic Life Marker C to Aquatic Life Marker D to Aquatic Life Marker E to Channel Marker #74, then in a northeastern direction to Aquatic Life Marker F to the southernmost point of land on the spoil island east of the Ship Channel

Pollutant: mercury

Species: all fish

Population: NKZ

Population Definition: No-Kill Zones: Indicates it is illegal to take, kill or possess any fish from specified waters due to chemical contamination.

Advisory Type: Estuary **Advisory Number:** 851

Status (Active or Rescinded): Active **Date Rescinded:**

Contact Name: Kirk Wiles **Contact Number:** 512-719-0215

Advisory: Upper Lavaca Bay (Area Modified 01/13/2000, See Cox Bay) **AdvisoryID:** 305

Extent: That area of Lavaca Bay inshore of a line beginning at the last point of land at the northeastern approach of the Lavaca Bay Causeway, then in a southwest direction to Aquatic Life Marker A to Aquatic Life Marker B to Channel Marker #12, then in a southeastern direction to Aquatic Life Marker C to Aquatic Life Marker D to Aquatic Life Marker E to Channel Marker #74, then in a northeastern direction to Aquatic Life Marker F to the southernmost point of land on the spoil island east of the Ship Channel

Pollutant: mercury

Species: shellfish-crab

Population: NKZ

Population Definition: No-Kill Zones: Indicates it is illegal to take, kill or possess any fish from specified waters due to chemical contamination.

Advisory Type: Estuary **Advisory Number:** 851

Status (Active or Rescinded): Active **Date Rescinded:**

Contact Name: Kirk Wiles **Contact Number:** 512-719-0215
