# THIRD FIVE-YEAR REVIEW REPORT FOR ALCOA (POINT COMFORT)/LAVACA BAY SUPERFUND SITE CALHOUN COUNTY, TEXAS

**AUGUST 2021**

**Prepared by**

**U.S. Environmental Protection Agency**
**Region 6**
**Dallas, Texas**

**THIRD FIVE-YEAR REVIEW REPORT**
**ALCOA (POINT COMFORT)/LAVACA BAY SUPERFUND SITE**
**EPA ID#: TXD008123168**
**CALHOUN COUNTY, TEXAS**

This memorandum documents the U.S. Environmental Protection Agency's performance, determinations and approval of the third Five-Year review for the Alcoa (Point Comfort)/Lavaca Bay Superfund site under Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S. Code § 9621(c), as provided in the attached third Five-Year Review Report.

**Summary of the third Five-Year Review Report**

The site is located in Calhoun County, Texas, near the city of Point Comfort. The Site includes the 3,500-acre Alcoa Point Comfort Operations (PCO) Plant, the 420-acre Dredge Island, and portions of Lavaca Bay, Cox Bay, Cox Creek, Cox Cove, Cox Lake and western Matagorda Bay. Former smelting operations at the Site produced mercury-contaminated wastewater that was transported to an offshore lagoon on Dredge Island. Contamination has impacted soil, groundwater, surface water and sediment of the bay system. The cleanup includes extraction and treatment of groundwater, installation of a collection trench to stop dense non-aqueous phase liquid from moving into Lavaca Bay, removal and disposal of contaminated sediment at Dredge Island, and natural recovery of sediment left in place. Fish consumption restrictions are in place. Monitoring of sediment and fish tissue is ongoing.

**Environmental Indicators**

Human Exposure Status: Under Control
Contaminated Groundwater Status: Under Control
Sitewide Ready for Reuse: March 9, 2020

**Actions Needed**

The following actions must be taken for the remedy to be protective over the long term:

- Implement institutional controls at the Chlor-Alkali Process Area (CAPA) and Witco soils areas to protect the remedy and prevent potential exposures to remaining contamination,
- Continue monitoring to track progress in fish tissue mercury concentrations, and
- Assess the planned ship channel improvements (e.g., the new turning basin and port in the bay area immediately next to the Site) to determine if these dredging and removal activities will affect the ongoing remedial actions.

**Determination**

I have determined that the remedy for the Alcoa (Point Comfort)/Lavaca Bay Superfund site is protective of human health and the environment in the short term. This Five-Year Review Report specifies the actions that need to be taken for the remedy to be protective over the long term.

WREN STENGER

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Date: 2021.08.02 14:16:34 -05'00'

Wren Stenger
Director, Superfund and Emergency Management Division
U.S. Environmental Protection Agency, Region 6

**CONCURRENCES**

**THIRD FIVE-YEAR REVIEW REPORT**
**ALCOA (POINT COMFORT)/LAVACA BAY SUPERFUND SITE**
**EPA ID#: TXD008123168**
**CALHOUN COUNTY, TEXAS**


Digitally signed by Hunt, Laura
DN: cn=Hunt, Laura, email=Hunt.Laura@epa.gov
Date: 2021.07.07 13:53:16 -05'00'

Laura Hunt
Remedial Project Manager

Digitally signed by Villarreal, Chris
DN: cn=Villarreal, Chris, email=villarreal.chris@epa.gov
Date: 2021.07.13 22:11:00 -05'00'

Chris Villarreal
Chief, AR/TX Section

JOHN MEYER

Digitally signed by JOHN MEYER
DN: c=US, o=U.S. Government, ou=Environmental Protection Agency, cn=JOHN MEYER, 0.9.2342.19200300.100.1.1=68001003655626
Date: 2021.07.14 17:15:02 -05'00'

John C. Meyer
Chief, Superfund Remedial Branch

PAMELA TRAVIS

Digitally signed by PAMELA TRAVIS
DN: c=US, o=U.S. Government, ou=Environmental Protection Agency, cn=PAMELA TRAVIS, 0.9.2342.19200300.100.1.1=68001003655517
Date: 2021.07.23 15:39:02 -05'00'

Pamela Travis
Attorney, Office of Regional Counsel

I-JUNG CHIANG

Digitally signed by I-JUNG CHIANG
DN: c=US, o=U.S. Government, ou=Environmental Protection Agency, cn=I-JUNG CHIANG, 0.9.2342.19200300.100.1.1=68001003655489
Date: 2021.07.29 13:56:46 -05'00'

I-Jung Chiang
Chief, Superfund Branch, Office of Regional Counsel

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**ISSUES/RECOMMENDATIONS**

**THIRD FIVE-YEAR REVIEW REPORT**
**ALCOA (POINT COMFORT)/LAVACA BAY SUPERFUND SITE**
**EPA ID#: TXD008123168**
**CALHOUN COUNTY, TEXAS**

| **OU(s): Sitewide** | **Issue Category: Institutional Controls** | | | |
|---|---|---|---|---|
| | **Issue:** Institutional controls for areas encompassing capping remedies (CAPA and Witco area soils) need to be recorded. | | | |
| | **Recommendation:** Implement institutional controls at the CAPA and Witco soils areas to protect the remedy and prevent potential exposures to remaining contamination. | | | |
| **Affect Current Protectiveness** | **Affect Future Protectiveness** | **Party Responsible** | **Oversight Party/Support Agency** | **Milestone Date** |
| No | Yes | PRP | EPA | 9/30/2022 |

| **OU(s): Sitewide** | **Issue Category: Changed Site Conditions** | | | |
|---|---|---|---|---|
| | **Issue:** The slow decline of red drum tissue concentrations in the Closed Area have led to the study of other possible mercury sources and the completion of more remedies to control these sources. | | | |
| | **Recommendation:** Continue monitoring to track progress in fish tissue mercury concentrations. | | | |
| **Affect Current Protectiveness** | **Affect Future Protectiveness** | **Party Responsible** | **Oversight Party/Support Agency** | **Milestone Date** |
| No | Yes | PRP | EPA | 9/30/2022 |

| **OU(s): Sitewide** | **Issue Category: Changed Site Conditions** | | | |
|---|---|---|---|---|
| | **Issue:** Ongoing and pending improvements to the Matagorda Ship Channel from 2020 to 2024 may need to be monitored to assess how ship channel dredging could affect the remedy. | | | |
| | **Recommendation:** Assess the planned ship channel improvements (e.g., the new turning basin and port in the bay area immediately next to the Site) to determine if these dredging activities will affect ongoing remedial actions. | | | |
| **Affect Current Protectiveness** | **Affect Future Protectiveness** | **Party Responsible** | **Oversight Party/Support Agency** | **Milestone Date** |
| No | Yes | PRP | EPA | 9/30/2022 |

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## Tables

# Figures

# LIST OF ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| ARAR | Applicable or Relevant and Appropriate Requirement |
| CAB | Community Advisory Board |
| CAPA | Chlor-Alkali Process Area |
| CD | Consent Decree |
| CDF | Confined Disposal Area |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | Code of Federal Regulations |
| COC | Contaminant of Concern |
| DNAPL | Dense Nonaqueous Phase Liquid |
| EPA | United States Environmental Protection Agency |
| FYR | Five-Year Review |
| IC | Institutional Control |
| meHg | Methylmercury |
| mg/kg | Milligrams per Kilogram |
| mg/L | Milligrams per Liter |
| MS3 | Mainland Shoreline No. 3 |
| NCP | National Contingency Plan |
| NPL | National Priorities List |
| O&M | Operation and Maintenance |
| OMMP | Operation, Maintenance and Monitoring Plan |
| OU | Operable Unit |
| PAH | Polycyclic Aromatic Hydrocarbon |
| PCO | Point Comfort Operations |
| ppm | Parts per Million |
| PRP | Potentially Responsible Party |
| RAAER | Remedial Action Annual Effectiveness Report |
| RAO | Remedial Action Objective |
| ROD | Record of Decision |
| RPM | Remedial Project Manager |
| TCEQ | Texas Commission on Environmental Quality |
| TDH | Texas Department of Health |
| TDSHS | Texas Department of State Health Services |
| THg | Total Mercury |
| TOC | Total Organic Carbon |
| UU/UE | Unlimited Use and Unrestricted Exposure |

# I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, 42 U.S.C. § 9621, consistent with the National Contingency Plan (NCP) 40 CFR Section 300.430(f)(4)(ii), and considering EPA policy.

This is the third FYR for the Alcoa (Point Comfort)/Lavaca Bay Superfund site (the Site). The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared because hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of one operable unit (OU) that addresses soil, sediment and groundwater and is addressed in this FYR.

EPA remedial project manager (RPM) Laura Hunt led the FYR. Participants included EPA community involvement coordinator (CIC), Adam Weece, Texas Commission on Environmental Quality (TCEQ) project manager, Simon Payne, and Ryan Burdge and Karmen King from EPA FYR contractor Skeo. The potentially responsible party (PRP) was notified of the initiation of the FYR. The review began on 12/2/2020.

**Site Background**

The 5,410-acre Site is located on the south side of State Highway 35 near the city of Point Comfort, Texas (Figure 1). The former Alcoa Point Comfort Operations (PCO) Plant covers about 3,500 acres and was established as an aluminum smelter in 1948. The PCO Plant shut down in 2019. From the 1960s until 2019, other industrial facilities that operated at the PCO Plant area included:

- A chlor-alkali production plant known as the chlor-alkali process area (CAPA). Mercury and carbon tetrachloride were released to the subsurface at the CAPA. Between 1966 and 1970, wastewater containing mercury was transported to an offshore gypsum lagoon on Dredge Island. These activities resulted in mercury contamination in soil and shallow groundwater.
- Witco Chemical Corporation (Witco) processed coal tar from 1964 to 1985. The Witco portion of the PCO Plant area included a coal tar tank farm, a creosote storage area, a binder pitch storage area and a distillation area (Figure 2). As a result of the coal tar processing operations, polycyclic aromatic hydrocarbons (PAHs) discharged into Lavaca Bay through the movement of a dense non-aqueous phase liquid (DNAPL) in the former tank farm area.

Industrial activities and groundwater discharge to the bay resulted in the contamination of three distinct areas: (1) surface water and sediment of the Bay System (resulting in fish and shellfish bioaccumulation); (2) Dredge Island (Alcoa deposited waste in a lagoon); and (3) the Plant/Mainland, which includes the former CAPA and Witco areas.

Land uses next to the PCO Plant area are principally industrial and agricultural. They include Formosa Hydrocarbons Production Corporation and Calhoun Port Authority Agricultural pasturelands, which are located to the east of the PCO Plant area. Lavaca Bay is used for recreational fishing as well as commercial shrimping, fishing, crabbing and oystering. There are numerous fishing facilities located on or near Lavaca Bay, including boat ramps, piers, docks and bait shops.

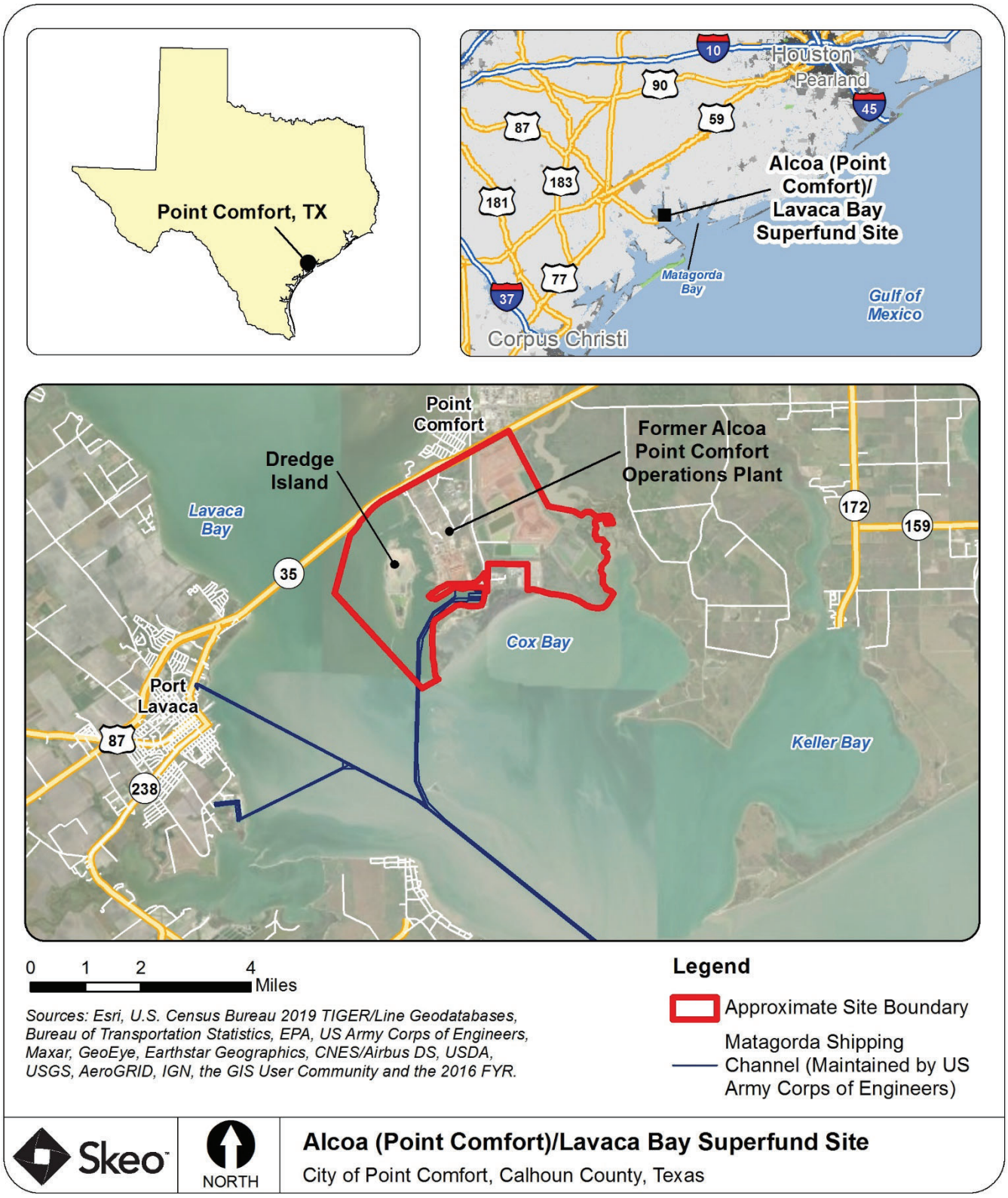
Several groundwater zones occur at various depths across the Site and are referred to as Zones A, B and C (from shallowest to deepest). Zone A is usually present about 0 to 5 feet above sea level and has Beaumont Clay above and below it. Zone B occurs around 20 to 30 feet below sea level, is between 1 foot and 20 feet in thickness, and is a direct discharge to Lavaca Bay. Zone C is separated from Zone B by Beaumont Clay. It is the deepest groundwater zone at the plant. The thickness of Zone C is unknown but exceeds 50 feet at the CAPA. Groundwater in the shallow zones in the area of CAPA flows toward the bay. It is not considered suitable for drinking water due to high natural salinity.

