Alcoa Environmental

2010 Remedial Action Annual Effectiveness Report

Alcoa (Point Comfort) / Lavaca Bay Superfund Site

March 31, 2011

ALCOA

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2010 REMEDIAL ACTION ANNUAL EFFECTIVENESS REPORT

ALCOA (POINT COMFORT) / LAVACA BAY SUPERFUND SITE

Prepared for:

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CAPA	Chlor-Alkali Process Area
CCND	Calhoun County Navigation District
CD	Consent Decree
CDF	Confined Disposal Facility
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
DMPA	Dredge Material Placement Area
DNAPL	Dense Non-Aqueous Phase Liquid
EE/CA	Engineering Evaluation/Cost Analysis
FS	Feasibility Study
GPA	Gypsum Placement Area
MSL	Mean Sea Level
NGVD	National Geodetic Vertical Datum
OMMP	Operation, Maintenance and Monitoring Plan
RAAER	Remedial Action Annual Effectiveness Report
RDR	Remedial Design Report
RI	Remedial Investigation
ROD	Record of Decision
SOW	Statement of Work
USEPA	United States Environmental Protection Agency

1.0 INTRODUCTION

1.1 Objective

This 2010 Remedial Action Annual Effectiveness Report (RAAER) for the Alcoa (Point Comfort)/Lavaca Bay Superfund Site (the "Site") in Point Comfort, Texas satisfies the requirements of the CERCLA Consent Decree/Statement of Work between Alcoa (Alcoa Inc. and Alcoa World Alumina Atlantic, L.L.C.) and the United States of America and the State of Texas, entered in the United States District Court, Southern District on the effective date of March 1, 2005 (United States et al., 2005).

Although actual monitoring data are submitted with the quarterly progress reports as the analytical information is validated, the objective of the RAAER is to create an integrated assessment of the progress towards achieving the overall Site remediation goals using results from all monitoring performed subsequent to the lodging of the Consent Decree.

1.2 CD/SOW Requirements for the RAAER

Per the Statement of Work attached to the Consent Decree, the RAAER:

> *"...shall be prepared to evaluate the effectiveness of the RA [Remedial Action] including, but not limited to, an evaluation of the performance of the hydraulic control system at CAPA, natural recovery of sediments in Lavaca Bay, trends in fish/shellfish tissue values, and an evaluation of O&M activities. In preparing the report, Settling Defendants shall use the O&M and Performance Monitoring data collected and any data collected during construction of the remedy. The Annual Effectiveness Report shall be submitted to EPA in accordance with the schedule contained in the Remedial Action Work Plan."*

The Remedial Action Work Plan (Alcoa, 2005a) specifies that the RAAER be submitted by March 31 of the year following the completion of each monitoring program.

The Statement of Work attached to the Consent Decree states that specific topics to be discussed in the RAAER include:

- Site information;
- Media description;

- Treatment system description;
- Treatment system performance;
- Observations and lessons learned; and
- Verification that site conditions have not changed and there have been no land use or property development changes that may affect the remedial action.

1.3 Site Description and Status of Remedial Activities

The Site is defined in the Consent Decree as:

> *"...the Alcoa/Lavaca Bay Superfund Site, generally consisting of the Plant, Dredge Island, Formosa Tract, and portions of Lavaca Bay, Cox Bay, Cox Creek, Cox Cove, Cox Lake (Cox Creek, Cox Cove, and Cox Lake are also known as Huisache Creek, Cove and Lake) and western Matagorda Bay located in Calhoun County, Texas, and areas containing hazardous substances depicted generally on the map attached as Appendix C." (Note: map from Consent Decree not presented herein).*

Although all areas of the Site were investigated during the Remedial Investigation, the risk assessments indicated that only certain parts of Lavaca Bay, the Dredge Island, and two areas on the Plant/Mainland (the Chlor-Alkali Process Area [CAPA] and the Witco Area) required development of remedial action objectives and subsequent remediation. Remediation of the Site, as described in the Record of Decision (ROD) (USEPA, 2001), consisted of actions that were initiated prior to the ROD (some of which were completed prior to the ROD and some of which are ongoing), and several future actions. This RAAER presents monitoring information that reflects the effects of both the completed actions and the ongoing activities. The following remedial actions have either been completed or represent an ongoing activity at the Site:

- Stabilization of the Dredge Island (completed as a non-time critical removal action prior to the ROD);
- Removal of CAPA sediment and sediment near Dredge Island (completed as a treatability study prior to the ROD);
- Extraction and treatment of groundwater at the CAPA (initiated as a treatability study prior to the ROD and continuing as an ongoing remedial action pursuant to the Consent Decree);
- Dredging of the Witco Channel (completed as part of routine plant maintenance prior to the ROD);
- Installation of a soil cap at the CAPA, with institutional controls to manage exposure to soil (completed prior to the ROD);

- Removal of Building R-300 at the CAPA (completed prior to the ROD);
- Natural recovery of sediments (ongoing activity);
- Institutional controls to manage exposure to finfish/shellfish (ongoing activity)
- Installation of a Dense Non-Aqueous Phase Liquid (DNAPL) containment system (slurry wall vertical barrier) at the Witco Area (installed in 2006);
- Installation of soil caps at the Witco Area, with institutional controls to manage exposure to soil (installed in 2006); and
- Dredging of the Witco Marsh (completed in 2006).

On May 23, 2007, USEPA published notice that an Explanation of Significant Differences (ESD) had been signed for the Site. The ESD indicates that enhanced natural recovery north of Dredge Island is no longer a necessary component of remedial action for the Site. The notice states:

> *"Although the remediation goal for sediment in open water areas of Lavaca Bay has been achieved, Alcoa will continue to monitor mercury levels in fish and marsh sediment. Results from the ongoing monitoring will be updated in the annual Remedial Action Effectiveness Report. EPA will review the report to determine if the remedy continues to be protective of human health and the environment. If EPA determines that the remedy is not protective, EPA can require Alcoa to undertake additional response actions."*

The Preliminary Close Out Report (PCOR) for the Alcoa/Lavaca Bay site was signed by USEPA on July 23, 2007. The PCOR documents that all construction activities required by the Record of Decision were completed. Long term monitoring of red drum and blue crab is required to evaluate the recovery of mercury levels in fish and shellfish.

The Consent Decree specifies certain performance monitoring activities to evaluate the effectiveness of the remedy. The scopes of each of these monitoring activities are contained in the Remedial Design Reports (RDRs) and/or Operation, Maintenance and Monitoring Plans (OMMPs) attached to the Consent Decree. The Consent Decree documents that govern operation, maintenance and monitoring for currently completed or ongoing activities are:

- Chlor-Alkali Process Area RDR and OMMP (Appendix A);
- Lavaca Bay Sediment Remediation and Long-Term Monitoring Plan OMMP (Appendix H);
- Lavaca Bay Finfish and Shellfish OMMP (Appendix I);
- Dredge Island OMMP (Appendix D);

- Chlor-Alkali Process Area Soils RDR and OMMP (Appendix F);
- Witco Tank Farm DNAPL Containment System RDR and OMMP (Appendix B); and
- Witco Area Soils RDR and OMMP (Appendix G).

The RDRs/OMMPs provide detailed descriptions of the performance monitoring that is summarized in this RAAER. Although the general scopes of the relevant OMMPs are described subsequently, the reader is directed to the RDR/OMMP documents for specific details about each monitoring program. Due to the large size of the RDR/OMMP documents, they are not reproduced here.

2.0 OVERVIEW OF O&M AND PERFORMANCE MONITORING PROGRAMS

2.1 Chlor-Alkali Process Area Groundwater Extraction and Treatment System

The CAPA groundwater extraction and treatment system began full-scale operation in May 1998. The primary system components are four groundwater extraction wells, an air stripper that removes volatile organic compounds from the groundwater, and a series of carbon vessels that remove mercury. Ancillary piping, filters, pumps, tanks, etc. comprise the rest of the system. The objective of the groundwater extraction system is to provide hydraulic control of that portion of the dissolved mercury plume that was believed to contribute over 98 percent of the mercury mass flux from Zone B groundwater to Lavaca Bay prior to groundwater control. A treatability test conducted in 1997/1998 indicated that an aggregate extraction rate of approximately 10 gallons per minute (gpm) from the four extraction wells creates a cone of depression that extends parallel to the shoreline along the line of wells.

The system has operated continuously since 1998, with only minor interruptions for maintenance or trouble-shooting, or during power interruptions at the Point Comfort Operations (PCO) facility. Detailed information for the CAPA groundwater extraction and treatment system, including the results of investigations and system design, is provided in the CAPA Focused Investigation Data Report (Alcoa, 1998) and CAPA Groundwater Treatability Study Data Report (Alcoa, 1999).