Appendix A lists the documents used in preparing this FYR Report. Appendix B provides a brief site chronology.

**FIVE-YEAR REVIEW SUMMARY FORM**

| **SITE IDENTIFICATION** | | |
|---|---|---|
| **Site Name:** Alcoa (Point Comfort)/Lavaca Bay Superfund Site | | |
| **EPA ID:** TXD008123168 | | |
| **Region:** 6 | **State:** Texas | **City/County:** Point Comfort/Calhoun |
| **SITE STATUS** | | |
| **NPL Status:** Final | | |
| **Multiple OUs?**<br>No | **Has the Site achieved construction completion?**<br>Yes | |
| **REVIEW STATUS** | | |
| **Lead agency:** EPA | | |
| **Author name:** Laura Hunt, with additional support provided by Skeo | | |
| **Author affiliation:** EPA Region 6 | | |
| **Review period:** 12/2/2020 - 4/2/2021 | | |
| **Date of site inspection:** Not performed due to Covid-19 travel restrictions and social distancing | | |
| **Type of review:** Statutory | | |
| **Review number:** 3 | | |
| **Triggering action date:** 7/8/2016 | | |
| **Due date *(five years after triggering action date)*:** 7/8/2021 | | |

**Figure 1: Site Vicinity Map**




*Disclaimer:* This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

**Figure 2: Detailed Site Map**


*Disclaimer:* This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

# II. RESPONSE ACTION SUMMARY

**Basis for Taking Action**

In the early 1970s testing by the Texas Department of Health Services (TDH, now known as the Texas Department of State Health (TDSHS), showed significantly elevated levels of mercury in oysters and crabs. Periodic sampling and analysis by TDH of finfish and shellfish in Lavaca Bay continued after 1970 and showed the problem of elevated mercury levels in finfish and shellfish to be persistent. EPA added the Site to the Superfund program's National Priorities List (NPL) in April 1994.

In 1994, Alcoa and EPA negotiated an Administrative Order on Consent and a Statement of Work for the Site's remedial investigation and feasibility study (RI/FS). Alcoa conducted several removal actions concurrent with the RI/FS, as discussed below in the Response Actions section of this report. In March 2000, EPA approved the RI Report for the Site. The RI focused on three distinct but interrelated areas: (1) the Bay System, which includes Lavaca Bay, Cox Bay and parts of adjacent bays; (2) Dredge Island; and (3) the Plant/Mainland, which includes the CAPA and the former Witco Process Area (Witco or Witco Area). Table 1 lists the contaminants in these areas.

Contaminated groundwater discharging to Lavaca Bay from the Zone B aquifer underlying the CAPA was identified during the RI as an ongoing source of mercury to the bay but was determined to not pose a direct risk to human health because affected groundwater has not been, nor is anticipated to be, a drinking water source. Risk assessment conclusions are summarized below.

- Bay System:
    - Noncarcinogenic risk can occur for a woman of childbearing age consuming fish from Lavaca Bay and the Closed Area of Lavaca Bay.
    - The predicted risk to fisherman consumption of fish and shellfish with accumulated mercury caught from the Lavaca Bay "Closed Area" was found to be unacceptable.
    - Potential ecological impacts can occur from direct contact with mercury-contaminated sediment and from accumulation of mercury in fish tissues to levels that can cause behavioral and reproductive effects.
- Dredge Island
    - The risk assessment assumed Dredge Island would be contained within the diked area with mercury-containing soils that will eventually be covered with "clean" dredge sediments. Potential worker exposure was assessed. Based on this exposure scenario, the hazard index (HI) calculated for ingestion of and dermal contact with soil was less than 1 when both the predicted mean and maximum mercury concentrations were used.
- For Plant/Mainland
    - Noncarcinogenic risk can occur for a potential future industrial worker, a future construction worker and a current maintenance worker exposed to mercury-contaminated soils within the footprint of the R-300 building at the CAPA.
    - Carcinogenic risk can occur for a potential future industrial worker in the Witco Area exposed to PAHs.
    - Groundwater discharge to potentially potable groundwater receptors was determined not to be a complete exposure pathway.

**Table 1: Site Contaminants, by Area**

| Area | Contaminant | Media |
|---|---|---|
| Bay System | Mercury | Sediment |
| Dredge Island | Mercury | Soil |
| Plant/Mainland | PAHs and Mercury | Surface soil |

## Response Actions

*Initial Response Actions*

Bay System
In April 1988, TDH issued an order closing an approximately one square mile area of Lavaca Bay to the taking of finfish and crabs due to elevated mercury levels in finfish and shellfish. TDH lifted the ban on oystering in January 2000 and reopened part of the closure area (Cox Bay). Partial lifting of the Cox Bay closure was due to TDH's risk characterization showing decreased levels of mercury in finfish and crabs to levels acceptable for human consumption.

Three actions took place prior to, or concurrent with the RI, as summarized below. Although these had been completed or were ongoing when EPA signed the Site's Record of Decision (ROD), the ROD indicates these three actions are part of the selected remedy.

Dredge Island Stabilization and Northern Marsh Removal
Alcoa conducted several early response actions under EPA oversight. In April 1998, EPA signed an Action Memorandum under which Alcoa conducted a non-time-critical removal action at Dredge Island. The purpose of the removal action was to relocate and contain mercury-contaminated soils on the island and fortify the island to protect against possible damage during a severe storm event. Part of the work included removal of the marshes on the north end of the island. A final cover for the disposal areas consisted of dredged material taken from an area of Lavaca Bay that has mercury concentrations below human health and ecological risk-based values. This non-time-critical removal action began in September 1998 and finished during summer 2001.

CAPA Sediment Removal
Sediment removal occurred in two phases, from August 1998 to January 1999. The first phase involved dredging of contaminated sediments from the channel area next to the CAPA using hydraulic methods. Alcoa's dredge disposal lakes received the sediments and routed decant water to the bay after sediment settling. During the removal effort, Alcoa performed water quality monitoring as well as post-dredge sediment sampling. The second phase involved dredging of sediment from a location near Dredge Island and disposing of the material on Dredge Island. From a mass removal standpoint, results showed dredging was effective in areas with high mercury concentrations that have the potential for sediment resuspension from influences such as navigational traffic. Monitoring of resuspended sediment and oyster tissue confirmed that mercury levels at concentrations below concern, showing no mercury resuspension occurred during sediment removal activities.

CAPA Groundwater Hydraulic Control System
Alcoa installed a groundwater extraction and treatment system in 1998 at the CAPA as part of a treatability study. Installation of the extraction system was to evaluate the effectiveness of hydraulically controlling the discharge of mercury and carbon tetrachloride contaminated groundwater from the CAPA into Lavaca Bay.

*Remedial Action*

EPA signed the Site's ROD in December 2001. The ultimate goal of remedial actions in Lavaca Bay will be the reduction of mercury in upper trophic level fish/shellfish to levels that would be protective of human consumption and not pose an unacceptable ecological risk. Table 2 lists the RAOs and components of the remedy, as described in the 2001 ROD and 2007 Explanation of Significant Differences (ESD). EPA did not identify groundwater contamination as a complete exposure pathway and therefore did not identify groundwater cleanup goals. Tables 3 and 4 list the selected sediment and soil cleanup goals.

Enhanced natural recovery was selected as part of the bay system remedy to help accelerate the natural recovery of sediment in open water areas of Lavaca Bay. Based on sediment sampling by Alcoa under the terms of the CERCLA Consent Decree, the open water sediment cleanup goal of 0.5 milligrams per kilogram (mg/kg) mercury was achieved by 2005. Since the mercury remediation goal for sediment in the open water areas of Lavaca Bay had already been met, EPA issued an ESD to remove the construction of a sediment cap in May 2007.

**Table 2. RAOs and Remedial Components, by Area**

| Area | RAO | Remedial Components |
|---|---|---|
| **Bay System**[a, b] | • Eliminate or reduce to the maximum extent practical mercury loading from ongoing unpermitted sources to Lavaca Bay.<br>• Reduce mercury to an appropriate level in surface sediments in sensitive habitats.<br>• Reduce mercury to an appropriate level in surface sediments in open water that represent a pathway by which mercury may be introduced into the food chain.<br>• Reduce sediment PAH concentrations below the NOAA effects value. | *Extraction and treatment of CAPA groundwater:* Groundwater controlled by four extraction wells, with treatment and discharge to Lavaca Bay. |
| | | *Witco Area DNAPL collection and containment:* DNAPL intercepted by a collection system prior to discharge to the Bay System and then disposal off site. The use of either a DNAPL containment or a collection technology will be refined during the remedial design. |
| | | *Witco channel dredging:* About 200,000 cubic yards of mercury contaminated sediment will be dredged and disposed of in a confined disposal facility on Dredge Island. |
| | | *Witco Marsh dredging or filling:* Witco Marsh would be remediated by dredging or filling to address the concern of biological uptake of mercury. |
| | | *Institutional controls to manage exposure to finfish/shellfish:* The fish closure will remain in place to control the consumption of finfish and shellfish for the Closed Area. |
| | | *Monitoring:* Monitoring will be required to confirm the natural recovery of sediment and fish tissue to acceptable levels. Monitoring surface water will be conducted to evaluate the effectiveness of the CAPA groundwater hydraulic control system. |
| **CAPA Soils** | Reduce the future exposure potential of site workers (construction worker, general industrial worker and maintenance worker) to mercury in soils in the vicinity of Building R-300. | *Building R-300 removal:* The walls and roof of Building R-300 will be removed and hauled off-site. |
| | | *Building R-300 area capping:* Building slab and the area immediately west of Building R-300 will be capped with a clay sublayer covered by crushed rock. |
| | | *Institutional controls to manage exposure to soil:* Excavation of any soils below or immediately west of Building R-300 would only be permitted after a worker safety program is developed for the specific excavation activity and repair of the cap would be required after excavation. The Building R-300 area would be deed recorded as containing soils with elevated mercury levels. |
| **Former Witco Area Soils** | Reduce the future exposure potential of site workers (construction worker, general industrial worker and maintenance worker) to PAHs in surficial soils at the Stormwater Sump, Separator Area and Former Tank Farm Area. | *Capping:* The Stormwater Sump and Separator Area and Former Tank Farm Area will be capped with 6 inches of clean soil. |
| | | *Institutional controls to manage exposure to soil:* Future excavation of any soils in these areas would only be permitted after a worker safety program is developed for the specific excavation activity and repair of the cap would be required after excavation. These areas would be deed recorded as containing soils with elevated PAH concentrations. |

*Notes:*

a. As stated in the ROD, the areas targeted for potential remedial action in the Bay System were identified based on total mercury and PAH concentrations in surface sediments, habitat types, potential for sediment resuspension due to influences such as ship traffic and observed mercury concentrations in biota. Potential areas of biological uptake include the northern fringe marshes on Dredge Island, the Witco Marsh and the southern causeway marshes.

b. Enhanced natural recovery was selected as part of the bay system remedy to help accelerate the natural recovery of sediment in open water areas of Lavaca Bay. Based on sediment sampling by Alcoa under the terms of the CERCLA Consent Decree, the open water sediment cleanup goal of 0.5 mg/kg mercury was achieved by 2005. Since the mercury remediation goal for sediment in the open water areas of Lavaca Bay had already been met, EPA issued an ESD to remove the construction of a sediment cap in May 2007.

**Table 3: Sediment COC Target Cleanup Goals**

| Sediment Area COC | Target Cleanup Goal (mg/kg) | Basis |
|---|---|---|
| Mercury in marsh area | 0.25 | Target sediment remediation goal developed to achieve acceptable fish and shellfish tissue levels. |
| Mercury in open water | 0.5 | Target sediment remediation goal developed to achieve acceptable fish and shellfish tissue levels. |

**Table 4: Soil PRGs for CAPA and Witco Area**

| Soil Area COC | Target Cleanup Goal (mg/kg)[a] |
|---|---|
| CAPA | |
| Mercury | 180 |
| Witco Area | |
| Benz(a)anthracene | 32 |
| Benzo(a)pyrene | 3.2 |
| Benzo(b)fluoranthene | 32 |
| Benzo(k)fluoranthene | 320 |
| Chrysene | 3,200 |
| Dibenz(a,h)anthracene | 3.2 |
| Indeno(1,2,3-c,d)pyrene | 32 |
| *Notes:*<br>a. Health-based concentration protective of commercial and industrial use. | |

***Additional Response Actions to Enhance Recovery***

Following the 2016 FYR, EPA directed Alcoa to do more studies related to sediment and fish-tissue concentrations. Conclusions resulting from the studies supported development of a response action plan to remove mercury containing sediments and soils which could be a source for resuspension and redistribution for potential methylation and uptake to the ecosystem. Alcoa did these studies (Table 5) and implemented additional response actions pursuant to the 2001 ROD, which EPA reviewed in a 2019 FYR Addendum Report.

**Table 5: Additional Studies After 2016 FYR**

| Study | Objective |
|---|---|
| A study to evaluate site-specific marsh conditions where enhanced methylation and uptake can occur (completed and documented by October 2016). | • Focused sediment sampling in and near marshes – the study provided additional information on potential areas in and near the marshes where juvenile blue crabs have elevated mercury concentrations.<br>• Expanded methylation study during the peak mercury methylation period – the study was designed to help understand why methylmercury levels may not be declining in areas where total mercury levels have achieved the cleanup goals and understand the specific |

| Study | Objective |
|---|---|
| | site conditions associated with high levels of methylmercury. |
| A study to evaluate whether additional uptake pathways cause mercury levels in red drum in the Closed Area to remain elevated (completed and documented by October 2016). | • Focused prey sampling in marshes – the purpose of this study was to expand the understanding of potential sources of mercury to red drum by including prey items, which are significant components of the red drum diet but have not routinely been collected and may contribute to the uptake of mercury to red drum.<br>• Methylmercury sediment sampling in open water – information from the study was used to evaluate the potential for methylmercury uptake in the open water areas north and east of Dredge Island. |
| A study to understand sediment and mercury transport from the Witco Area and Alcoa channels to the area north of Dredge Island (completed and documented by October 2016). | • To determine whether mercury is mobilized via resuspension of sediments and if this plays a role in slowing recovery in causeway marshes and associated methylmercury levels in red drum and juvenile blue crabs. |
| High-resolution water column sampling in the vicinity of the Alcoa and Witco channel areas and Mainland Shoreline No. 3 (MS3) (completed and documented by October 2016). | • To evaluate dissolved and particulate mercury levels to identify potential residual sources of mercury.<br>• To further characterize mercury concentrations in near-shore sediments areas (e.g., Mainland Shoreline No. 3) and at-depth sediments (e.g., Alcoa and Witco channels). |

Conclusions from the above studies supported development of a revised Conceptual Site Model and a response action plan to remove mercury-containing sediments and soils shown to be a source for resuspension and redistribution of methylated mercury. Alcoa addressed the areas of concern in the following response action plans:

- The Witco Channel and Harbor Dredging and MS3 Excavation Response Action Plan presents the approach to remove the ongoing sources of mercury to the Lavaca Bay system.
- The Causeway Cove Response Action Addendum describes an additional remedial action to reduce biota mercury levels in the Closed Area. This action describes the excavation of marshes in Causeway Cove and Witco Harbor.

Additional response actions to enhance recovery are listed below.

- *Causeway Cove response action:* Starting in January 2017, excavation of the emergent marsh vegetation and sediment from the upland edge of the vegetation to the bay side edge of the emergent vegetation occurred. All excavation activities finished by February 2017. The excavation activities resulted in the removal of 13,862 cubic yards of sediments and vegetation from 4.08 acres along the Causeway Cove and Witco shorelines. Alcoa submitted the final report for the project, the Causeway Cove Marsh Removal Report, to EPA in May 2017. By 2018 and 2019, all monitored marshes met the performance standard and marsh sediment samples are no longer being collected.
- *Witco channel and harbor dredging and MS3 excavation:* Excavation of MS3 upland areas and dredging at the Witco Area began in June 2017. Excavation activities on MS3 resulted in the removal of 36,956 cubic yards of soil that were placed in the Dredge Island confined disposal facility (CDF). To confirm design elevations, remedial activities included bathymetric and topographic surveys for the entire removal project. A final survey combined all the intermittent surveys and informed the total dredge volume of 366,667 cubic yards to pump to the CDF on Dredge Island. Alcoa submitted the final report for the project, the Response Action Completion Report for the Witco Channel and Harbor Dredging and MS3 Excavation, to EPA in December 2017.

**Status of Implementation**

Alcoa constructed remedy components under EPA and TCEQ oversight throughout the implementation of the remedial actions for the Site. EPA signed the Site's Preliminary Close-Out Report in July 2007. Details about the construction activities for each project are discussed below.

*Bay System*

Extraction and Treatment of CAPA Groundwater
The CAPA groundwater hydraulic control system has operated continuously since 1998. The system consists of four groundwater extraction wells, an air stripper that removes volatile organic compounds (i.e., carbon tetrachloride) from the groundwater, and a series of carbon vessels that remove mercury. Water level monitoring data, measured groundwater extraction rates and effluent sampling results evaluate the effectiveness of the CAPA groundwater hydraulic control system.

The objective of the groundwater extraction system is to provide hydraulic control of that portion of the dissolved mercury plume from Zone B groundwater and prevent discharge to Lavaca Bay. The system has been operating since 1998 and has been successful in reversing the groundwater gradient of the CAPA area and preventing discharge of mercury to Lavaca Bay from groundwater beneath the CAPA. Lavaca Bay surface water monitoring ended in 2007 after sampling results for mercury and carbon tetrachloride showed effective hydraulic control by the groundwater treatment system when compared to state surface water quality standards.

*CAPA Soils*

Between December 1999 and February 2000, Alcoa removed the R-300 building and capped the area with 6 inches of gravel (crushed limestone) placed over a clay subgrade. Warning signs placed on the north and west sides of the capped area aimed to limit use of the area by plant and contractor personnel. In addition, Alcoa distributed a memo plant-wide to inform workers of the upgrades made to the area, restrictions on the capped portion of the CAPA, and disciplinary actions resulting from not complying with restrictions.

*Witco Area*

Alcoa dredged about 200,000 cubic yards of sediment from the Witco Channel from December 2001 to January 2002. The ROD called for a collection trench or containment system west of the former Witco Tank Farm Area for the purpose of intercepting DNAPL potentially migrating to Lavaca Bay. The use of either a DNAPL containment or collection technology was to be refined during the remedial design.

Construction at the Witco Area occurred from March 2006 to December 2006. As per the remedial design, Alcoa installed a 100-foot-long slurry wall 3 feet into the underlying clay material and a DNAPL collection sump on the upgradient side of the slurry wall. Recovered DNAPL is collected and stabilized before sent off site for treatment and disposal at a licensed disposal facility. However, no DNAPL has been observed in the collection sump since its installation in 2006.

Additional response actions in 2006 included construction of a new drainage channel, construction of a soil cap in the former tank farm area, removal of an oil/water separator and construction of a soil cap in the former processing area.

*Remediation of Witco Marsh by Dredging*
Dredging of Witco Marsh took place from January to April 2006, with the removal of about 57,200 cubic yards of material.

Monitoring/Natural Recovery of Sediments

Alcoa's annual long-term monitoring focuses on monitoring sediment mercury concentrations from open water and marsh areas within the Closed Area and comparing them to the habitat-specific remediation goals. Long-term tissue monitoring of red drum and juvenile blue crabs occurs annually to evaluate the recovery of mercury levels in finfish and shellfish.

In September 2017, soil and groundwater samples were collected and analyzed for mercury and PAHs to evaluate the potential effects from Hurricane Harvey which made landfall in August of 2017. Mercury concentrations in groundwater and soil were below the cleanup levels identified in the ROD and are consistent with sample results collected prior to Hurricane Harvey.

## Institutional Controls (ICs)

The remedy calls for institutional controls for the bay area to manage exposure to finfish and shellfish as well as soil institutional controls for the CAPA and Witco areas. The Texas Department of Health implemented fishing and fish consumption restrictions in 2000. The institutional controls specified in the ROD for the soils in the CAPA and the Witco Area are not yet in place. Table 6 lists the anticipated institutional controls. They are also shown in Figure 2. Specifically, the institutional controls shall:

- Identify the location of caps, barriers and containment systems constructed as part of the remedial action to notify future purchasers or users of the property that excavation in these areas may cause a release of hazardous substances to the environment.
- Restrict the construction of any buildings, wells, pipes, roads, ditches, fences, channels, cables or any other structures – fixtures or otherwise – by any person in a manner not consistent with the ROD.
- CAPA-area soils would be deed recorded as containing soils with elevated mercury levels.
- Witco-area soils would be deed recorded as containing soils with elevated PAH concentrations.

While in operation, Alcoa issued updated memoranda to plant staff and contractors to note that construction activities were conducted at the CAPA and Witco areas as part of Superfund cleanup activities. Memoranda instructed plant personnel and contractors not to drive on the capped areas, with consequences of severe discipline or dismissal for disregarding of instructions. Warning signs posted in capped areas identify protected portions of the CAPA and Witco areas.

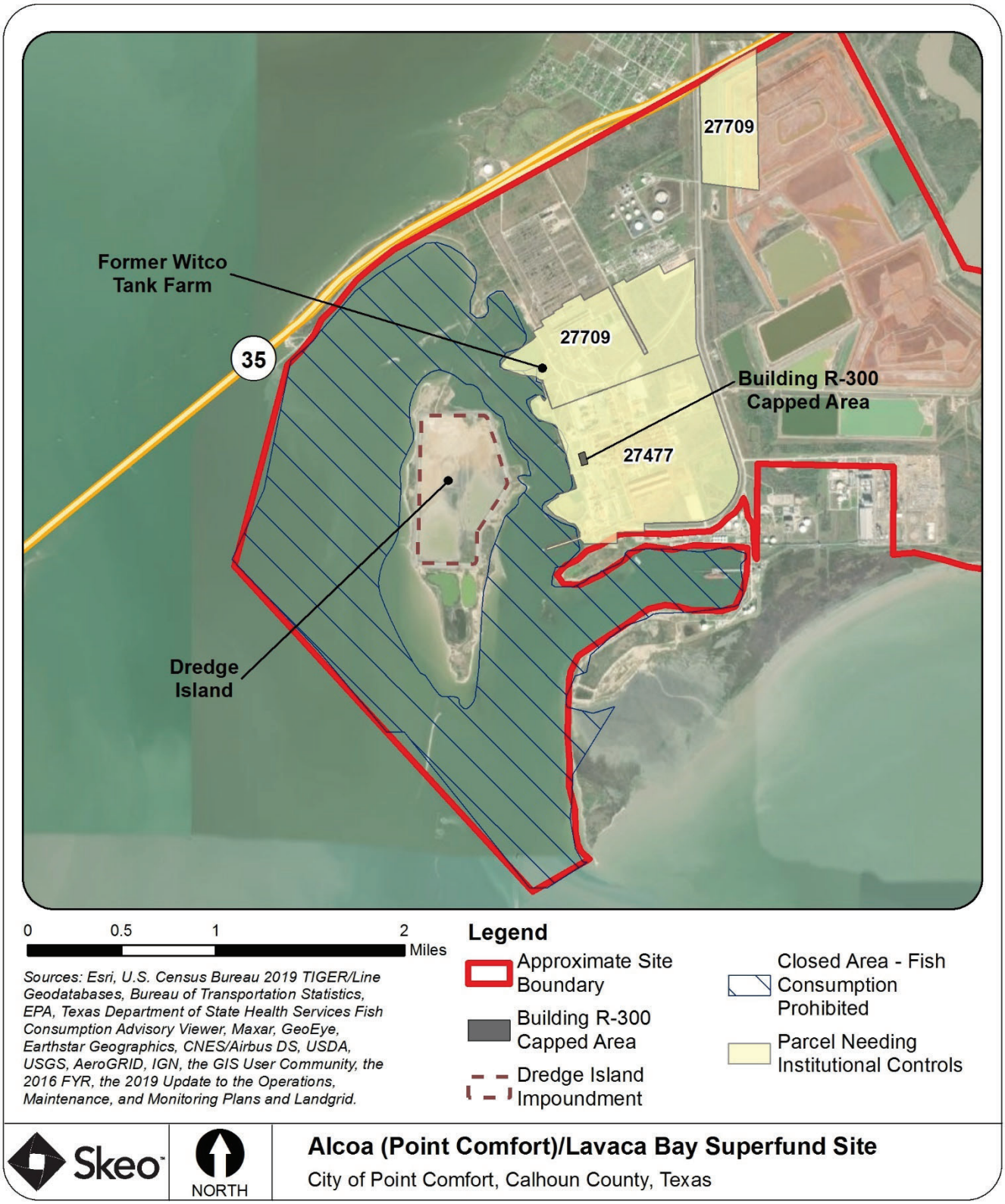
Per the 1998 Action Memorandum, EPA determined that no institutional controls will be necessary for Dredge Island since maintenance and post-removal site controls would be implemented. EPA did not require groundwater controls because there are no potable well users in the vicinity.

**Table 6: Summary of Planned and/or Implemented Institutional Controls (ICs)**

| Media, Engineered Controls, and Areas That Do Not Support UU/UE Based on Current Conditions | ICs Needed | ICs Called for in the Decision Documents | Impacted Parcel(s) | IC Objective | Title of IC Instrument Implemented and Date (or planned) |
|---|---|---|---|---|---|
| Bay Area | Yes | Yes | Closed Area of Lavaca Bay, as defined by the TDH fish closure area | Control the consumption of finfish and shellfish from the "Closed Area" of Lavaca Bay. | Texas Department of Health Order No. AL -1 issued April 21, 1988 Order No. AL-13 Modification issued January 13, 2000 |

| Media, Engineered Controls, and Areas That Do Not Support UU/UE Based on Current Conditions | ICs Needed | ICs Called for in the Decision Documents | Impacted Parcel(s) | IC Objective | Title of IC Instrument Implemented and Date (or planned) |
|---|---|---|---|---|---|
| CAPA Area Soils | Yes | Yes | 1.8 acres west of former Building R-300 | The ROD calls for ICs to manage exposure to soil | 9/30/2022 |
| Witco Area Soils | Yes | Yes | Soil caps covering PAH-contaminated soils occur in former tank farm and former processing areas | The ROD calls for ICs to manage exposure to soil | 9/30/2022 |

**Figure 3: Institutional Control Map**




*Disclaimer:* This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

**Systems Operations/Operation and Maintenance (O&M)**

Performance monitoring is conducted at the Site to satisfy the requirements of the Consent Decree/Statement of Work between Alcoa, the United States of America, and the state of Texas, entered in the U.S. District Court, Southern District, effective March 1, 2005. The scope of the monitoring activities is described in the Site's remedial design reports (RDRs) and operations, maintenance, and monitoring plans (OMMPs) attached to the Consent Decree. The original RDRs and OMMPs describe the operations, maintenance and monitoring programs for the following remedy components:

- CAPA Groundwater
- Former Witco Tank Farm DNAPL Containment System
- Dredge Island
- Witco Marsh Remediation
- CAPA Soils
- Witco Area Soils
- Lavaca Bay Sediment Remediation and Long-term Monitoring Plan
- Lavaca Bay Finfish and Shellfish

The additional studies and response actions completed during this FYR period affected the scope of certain OMMPs. These changes are described in the February 2019 Updates to Operations, Maintenance and Monitoring Plans, Alcoa (Point Comfort)/Lavaca Bay Superfund Site. The results of the most recent (2019) annual report documented monitoring efforts are described by monitoring activity below.

The CAPA groundwater hydraulic control system began full-scale operation in May 1998. The system has operated continuously since 1998 with only minor interruptions for maintenance or troubleshooting, or during power interruptions at the PCO facility.

While the PCO facility operated, routine monitoring and maintenance of the DNAPL capping and containment features in the Witco Area controlled potential on-site worker exposure to surface soils. Routine inspection and maintenance of these features ensure the integrity of the drainage channel, soil cap, signage and sump conditions. EPA agreed to semi-annual inspection frequency for DNAPL features in the Witco Area in 2019. Monitoring results from December 2019 indicate that the DNAPL collection sump exhibits normal conditions. No actions are needed to address any damage or product level.

The integrity of the Dredge Island stabilization project is routinely maintained and monitored. During 2019, Alcoa found the structural steel of the north decant structure required either refurbishment or replacement. EPA and TCEQ approved Alcoa's proposed replacement of the structures. Fabrication of replacement structures are being developed and communicated to EPA. EPA approval, with concurrence from TCEQ for the proposed replacement of both structures was received via letter dated May 22, 2019. Per the revised 2019 OMMP, EPA agreed to a semi-annual inspection frequency for Dredge Island. Results of the 2020 inspections indicate that the island is in stable condition and performance objectives are met.

Remediation of Witco Marsh is complete (2006) and ongoing monitoring is no longer required. However, Alcoa continues to apply herbicide to prevent marsh grasses from reestablishing on a periodic basis. The 2020 Annual Report indicates that herbicide treatment is ongoing.

Maintenance and monitoring of the Witco soils remedial actions continue on a semiannual basis. Alcoa conducts semiannual inspections of the capped area to determine cap integrity, vegetation growth, signage integrity, storm drain condition, and status of equipment and waste storage. Results of the 2020 semi-annual inspections indicate that there are no problems with the Witco cap areas. Conditions of erosion, settlement/ponding, vegetation, intrusive trees, drainage/rip rap, animal damage and vehicle ruts were all normal.

In accordance with the 2019 OMMP, Alcoa conducts semi-annual inspections and maintenance of the Building R-300 clay/gravel cap to determine cap integrity, vegetation growth, signage integrity, storm drain condition and equipment/waste storage conditions. Results of the 2020 semi-annual inspections indicate that there are no problems with the cap. Typical problems of erosion, settling, ponding, washouts, holes, vehicle ruts and intrusive vegetation are within normal parameters.

# III. PROGRESS SINCE THE PREVIOUS REVIEW

This section includes the protectiveness determinations and statements from the 2016 FYR Report and 2019 FYR Report Addendum as well as the recommendations from the 2016 FYR Report and the status of those recommendations.

**Table 7: Protectiveness Determinations/Statements from the 2016 FYR Report**

| OU # | Protectiveness Determination[1] | Protectiveness Statement |
|---|---|---|
| Sitewide | Short-term Protective | The remedy for the Alcoa (Point Comfort)/Lavaca Bay Superfund Site is protective of human health and the environment in the short term due to the fish closure order in place to control the consumption of finfish and shellfish from the "Closed Area" of Lavaca Bay.<br><br>A long-term protectiveness determination of the remedy cannot be made at this time until further information is obtained related to the exposure assumptions and understanding of potential sources of mercury used at the time of the ROD. Further information will be obtained by undertaking the recommendations identified in this Five-Year Review Report. It is expected that the recommendations will take approximately three years to implement. |

[1] The 2016 FYR reported the protectiveness as "Long-term protectiveness deferred". This determination is not a defined protectiveness determination and is not allowed per EPA Guidance and policy. The protectiveness of the 2016 FYR should have been correctly reported as "Short-Term Protective" per the findings of that FYR and the protectiveness statement included in that FYR.

**Table 8: Status of Recommendations from the 2016 FYR Report**

| Issue | Recommendations | Current Status | Current Implementation Status Description | Completion Date (if applicable) |
|---|---|---|---|---|
| Total mercury levels in the causeway marsh sediments are approaching levels in the Adjacent Open Area of Lavaca Bay. However, there has not been a corresponding reduction in the mercury levels in red drum and juvenile blue crabs in the vicinity of these marshes. It is unknown whether there are site-specific conditions in the marshes where enhanced methylation and uptake into red drum and juvenile blue crabs can occur even in the presence of low total mercury concentrations in the surface sediment. | Conduct the following studies to evaluate site-specific marsh conditions where enhanced methylation and uptake can occur:<br>• Focused sediment sampling in and near marshes.<br>• Expand methylation study during the peak mercury methylation period. | Completed | This study has been completed and was used to update the CSM and a remedial action plan. Additional details are included in the 2019 FYR addendum. | 12/30/2019 |
| It is uncertain whether red drum may be accumulating a significant level of their mercury through an uptake pathway not being monitored. More mercury uptake pathways need to be considered in evaluating options to reduce elevated mercury levels in red drum. | The following studies should be conducted to evaluate whether additional uptake pathways cause mercury levels in red drum in the Closed Area to remain elevated.<br>• Focused prey sampling in marshes.<br>• Methylmercury sediment sampling in open water. | Completed | This study has been completed and was used to update the CSM and a remedial action plan. Additional details are included in the 2019 FYR addendum. | 12/30/2019 |
| It is uncertain whether there are additional sources of mercury in sediments that are transported into areas where conditions are favorable for enhanced methylation and uptake into the food web. | Conduct a study to understand sediment and mercury transport from the Witco and Alcoa channels and Witco Cut to the area north of Dredge Island. | Completed | This study helped determine whether mercury is mobilized via resuspension of sediments and if this plays a role in slowing recovery in the Causeway marshes and the associated methylmercury levels in red drum and juvenile blue crab and has been completed. It was used to update the CSM and a remedial action plan. Additional details are included in the 2019 FYR addendum. | 12/30/2019 |

| Issue | Recommendations | Current Status | Current Implementation Status Description | Completion Date (if applicable) |
|---|---|---|---|---|
| Residual sources of mercury may exist in sediments and soils in the vicinity of Mainland Shoreline No. 3, the shallows adjacent to the Alcoa and Witco channels (including the Witco Harbor) and along the northwest edge of Dredge Island. | Conduct a high-resolution water column sampling program in the vicinity of the Alcoa and Witco channel areas and Mainland Shoreline No. 3 to evaluate dissolved and particulate mercury levels. | Completed | This sampling evaluated dissolved and particulate mercury levels. This data was used to identify potential residual sources of mercury and to further characterize mercury concentrations in near-shore sediments areas (e.g., Mainland Shoreline No. 3) and at-depth sediments (e.g., Alcoa and Witco channels). Additional details are included in the 2019 FYR addendum. | 12/30/2019 |
| Concentrations of mercury in red drum from the Closed Area continue to be elevated when compared to the adjacent Open Area | Using results of the above recommendations, update and refine the Site's conceptual model and incorporate the results of the studies into a remedial action plan, that once implemented, would reduce mercury levels in red drum. | Completed | The CSM has been updated and a remedial action plan was created. Additional details are included in the 2019 FYR addendum. | 12/30/2019 |

The Addendum to the second FYR Report was completed to address uncertainties identified in the 2016 FYR related to long-term protectiveness, although not required. Table 9 lists the protectiveness statement for the 2019 FYR Report Addendum. No new issues were identified in the 2019 FYR Report Addendum and all issues from the 2016 FYR were addressed.

**Table 9: Protectiveness Determinations/Statements from the 2019 FYR Report Addendum**

| OU # | Protectiveness Determination | Protectiveness Statement |
|---|---|---|
| Sitewide | Protective | The remedy for the Alcoa (Point Comfort)/Lavaca Bay Superfund site is protective of human health and the environment in the short term due to the fish closure order in place to control the consumption of finfish and shellfish from the "Closed Area" of Lavaca Bay. |

# IV. FIVE-YEAR REVIEW PROCESS

**Community Notification, Community Involvement and Site Interviews**

A membership list for a Community Advisory Board (CAB) to reflect current Calhoun County demographics has been developed. The CAB met at PCO in March 2016, November 2016 and May 2017. A fourth CAB meeting was held at PCO in May 2019. Twenty persons attended including members of the agencies, two Alcoa representatives and the public. Meeting agenda topics included updates to facility operations, reviews of the Conceptual Site Model, progress made toward achieving goals from EPA's second FYR, descriptions of work

completed in 2017, 2018 monitoring results, and future activities. The 2021 CAB meeting is scheduled for Fall2021.

During the FYR process, interviews are conducted to document any perceived problems or successes with the remedy that has been implemented to date. The results of these interviews are summarized below and the completed interview forms are in Appendix B. Attempts were made to obtain interviews from representatives of the community; however, members of the community did not respond to questionnaires. Alcoa declined a request to complete the interview form. The TCEQ Project Manager stated that the site appears to be well maintained, that downward trends of mercury concentrations for most parts of the Closed Area in the open water and marsh sediment area are occurring, and that restrictive covenants in the CAPA and Witco area need to be filed.

A public notice was made available by newspaper posting in the *Port Lavaca Bay*, on 3/19/2021 (Appendix C). It stated that the FYR was underway and invited the public to submit any comments to EPA. The results of the review and the report will be made available at the Site's information repository, Calhoun County Public Library, located at 200 West Mahan Street, Port Lavaca, TX 77979 and on the Site website.

## Data Review

The ultimate goal of the remedial actions is to reduce mercury levels in fish tissue. Under the terms of the Consent Decree, Alcoa prepares a Remedial Action Annual Effectiveness Report (RAAER) documenting routine monitoring data. The RAAER evaluates the effectiveness of the remedial action, including, but not limited to, an evaluation of the performance of the CAPA groundwater hydraulic control system, natural recovery of sediments in Lavaca Bay, trends in fish/shellfish tissue values and O&M activities. This FYR data review includes monitoring data collected from the previous five years which overlaps with the additional excavations in 2017.

### CAPA Groundwater Hydraulic Control System

The system has been operating since 1998 and has successfully reversed the groundwater gradient in the area of the CAPA. Annually collected potentiometric data from 2020 in Figure F-1 shows the hydraulic barrier created by the four extraction wells is effectively reducing the potential for migration of mercury-impacted groundwater from the CAPA to Lavaca Bay.

Routine monitoring results for the CAPA groundwater hydraulic control system show that the discharged groundwater does not exceed the discharge standards (mercury daily maximum concentration of 0.010 milligrams per liter [mg/L], mercury daily average concentration of 0.005 mg/L, carbon tetrachloride daily maximum concentration of 0.380 mg/L and carbon tetrachloride daily average concentration of 0.142 mg/L). Table F-1 presents the approximate mass of mercury removed from the groundwater hydraulic control wells beginning in 1998 through to the most recent available data collected in 2020. Trends in the data appear to indicate a reduction in the amount of mercury removed at all of the sample points.

Historical sampling results from the extraction wells show either a decrease or stabilization in the concentrations of mercury and carbon tetrachloride since the groundwater extraction and treatment system began operating. Concentrations of mercury and carbon tetrachloride measured since sample collection began are shown in Figures F-2 and F-3, while results for each well from the past five years are summarized in Table F-2.

### Lavaca Bay Sediment Monitoring

Lavaca Bay sediment monitoring occurs in open areas and marsh areas. A summary of each type of activity is provided below.

*Open Areas*

The open water mercury cleanup goal was achieved in 2005, as documented in the 2005 RAAER. However, Alcoa is conducting voluntary sediment monitoring as part of the ongoing effort to evaluate mercury concentration trends in fish tissue in the Closed Area of Lavaca Bay. Additional sediment monitoring was also

conducted in support of the investigations to help address issues identified in the 2016 FYR Report. Sampling in this FYR period included:

- In 2016, more sampling was completed in the Eastern Causeway Cove area with increased sampling density and more accurately delineated mercury concentrations in the cove. Sampling results indicate that areas with elevated mercury concentrations (as compared to previous years sampling results) exist in the cove and may act as a source of mercury to fish in the Closed Area. In response, the Causeway Cove response action started in January 2017.
- In 2017, open water sediment sampling from 13 locations occurred in the Eastern Causeway Cove. Selection of sample locations provided current data for 10 historical open water stations and three supplemental Eastern Causeway Cove locations with elevated mercury sediment concentrations in 2016.
- In 2019, sampling efforts collected 13 open-water sediment samples from the same locations sampled in 2016 and 2017.

Figure F-4 in Appendix F shows the location and results from the most recent (November 2019) open water sampling event and Figure F-5 shows the mercury trends in the Eastern Causeway Cove and West Causeway Cove open sediment sampling areas. The average total mercury concentration measured in Causeway Cove East in 2019 (0.23 mg/kg) remains below the ROD cleanup goal of 0.5 mg/kg and is the lowest in the period of record, indicating the 2017 response actions improved conditions. The average total mercury concentration measured in Causeway Cove West in 2019 (0.12 mg/kg) remains below the ROD cleanup goal of 0.5 mg/kg and is the second lowest in the period of record.

*Marsh Areas*

Sampling occurred in 2015, 2016 and 2017 to assist in the further study of marsh sediment-related mercury in fish and shellfish, and to measure the continued recovery of Marshes 7 and 15. In 2017, due to elevated mercury concentrations in sediment, Alcoa excavated Marshes 1, 2 and 3 in the Eastern Causeway Cove, and portions of Marshes 6 and 7 next to Mainland Shoreline No. 3 (MS3). The concentrations of mercury for these marshes in 2016 were: 0.164 for Marsh 1, 0.061 for Marsh 2, 0.056 for Marsh 3, 0.281 for Marsh 6 and 0.549 for Marsh 7. The consent decree requires that the open water sediment monitoring program be performed until a mean mercury concentration of less than 0.5 mg/kg dry weight is measured in the Closed Area sediment in two consecutive years. By 2017 all monitored marshes have met the cleanup goal of 0.25 mg/kg and marsh sediment samples are no longer being collected (Table F-3). The highest remaining concentrations collected from Marshes 15 and 19 in 2017 were 0.08 and 0.07 mg/kg respectively. While open water sediment sampling is no longer required on either an annual or even-year basis, if a need for additional data is identified, Alcoa will schedule a sampling event to meet the desired goal.

**Finfish/Shellfish Monitoring**

Per the Consent Decree (CD), the finfish and shellfish monitoring program is to evaluate the effectiveness of the Remedial Action (RA) by collecting and evaluating mercury levels in fish and shellfish tissue. The RAO for Lavaca Bay will be met when the mean mercury concentration of red drum collected in the Closed Area is not statistically different than the mean level measured in red drum collected from the Adjacent Open Area.

Appendix A of the Finfish and Shellfish OMMP, describes the statistical approach used to compare the mercury concentrations of red drum in the Closed Area with those in the Adjacent Open Area. To support the statistical comparison, 60 red drum tissue samples are analyzed annually for mercury (30 from the Closed Area and 30 from the Adjacent Open Area). Routine annual monitoring also includes the collection of juvenile blue crab samples from shoreline marsh stations in the Closed Area and Adjacent Open Area. The 2020 annual monitoring event included collection of 30 juvenile blue crab samples from the Adjacent Open Area and 30 juvenile blue crab samples from the Closed Area.

Since completion of more cleanup work in 2017, Alcoa conducted four finfish/shellfish sampling events. A summary of the mean mercury concentrations in red drum and juvenile blue crabs measured since 1997 is presented in Table F-4 in Appendix F. Figure F-6 in Appendix F shows the trends in red drum mercury

concentrations in the Open Area and the Closed Area of Lavaca Bay. The mean concentration of mercury measured in Closed Area red drum in 2020 represents the lowest mean concentration measured in the fish/shellfish monitoring program. The 2020 data represent a continuation of the downward trend observed in average concentrations in the Closed Area red drum, suggesting the additional cleanup actions in 2017 have been effective in reducing mercury levels in red drum in the Closed Area. However, statistical analysis indicates the mean mercury concentration of red drum from the Closed Area (0.42 milligrams per kilogram [mg/kg]) remains statistically significantly higher than the mean of the Adjacent Open Area samples (0.26 mg/kg).

In addition to red drum, short-term trends of mercury levels in juvenile blue crabs are monitored to qualitatively evaluate the remedy effectiveness. Juvenile blue crabs are at a lower trophic level with a much smaller foraging range than red drum, allowing for a more focused indictor of changes in mercury availability. Overall, mercury concentrations in the juvenile blue crabs in the Closed Area are decreasing and approaching levels found in juvenile blue crabs in the Adjacent Open Area (Table F-4).

**Site Inspection**

Due to travel restrictions related to COVID-19 and social distancing guidance, an in person site inspection was postponed until travel restrictions are lifted. Alcoa provided a site assessment using drone and ground level photographs (Appendix E) which was used to assess the protectiveness of the remedy.

For the site assessment, the following areas were documented by Alcoa:

**Entrance/Access Signs:** Entrance signs warning of the fishing ban were observed and appeared to be in good condition.

**Chlor-alkali Process Area:** The CAPA water treatment system is operating as designed and per the O&M Manual. The cover system area is well-maintained and required signage is in good condition. All recovery wells are operating and with locking surface casings to restrict access.

**Former Witco Processing Area:** The soil cap is in good condition and no damage was observed. The required signage warning people not to disturb the cap was in place and in good condition.

**Dredge Island:** The O&M inspections, maintenance and vegetation control program are in effect. Decant structure construction/installation is near completion.

**Lavaca Bay:** Signs noting the Closed Area fishing ban were observed and appeared to be in good condition.

# V. TECHNICAL ASSESSMENT

**QUESTION A:** Is the remedy functioning as intended by the decision documents?

**Question A Summary:**

The status of remedy function is presented by area.

With the exception of persistent elevated fish tissue COC concentrations, the Bay System remedy is functioning as intended, as per requirements in the ROD and 2007 ESD documents. Mercury loading to Lavaca Bay is reducing with the effective operation of the CAPA groundwater hydraulic control system. The implemented remedial actions are effective in reducing the level of mercury in sediment for sensitive habitats and open-water areas and are achieving cleanup goals for sediment in both areas. Additional removal actions since the 2016 FYR include Witco channel and harbor dredging, MS3 excavation and Causeway Cove sediment removal. Annual finfish sampling results show concentrations are decreasing. However, the Consent Decree goal of having

comparable mean mercury concentrations in the Closed Area and the Adjacent Open Area has not yet been achieved. Results from the annual juvenile blue crab sampling show ongoing recovery in the majority of the Closed Area with downward trends in mercury levels. Long-term monitoring will continue to assess mercury concentrations in blue crabs and finfish.

The CAPA soils remedy is functioning as intended. The cap is well maintained, and the most recent CAPA cap inspection did not identify any issues (November 2020). Results of the annual inspection did not identify any problems such as erosion, settling, ponding, washouts, holes, vehicle ruts or intrusive vegetation. Vegetation control is a continuing O&M practice. Warning signs are in place to prevent usage of the area. However, recorded institutional controls called for in the 2001 ROD are not in place for the capped area.

The soils remedy for the Witco Area is functioning as intended. Monitoring of the drainage channel, soils caps and DNAPL collection sump occur routinely, with the most recent inspection occurring in November 2020. Results of the annual inspection did not identify any abnormal conditions associated with the soil caps. The drainage channel exhibited/showed minor issues. However, these issues do not affect the channel's operation and will be monitored closely. No DNAPL has been observed in the collection sump. Warning signs are in place to prevent usage of the area. However, recorded institutional controls called for in the 2001 ROD are not in place for the capped area.

The PCO Plant shut down in 2019 and Alcoa intends to sell the property, further necessitating the need for recorded restrictions that will run with the land (as outlined in the Consent Decree) be recorded for the appropriate areas to ensure future land use does not affect the protectiveness of the remedy actions. Additional institutional controls (such as CAPA groundwater) not addressed in the Consent Decree may need to be pursued.

Per the Action Memorandum, EPA determined that no institutional controls will be necessary for Dredge Island since maintenance and post-removal site controls would be implemented. EPA did not require groundwater controls due to no potable well users in the vicinity.

The ROD identified the TDSHS fish closure order as an institutional control to manage exposure to finfish and crabs. Alcoa has posted fish closure warning signs in three languages (English, Spanish and Vietnamese) in the closed area and has reported these signs as intact during their 2020 inspection (Appendix E). The closure order deems it is illegal to keep fish or crabs caught within the closure area. However, catch-and-release fishing is allowed within the Closed Area.

Prior to receiving a Certificate of Completion of the Remedial Action, Alcoa will implement the institutional controls specified in the ROD and Consent Decree for the soils in the CAPA and the Witco Area. Deeds for the properties associated with these features will record their soil mercury (CAPA) and PAH (Witco) conditions.

It is likely that shipping channel projects could affect ongoing remedial actions in the Closed Area. The pending Matagorda Ship Channel Improvement Project (MSCIP), as described in the U.S. Army Corps of Engineers' (Corps) August 2019 Environmental Impact Statement (EIS), include increased channel capacity and creation of a new turning basin within the Closed Area. The EIS notes that "*Under the recommended plan, factors that could affect DO* [dissolved oxygen] *include the increase in both water circulation and salinity*" and that "*There is potential for a change in bay-bottom velocities due to a wider and deeper channel and the actions taken as part of the DMMP."* EPA recognizes the potential for negative impacts to the Site by the MSCIP and will engage with the Corps to evaluate any effects to the remedy and ensure proper disposal of material.

**QUESTION B:** Are the exposure assumptions, toxicity data, cleanup levels and RAOs used at the time of the remedy selection still valid?

**Question B Summary:**

The exposure assumptions and toxicity data used at the time of the remedy selection are still valid. The original RI risk assessments address current/applicable exposure conditions and rely on appropriate toxicity data. The RAOs for the CAPA and Witco soils are appropriate for current on-site worker exposure settings.

The cleanup levels and remedial action objectives (RAOs) are still valid. The Bay System RAOs are designed to allow the reduction of mercury levels in fish tissue such that the overall risk throughout Lavaca Bay will approach that which would be present but for the historical Point Comfort operations. The cleanup goals for sediments were site-specific and based on site-specific calculations described in the RI Report. These cleanup values remain valid. The 2001 ROD did not identify groundwater contamination as a complete exposure pathway and subsequently did not identify groundwater cleanup goals.

**QUESTION C:** Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that could call into question the protectiveness of the remedy. On August 26, 2017, Hurricane Harvey made landfall on the Texas coast, causing massive damage and flooding to broad areas of Texas. EPA conducted assessment activities at NPL sites where Hurricane Harvey might have adversely impacted existing site conditions and/or a remedy already in place. In September 2017, soil and groundwater samples were collected and analyzed for mercury and PAHs to evaluate the potential effects from Hurricane Harvey. Mercury concentrations in groundwater and soil were below the cleanup levels identified in the ROD and are consistent with sample results collected prior to Hurricane Harvey.

# VI. ISSUES/RECOMMENDATIONS

| Issues/Recommendations |
|---|
| **OU(s) without Issues/Recommendations Identified in the FYR:** |
| **None** |

| **Issues and Recommendations Identified in the FYR:** |
|---|

| **OU(s): Sitewide** | **Issue Category: Institutional Controls** | | | |
|---|---|---|---|---|
| | **Issue:** Institutional controls for areas encompassing capping remedies (CAPA and Witco area soils) as outlined in the Consent Decree need to be recorded. | | | |
| | **Recommendation:** Implement institutional controls at the CAPA and Witco soils areas to protect the remedy and prevent potential exposures to remaining contamination. | | | |
| **Affect Current Protectiveness** | **Affect Future Protectiveness** | **Party Responsible** | **Oversight Party/Support Agency** | **Milestone Date** |
| No | Yes | PRP | EPA | 9/30/2022 |

| OU(s): Sitewide | Issue Category: Changed Site Conditions | | | |
|---|---|---|---|---|
| | **Issue:** The slow decline of red drum tissue concentrations in the Closed Area have led to the study of other possible mercury sources and the completion of more remedies to control these sources. | | | |
| | **Recommendation:** Continue monitoring to track progress in fish tissue mercury concentrations. | | | |
| **Affect Current Protectiveness** | **Affect Future Protectiveness** | **Party Responsible** | **Oversight Party/Support Agency** | **Milestone Date** |
| No | Yes | EPA | EPA | 9/30/2022 |

| OU(s): Sitewide | Issue Category: Changed Site Conditions | | | |
|---|---|---|---|---|
| | **Issue:** Ongoing and pending improvements to the Matagorda Ship Channel from 2020 to 2024 may need to be monitored to assess how ship channel dredging could affect the remedy. | | | |
| | **Recommendation:** Assess the planned ship channel improvements (e.g., the new turning basin and port in the bay area immediately next to the Site) to determine if these dredging activities will affect ongoing remedial actions. | | | |
| **Affect Current Protectiveness** | **Affect Future Protectiveness** | **Party Responsible** | **Oversight Party/Support Agency** | **Milestone Date** |
| No | Yes | PRP | EPA | 9/30/2022 |

**OTHER FINDINGS**

- Due to Covid-19 travel restrictions and social distancing requirements, EPA could not perform a site inspection during this FYR period. EPA will conduct a site inspection once conditions allow.
- Deed record Institutional Controls (IC) should be completed prior to any sale.

# VII. PROTECTIVENESS STATEMENT

| Sitewide Protectiveness Statement |
|---|
| *Protectiveness Determination:*<br>Short-term Protective |
| *Protectiveness Statement:*<br>• The remedy for the Alcoa (Point Comfort)/Lavaca Bay Superfund site is protective of human health and the environment in the short term due to the groundwater hydraulic control, the soils remedy, the removal of or recovery of contaminated sediments, and the fish closure order in place to control the consumption of finfish and shellfish from the "Closed Area" of Lavaca Bay. However, in order for the remedy to be protective in the long-term, the following actions are needed to ensure protectiveness: implement institutional controls at the CAPA and Witco soils areas to protect the remedy and prevent potential exposures to remaining contamination, |

continue monitoring to track progress in fish tissue mercury concentrations, and assess the planned ship channel improvements (e.g., the new turning basin and port in the bay area immediately next to the Site) to determine if these dredging and removal activities will affect the ongoing remedial actions.

## VIII. NEXT REVIEW

The next FYR Report for the Alcoa (Point Comfort)/Lavaca Bay Superfund site is required five years from the completion date of this review.

# APPENDIX A – REFERENCE LIST


Alcoa. Remedial Investigation Report, Alcoa (Point Comfort)/Lavaca Bay Superfund Site. November 1999.

Alcoa. Feasibility Study, Alcoa (Point Comfort)/Lavaca Bay Superfund Site. 2000.

Alcoa. Dredge Island Removal Action Plan, Volume 4 – Phase 1 Dredge Island Stabilization Completion Report. Alcoa (Point Comfort)/Lavaca Bay Superfund Site. August 2002.

Alcoa. Remedial Action Work Plan. Alcoa (Point Comfort)/Lavaca Bay Superfund Site. August 2005.

Alcoa. 2014 Remedial Action Annual Effectiveness Report. Alcoa (Point Comfort)/Lavaca Bay Superfund Site. March 31, 2015.

Alcoa. 2015 Remedial Action Annual Effectiveness Report. Alcoa (Point Comfort)/Lavaca Bay Superfund Site. March 31, 2016.

Alcoa. Final Lavaca Bay Methylation Special Study – Phase 2. Study 4 – Update the Understanding of Methylation Processes and Uptake in the Closed Area – Spring 2016. Alcoa (Point Comfort)/Lavaca Bay Superfund Site. October 2016.

Alcoa. Final Report on Lavaca Bay High Resolution Water Column Monitoring Program. Alcoa (Point Comfort)/Lavaca Bay Superfund Site. October 2016.

Alcoa. Response Action Plan Witco Channel and Harbor Dredging and MS3 Excavation. Alcoa (Point Comfort)/Lavaca Bay Superfund Site. October 2016.

Alcoa. Witco Channel and Harbor Dredging, MS3 Excavation and Causeway Cove Response Action Plan – Response Action Plan Addendum (Appendix C). Alcoa (Point Comfort)/Lavaca Bay Superfund Site. December 2016.

Alcoa. Response Action Plan Addendum 2 to the Channel and Harbor Dredging and MS3 Excavation Response Action Plan for the South MS3 Dredging Response Action. Alcoa (Point Comfort)/Lavaca Bay Superfund Site. April 2017.

Alcoa. 2016 Remedial Action Annual Effectiveness Report. Alcoa (Point Comfort)/Lavaca Bay Superfund Site. March 2017.

Alcoa. 2017 Remedial Action Annual Effectiveness Report. Alcoa (Point Comfort)/Lavaca Bay Superfund Site. March 2018.

Alcoa. 2018 Remedial Action Annual Effectiveness Report. Alcoa (Point Comfort)/Lavaca Bay Superfund Site. March 2019.

Alcoa. Updates to Operations, Maintenance, and Monitoring Plans. Alcoa (Point Comfort)/Lavaca Bay Superfund Site. February 2019.

Alcoa. 2019 Remedial Action Annual Effectiveness Report. Alcoa (Point Comfort)/Lavaca Bay Superfund Site. March 2020.

Alcoa. 2020 Remedial Action Annual Effectiveness Report. Alcoa (Point Comfort)/Lavaca Bay Superfund Site. March 2021.

EPA. Record of Decision for the Alcoa (Point Comfort)/Lavaca Bay Superfund Site. December 2001.

EPA. Explanation of Significant Differences for the Alcoa (Point Comfort)/Lavaca Bay Superfund Site. May 23, 2007.

EPA. Preliminary Close-Out Report for the Alcoa (Point Comfort)/Lavaca Bay Superfund Site. July 23, 2007.

EPA. Five-Year Review Report, Alcoa (Point Comfort)/Lavaca Bay Superfund Site. June 2011.

EPA. Second Five-Year Review Report, Alcoa (Point Comfort)/Lavaca Bay Superfund Site. June 2016.

EPA. Addendum to Second Five-Year Review Report, Alcoa (Point Comfort)/Lavaca Bay Superfund Site. December 2019.

# APPENDIX B – SITE CHRONOLOGY

**Table B-1: Site Chronology**

| Event | Date |
|---|---|
| Aluminum smelter operates on site | 1948 through 1980 |
| Facility refines bauxite to produce alumina | 1958 through 2011 |
| Former Witco Processing Area in operation | 1964 through 1985 |
| The CAPA in operation | 1966 through 1979 |
| Closed Area designation closed about 1 square mile of Lavaca Bay to the taking of finfish and crabs | April 1988 |
| EPA proposed the Site for listing on the NPL | May 1993 |
| EPA finalized the Site's listing on the NPL | February 1994 |
| CAPA groundwater hydraulic control system installed | 1998 |
| Two phases of sediment dredging completed | August 1998 to January 1999 |
| Non-time-critical removal action at Dredge Island | September 1998 through Summer 2001 |
| Cox Bay portion of Lavaca Bay removed from Closed Area | January 2000 |
| RI Report completed | November 1999 |
| Final Baseline risk assessment completed | May 2000 |
| FS completed | May 2001 |
| ROD signature | December 2001 |
| Consent Decree for CERCLA response actions and response costs | March 1 2005 |
| EPA signed the Site's ESD | May 2007 |
| Preliminary Close-Out Report issued | June 2007 |
| Remedial Action Effectiveness Report for 2010 submitted | March 2011 |
| EPA issued the Site's first FYR Report | June 2011 |
| Remedial Action Effectiveness Report for 2011 submitted | March 2012 |
| Remedial Action Effectiveness Report for 2012 submitted | March 2013 |
| Remedial Action Effectiveness Report for 2013 submitted | March 2014 |
| Remedial Action Effectiveness Report for 2014 submitted | March 2015 |
| Remedial Action Effectiveness Report for 2015 submitted | March 2016 |
| EPA issued the Site's second FYR Report | July 2016 |
| Response action for marsh and sediment removal in the Causeway Cove completed | January 2017 |
| Remedial Action Effectiveness Report for 2016 submitted | March 2017 |
| Response action for excavation of MS3 upland area began | June 2017 |
| Dredging response actions suspended due to Hurricane Harvey | August 25 through September 4 2017 |
| All dredging response actions completed | September 29, 2017 |
| Remedial Action Effectiveness Report for 2017 submitted | March 2018 |
| OMMPs updated | February 2019 |
| Remedial Action Effectiveness Report for 2018 submitted | March 2019 |
| EPA issued the Addendum to the Second FYR Report | December 2019 |
| Alcoa announced permanent closure of refinery operations, which had been curtailed since 2016 | December 16 2019 |
| Remedial Action Effectiveness Report for 2019 submitted | March 2020 |
| Remedial Action Effectiveness Report for 2020 submitted | March 2021 |

# APPENDIX C – PRESS NOTICE

**Alcoa (Point Comfort)/Lavaca Bay Superfund Site**
**Public Notice**
**U. S. Environmental Protection Agency, Region 6**

**March 2021**

The U.S. Environmental Protection Agency Region 6 (EPA) will be conducting the third five-year review of remedy implementation and performance at the Alcoa (Point Comfort)/Lavaca Bay Superfund site (Site) in Point Comfort, Texas. Former operations at the Site produced wastewater that was transported to an offshore lagoon on Dredge Island. The Site consists of the former facility property, Dredge Island and surface water and sediment of the adjacent bays. The cleanup includes extraction and treatment of groundwater, installation of a collection trench to stop dense non-aqueous phase liquid from moving into Lavaca Bay, removal and disposal of contaminated sediment at Dredge Island, and natural recovery of sediment left in place. Fish consumption restrictions are in place and monitoring of sediment and fish tissue continue.

The five-year review will determine if the remedies are still protective of human health and the environment. The five-year review is scheduled for completion in July 2021.

The report will be made available to the public at the following local information repository:

Calhoun County Public Library
200 West Mahan Port Lavaca, TX 77979
(361) 552-7323

Site status updates are available on the Internet at
www.epa.gov/superfund/alcoa-lavaca-bay

All media inquiries should be directed
to the EPA Press Office at (214) 665-2200

For more information about the Site, contact:

Laura Hunt/Remedial Project Manager
(214) 665-9729
or 1-800-533-3508 (toll-free)
or by email at hunt.laura@epa.gov

Adam Weece/Community Involvement Coordinator
(214) 665-2264
or 1-800-533-3508 (toll-free)
or by email at weece.adam @epa.gov

# APPENDIX E –SITE INSPECTION PHOTOS

**Entrance/Access Sign**



**Chlor-alkali Process Area:** CAPA water treatment system is operating as designed and per the O&M Manual. The cover system area is well-maintained and required signage is in place (see photo). All recovery wells are operating and with locking surface casings to restrict access (see photo).


**Former Witco Processing Area:** Cover system area is well-maintained and required signage is in place (see photo).


**Dredge Island:** O&M inspections, maintenance and vegetation control program in effect. Decant structure construction/installation is near completion. Exterior levee with armor stone (see photos).

**South West Decant Structure**


**North East Decant Structure**



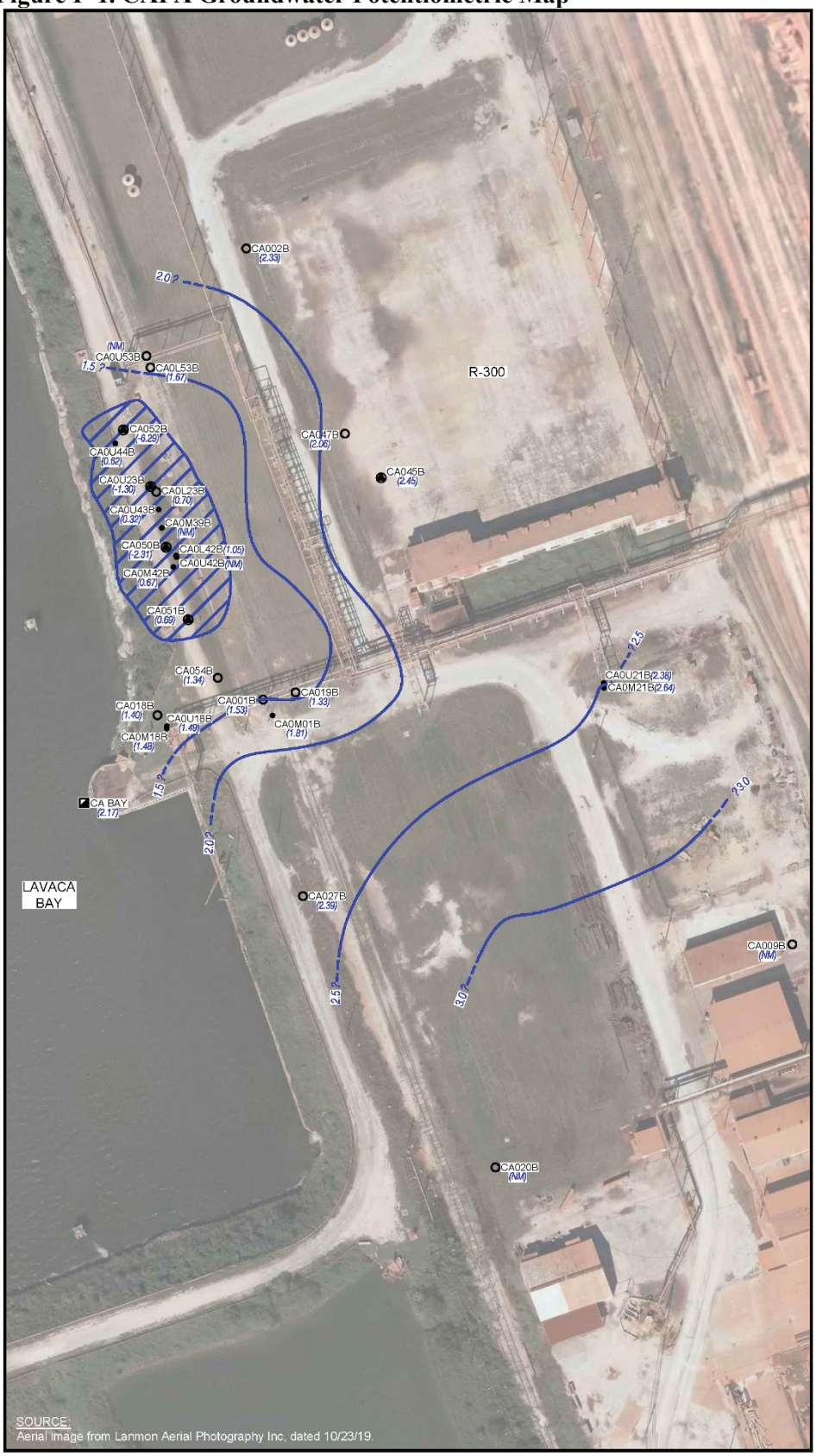

Date & Time: Wed, Nov 18, 2020, 14:44:59 CST
Position: +028°38'44.38" / -096°34'28.12" (±16.0ft)
Altitude: 24ft (±10.4ft)
Datum: WGS-84
Azimuth/Bearing: 360° N00W 6400mils True (±12°)
Elevation Angle: +04.1°
Horizon Angle: +01.2°
Zoom: 0.5X

# APPENDIX F – SUPPORTING DATA

**Table F-1. Mercury Removed at CAPA Groundwater Treatment System**

| Year | Pounds Mercury Recovered per CAPA Well | | | | Mercury Removed from all Wells (pounds) |
|---|---|---|---|---|---|
| | CAO50B | CAO51B | CAO52B | CAO23B | |
| 1998 | 20.67 | 4.62 | 0.30 | 11.81 | 37.40 |
| 1999 | 10.59 | 2.51 | 1.28 | 7.39 | 21.77 |
| 2000 | 9.05 | 2.28 | 0.83 | 4.85 | 17.01 |
| 2001 | 7.45 | 1.71 | 0.33 | 1.85 | 11.34 |
| 2002 | 4.70 | 0.90 | 0.21 | 2.55 | 8.36 |
| 2003 | 7.14 | 0.62 | 0.20 | 1.48 | 9.44 |
| 2004 | 4.66 | 0.41 | 0.16 | 1.38 | 6.61 |
| 2005 | 7.85 | 0.68 | 0.14 | 1.08 | 9.75 |
| 2006 | 5.35 | 0.79 | 0.15 | 0.89 | 7.18 |
| 2007 | 4.33 | 0.73 | 0.10 | 0.49 | 5.65 |
| 2008 | 10.99 | 0.97 | 0.19 | 0.98 | 13.13 |
| 2009 | 4.92 | 0.76 | 0.13 | 0.69 | 6.50 |
| 2010 | 3.31 | 0.41 | 0.09 | 0.72 | 4.53 |
| 2011 | 3.07 | 0.15 | 0.05 | 0.66 | 3.92 |
| 2012 | 4.00 | 0.24 | 0.06 | 0.60 | 4.89 |
| 2013 | 4.39 | 0.14 | 0.05 | 0.56 | 5.13 |
| 2014 | 4.07 | 0.06 | 0.04 | 0.83 | 5.00 |
| 2015 | 4.36 | 0.14 | 0.04 | 0.90 | 5.44 |
| 2016 | 5.23 | 0.22 | 0.03 | 0.84 | 6.32 |
| 2017 | 3.52 | 0.18 | 0.02 | 0.69 | 4.40 |
| 2018 | 3.91 | 0.29 | 0.02 | 0.77 | 4.98 |
| 2019 | 3.13 | 0.22 | 0.01 | 0.42 | 3.79 |
| 2020 | 2.68 | 0.27 | 0.01 | 0.30 | 3.26 |
| Cumulative Totals | 139.37 | 19.31 | 4.41 | 42.73 | 205.81 |

**Figure F-1. CAPA Groundwater Potentiometric Map**




## EXPLANATION

| | |
|---|---|
| CA018B | Well Designation |
| ○ | Monitoring Well |
| • | Piezometer |
| ◕ | Recovery Well |
| ◪ | Tidal Gauge |
| —1.5— | Estimated Potentiometric Surface Contour (Ft) C.I. = 0.5 Ft |
| ▨ | Area of Drawdown of Potentiometric Surface Caused by Pumping (not contoured) |
| (2.56) | Zone B Water Level (FT MSL) Measured 6/11/2020 |
| (NM) | Water Level Measurement Not Measured or Not Used |

STATE OF TEXAS
MATTHEW K. WICKHAM
GEOLOGY
LIC. # 5330
LICENSED
PROFESSIONAL GEOSCIENTIST

0 60 120 Feet

Notes:
1. Groundwater elevations measured in pumping wells are probably influenced by well inefficiencies.
2. Groundwater elevations are corrected for salinity effects.
3. Only wells measured for water levels are shown on this figure.
4. Surface water elevation used for contouring is from tidal gauge located southwest of CAPA (CA Bay).

2020 RAAER

**POTENTIOMETRIC SURFACE OF ZONE B GROUNDWATER (6/11/2020)**

GOLDER

Project: 19117631A

Date: 8/10/2020

Figure 1

Prepared for
ALCOA CORPORATION

**Figure F-2. Mercury Concentrations in CAPA Recovery Wells, 1998 through 2020**

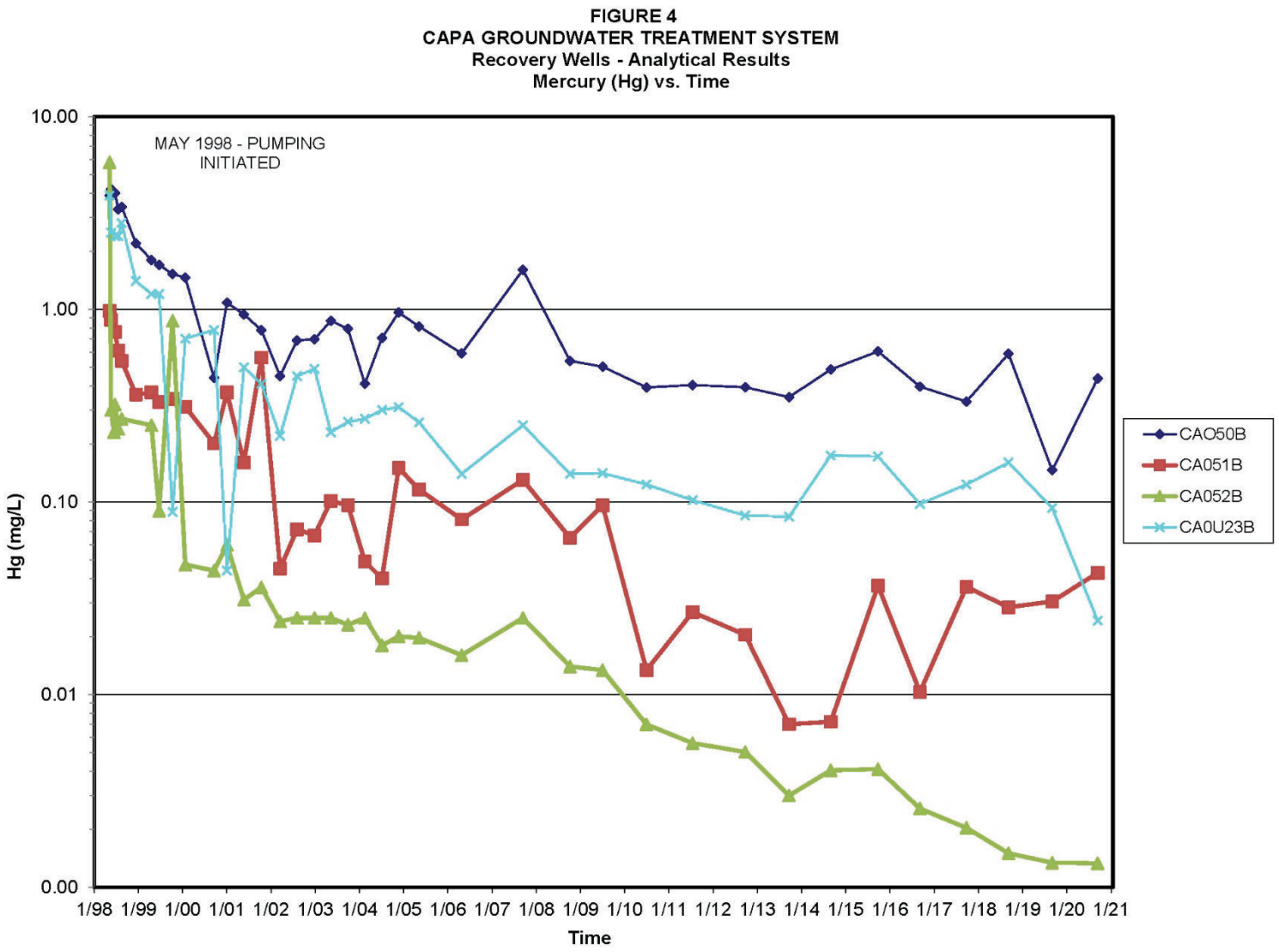


**Figure F-3. Carbon Tetrachloride Concentrations in CAPA Recovery Wells, 1998 through 2020**

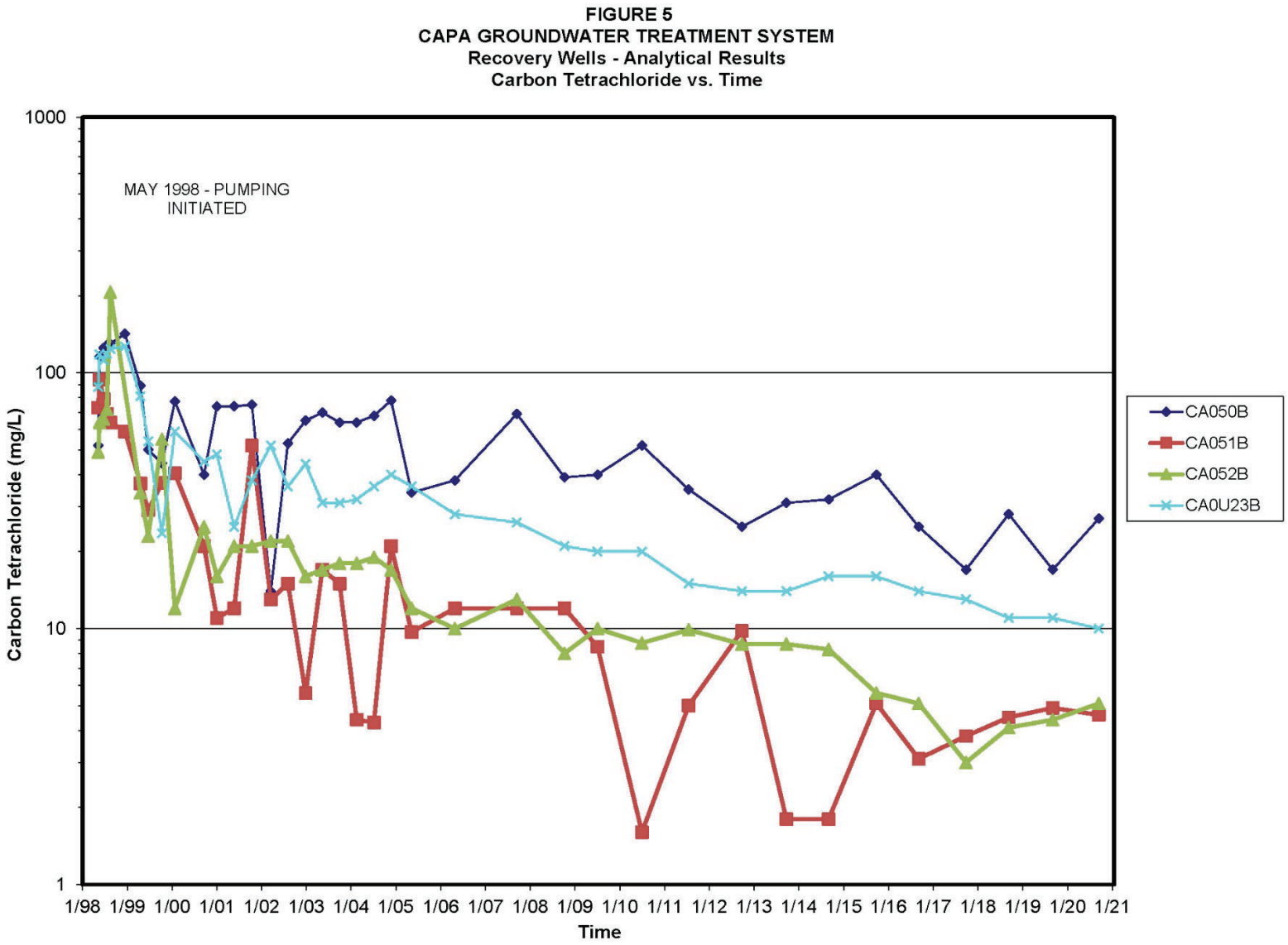


**Figure F-4. Open Water Sediment Sample Results, 2019**

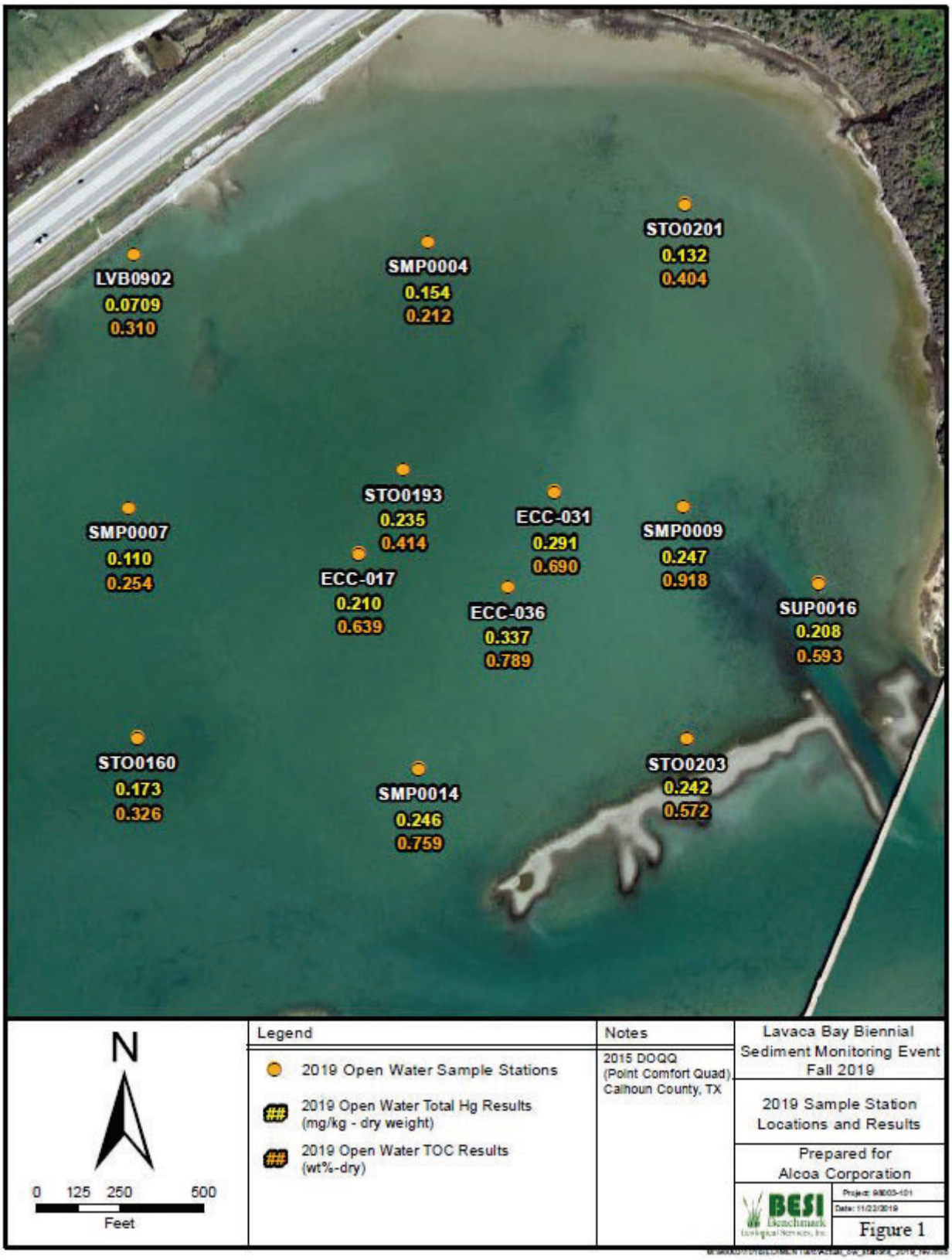


**Figure F-5. Total Mercury Trends, Closed Area Open-Water Sediment Sub-Area**

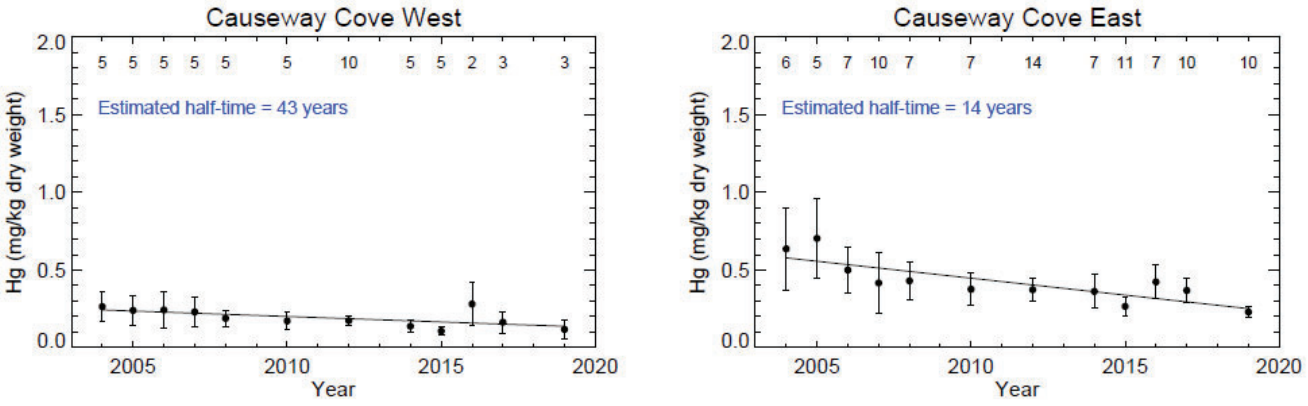



**Figure 2.5-2**

Closed Area Open-water Sediment Sub-area Total Mercury Trends

*Notes: Non-detect values set to MDL. Surface samples 0-2 cm and 0-5 cm included in averaging. Values at the top of the panel represent number of data points for each year. Outliers excluded from averaging: 2.88 mg/kg Hg in Alcoa Channel in 2015 and 1.25 mg/kg Hg in Northwest of Dredge Island in 2014. Half-time = -log(2) / regression slope.*

Prepared for Alcoa Corporation

**Figure F-6. Average Total Mercury Concentrations in Lavaca Bay Red Drum Tissue by Year, 1996 to 2020**

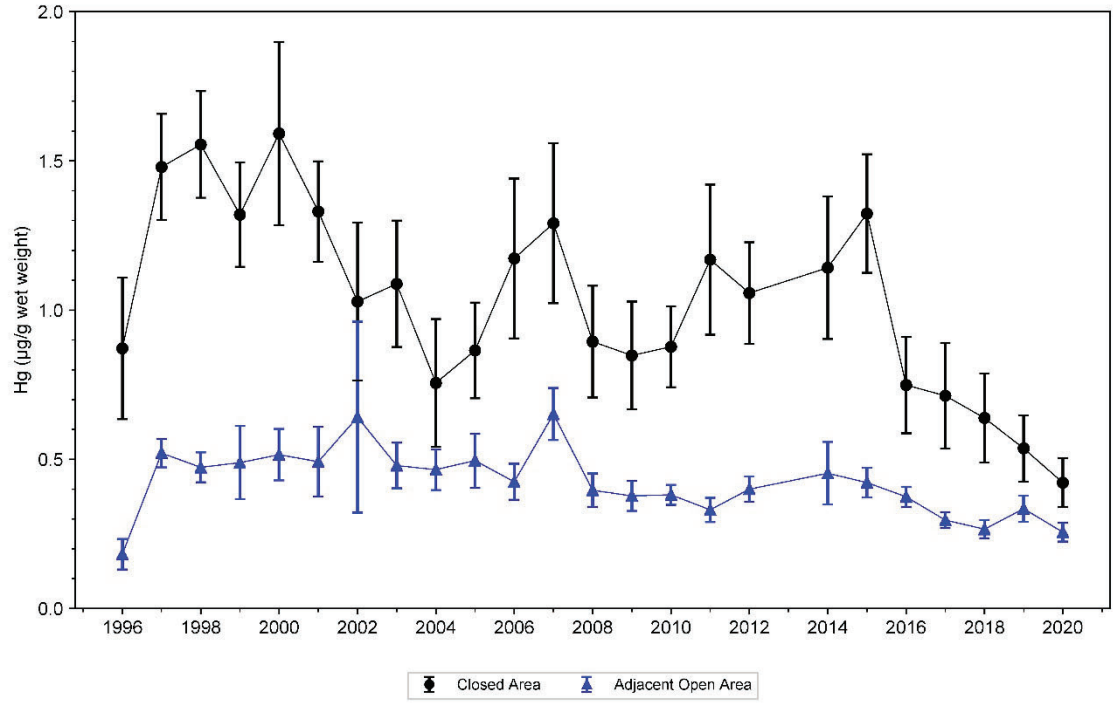



**Figure 2.6-2**

Average Total Mercury Concentrations in Lavaca Bay Red Drum Tissue by Year, 1996-2020

Notes: Symbols represent mean concentrations and error bars show two standard errors above and below the mean.
Prepared for Alcoa Corporation

ANCHOR QEA

**Table F-2. Summary of Marsh Sediment Mercury Concentrations**

| Marsh ID | 2008 | 2009 | 2010 | 2011 | 2012 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|
| Marsh 1 | 0.097 | 0.112 | 0.113 | 0.131 | 0.094 | 0.098 | 0.098 | 0.164 | Removed |
| Marsh 2 | 0.084 | 0.073 | 0.081 | 0.064 | 0.062 | 0.062 | 0.035 | 0.061 | Removed |
| Marsh 3 | 0.111 | 0.155 | 0.148 | 0.116 | 0.132 | 0.093 | 0.064 | 0.056 | Removed |
| Marsh 5 | 0.375 | 0.399 | 0.405 | 0.286 | 0.200 | 0.231 | 0.124 | 0.267 | Removed |
| Marsh 6 | 0.748 | 0.422 | 0.384 | 0.300 | 0.219 | 0.188 | 0.178 | 0.281 | Removed |
| Marsh 7 | 0.422 | 0.391 | 0.219 | 0.381 | 0.308 | 0.139 | 0.207 | 0.549 | Removed |
| Marsh 11 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | Removed |
| Marsh 14 | 1.261 | 1.109 | 0.535 | 0.719 | N.A. | Removed | Removed | Removed | Removed |
| Marsh 15 | 0.418 | 0.374 | 0.440 | 0.480 | 0.287 | 0.034 | 0.022 | 0.046 | 0.080 |
| Marsh 19 | 0.155 | 0.201 | 0.210 | 0.353 | 2.055 | 0.095 | 0.068 | 0.421 | 0.070 |

*Notes*:
1. Concentrations are in mg/kg, dry weight
2. Remediation goal is 0.25 mg/kg mercury. Highlighted if goal is met.
3. N.A. = not analyzed. Marsh 11 met the remediation goal of achieving sediment concentrations less than 0.25 mg/kg mercury in 2004 and 2005 with average concentrations of 0.019 and 0.021 mg/kg.
4. EPA agreed to suspend sediment and tissue monitoring activities in Lavaca Bay during 2013 as the samples might be biased by the short-term temporary disturbances created by the Marsh 14 dredging project. Therefore, the 2013 RAAER does not present any new sediment and tissue monitoring data.
5. Text is red if outliers were removed (details in text of annual RAAER).
6. Removed = Marsh 14 was dredged in 2012. In 2017, Alcoa physically removed Marshes 1, 2 and 3 in the Eastern Causeway Cove, and portions of Marshes 6 and 7 next to Mainland Shoreline Number 3 (Response Action Plan, Witco Channel and Harbor Dredging and MS3 Excavation October 17, 2016).

**Table F-3. Summary of Red Drum and Juvenile Blue Crab Tissue Data, 1997 to 2020**

| Red Drum Sampling Event | Closed Area | | Adjacent Open Area | |
|---|---|---|---|---|
| | Number of Samples | Mean THg (mg/kg ww) | Number of Samples | Mean THg (mg/kg ww) |
| 4Q 1997 | 34 | 1.41 | 27 | 0.51 |
| 2001 Annual | 30 | 1.33 | 15 | 0.49 |
| 2002 Annual | 22 | 1.03 | 8 | 0.64 |
| 2003 Annual | 29 | 1.09 | 30 | 0.48 |
| 2004 Annual | 29 | 0.76 | 32 | 0.47 |
| 2005 Annual | 30 | 0.86 (0.87) | 36 | 0.48 |
| 2006 Annual | 30 | 1.17 | 30 | 0.43 |
| 2007 Annual | 30 | 1.29 | 30 | 0.65 |
| 2008 Annual | 30 | 0.89 (0.9) | 30 | 0.4 |
| 2009 Annual | 30 | 0.85 | 30 | 0.38 |
| 2010 Annual | 30 | 0.88 | 30 | 0.38 |
| 2011 Annual | 30 | 1.17 | 30 | 0.33 |
| 2012 Annual | 30 | 1.06 | 30 | 0.4 |
| 2014 Annual | 30 (29) | 1.14 (1.06) | 30 (28) | 0.45 (0.40) |
| 2015 Annual | 30 | 1.32 | 30 | 0.42 |
| 2016 Annual | 30 | 0.75 | 30 | 0.37 |
| 2017 Annual | 30 | 0.71 | 30 | 0.3 |
| 2018 Annual | 30 | 0.64 | 30 | 0.27 |
| 2019 Annual | 30 | 0.54 | 30 | 0.33 |
| 2020 Annual | 30 | 0.42 | 30 | 0.26 |
| **Juvenile Blue Crab Sampling Event** | **Number of Samples** | **Mean HG (mg/kg ww)** | **Number of Samples** | **Mean HG (mg/kg ww)** |
| 4Q 1997 | 49 | 0.59 | 27 | 0.19 |
| 2001 Annual | 33 | 0.48 | 16 | 0.22 |
| 2002 Annual | 71 | 0.26 | 26 | 0.11 |
| 2003 Annual | 30 | 0.25 | 30 | 0.07 |
| 2004 Annual | 31 | 0.14 | 30 | 0.07 |
| 2005 Annual | 27 | 0.22 | 30 | 0.05 |
| 2006 Annual | 30 | 0.21 | 30 | 0.08 |
| 2007 Annual | 30 | 0.18 | 30 | 0.08 |
| 2008 Annual | 30 | 0.16 | 30 | 0.06 |
| 2009 Annual | 30 | 0.22 | 30 | 0.09 |

| | | | | |
|---|---|---|---|---|
| 2010 Annual | 30 | 0.23 | 30 | 0.09 |
| 2011 Annual | 30 | 0.17 | 30 | 0.06 |
| 2012 Annual | 30 | 0.14 | 30 | 0.06 |
| 2014 Annual | 30 | 0.18 | 30 | 0.07 |
| 2015 Annual | 30 | 0.1 | 30 | 0.04 |
| 2016 Annual | 30 | 0.12 | 30 | 0.05 |
| 2017 Annual | 30 | 0.14 | 30 | 0.06 |
| 2018 Annual | 30 | 0.1 | 30 | 0.04 |
| 2019 Annual | 30 | 0.07 | 30 | 0.04 |
| 2020 Annual | 30 | 0.08 | 30 | 0.05 |

*Notes*:
Corrections were made during the analysis performed for the 2019 RAAER. *Italicized values* were reported in previous RAAERs.
THg = total mercury
mg/kg ww = milligrams per kilogram wet weight

# APPENDIX G – INTERVIEW FORMS

| ALCOA (POINT COMFORT)/LAVACA BAY SUPERFUND SITE<br>FIVE-YEAR REVIEW INTERVIEW FORM | |
|---|---|
| **Site Name:** Alcoa (Point Comfort)/Lavaca Bay | |
| **EPA ID:** TXD008123168 | |
| **Interviewer name:** | **Interviewer affiliation:** |
| **Subject name: Simon Payne** | **Subject affiliation: TCEQ Project Manager** |
| **Subject contact information: 512-239-2466; simon.payne@tceq.texas.gov** | |
| **Interview date: 05/05/21** | **Interview time:** |
| **Interview location: Completed in writing due to travel restrictions** | |
| **Interview format (bolded):** In Person Phone Mail **Email** Other: | |
| **Interview category:** State Agency | |

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

   Photographic evidence indicates that the Site is well maintained.

2. What is your assessment of the current performance of the remedy in place at the Site?

   Performance of the current remedy is monitored by the issuance of Remedial Action Annual Effectiveness Reports. The latest RAAER indicates that completed and ongoing remedial actions, O&M activities, and natural recovery processes have resulted in downward trends in open water and marsh sediment mercury concentrations in most parts of the Closed Area. Additionally, photographic evidence of signage in the Closed Area, indicates that the signs are in operative condition. Based on the above, my assessment of remedy in place is that it is applicable.

3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities from residents in the past five years?

   I am not aware of any complaints or inquiries directed to the TCEQ.

4. Has your office conducted any site-related activities or communications in the past five years? If so, please describe the purpose and results of these activities.

   The TCEQ currently does not individually direct any site-related activities and any site-related communication are issued through the EPA.

5. Are you aware of any changes to state laws that might affect the protectiveness of the Site's remedy?

   I am not aware of any changes that would affect protectiveness.

6. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues?

   The current procedure at the property has been sufficient to notify on-site personnel of hazards in the CAPA and Witco area; however since operations have ceased and the PCO property is for sale, restrictive

covenants for these areas need to be filed, as stipulated in the 2001 ROD, as soon as possible to ensure potential purchases are aware of the hazards and use limitations of the property.

The current signage in the Closed Area has been sufficient to notify stakeholders of the IC's established in this area.

7. Are you aware of any changes in projected land use(s) at the Site?

I am not aware of any changes in projected land use at the Site, although the 2019 RAAER states Alcoa made a public announcement on December 26, 2019 that it was permanently closing the refinery operations, which had been curtailed since 2016.

8. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?

Performance of the Site's remedy is monitored annually and documented in the RAAERs, the downward trends in sediment recovery and mercury concentrations indicates that the process is currently effective.

9. Do you consent to have your name included along with your responses to this questionnaire in the FYR report?

Yes, I consent