Operations, maintenance, and monitoring were conducted in 2010 in accordance with the CAPA Groundwater RDR/OMMP (Consent Decree, Appendix A). The various maintenance activities, operational checks and sampling requirements are summarized in Table 3-3 of the RDR/OMMP. The discharge standards for the system effluent are shown in Table 3-1 of the RDR/OMMP. A summary of the CAPA groundwater extraction and treatment system performance is provided in Section 3.1 of this report.

2.2 Chlor-Alkali Process Area Offshore Surface Water Sampling

As discussed in the 2006 RAAER (Alcoa, 2007), the performance objective for this component of the OMMP was achieved in 2006 and it is no longer part of the annual monitoring program.

2.3 Lavaca Bay Sediment Monitoring

A key factor in the success of the Lavaca Bay remedy is the reduction of sediment mercury concentrations through targeted sediment removal efforts, capping, natural recovery, and/or enhanced natural recovery. The purpose of the sediment monitoring program is to verify that source control and remedial measures have been effective in reducing sediment concentrations to acceptable levels.

As described in the Lavaca Bay Sediment Remediation and Long-Term Monitoring Plan (Consent Decree Appendix H), the sediment monitoring program was designed to evaluate surface (0-5 cm) sediment mercury concentrations from open water and marsh areas within the Closed Area. The boundaries of the Closed Area are defined in the Texas Department of Health's Order against taking of finfish and shellfish for consumption.

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 (ppm) dry weight is measured in the Closed Area in two consecutive years. As documented in the 2005 RAAER (Alcoa, 2006a), this occurred in 2004 and 2005 when average concentrations of 0.293 ppm and 0.276 ppm, respectively, were measured in surface open water sediment samples from the Closed Area. Thus the performance objective of the open water sediment monitoring program established in the Consent Decree has been met. However, Alcoa has elected to continue monitoring of the northern half of the open water sediment sampling grid on a voluntary basis as part of its ongoing effort to better understand trends in fish tissue concentrations in the Closed Area of Lavaca Bay. In 2009 Alcoa decided to monitor the open water sediment every two years (even years), so no open water sediment samples were collected during the 2009 monitoring event. Open water sediment samples were collected in 2010.

The marsh sediment monitoring program began in 2004 with the collection of surface sediment samples from the eight largest marshes within the Closed Area ("one" of these eight marshes was actually two adjacent marshes, Marshes 1 and 2). The number of sub-samples used to yield a composite mercury concentration for each marsh ranged initially from three to five depending on the relative size of each marsh. The original marsh identification (ID) numbers and number of sub-samples initially collected (i.e., 2004 and 2005 annual monitoring events) were:

Marsh ID	Number of Sub-samples
1 and 2	5
3	3
5	5
7	3
11	5
14	3
15	3
19	4

The following recommendations were provided in the 2005 RAAER:

- *"The 2005 event identified what appears to be an outlier subsample (SUP0007) with elevated mercury concentrations in one marsh (Marsh 1). Modifications to the monitoring program to identify and deal with statistical outliers should be considered.*
- *The chemical analysis of marsh sediment subsamples, followed by mathematical averaging to derive a composite marsh mercury concentration for use in attaining performance standards seems to be a more informative approach to monitoring than compositing subsamples and obtaining just a single composite mercury analysis. We recommend that the chemical analysis of individual marsh sediment subsamples be performed in future monitoring events."*

Based on these recommendations, the sampling plan was revised for the 2006 marsh sediment monitoring event to 1) increase the number of samples in each marsh; and 2) individually analyze each marsh subsample, thereby allowing the identification of potential outliers yet still affording the opportunity to calculate an average mercury concentration of sediment in each marsh. The revised marsh sampling plan was submitted to USEPA on October 13, 2006 (Alcoa, 2006b).

In order to develop the revised sampling plan, an *a priori* power analysis was conducted to establish the number of samples that would be necessary to determine whether the mean mercury concentration of an individual marsh was different from the remedial goal, given the variability in the 2005 data. The power analysis determined that a total sample size of 70 would result in a power greater than 95%. Based on a sample size of 70, and the total length of the nine target marshes identified in 2005 (6,132 feet), samples were evenly distributed across the nine marshes. A minimum of six samples for any marsh was applied based on the median of the marsh lengths, 490 feet. This cutoff ensured that shorter marshes were not too sparsely sampled while retaining sufficient numbers to add samples for characterizing the longer marshes.

The following number of samples was collected from each marsh beginning with the 2006 annual monitoring event, and continuing with subsequent annual monitoring events:

Marsh ID	Number of Sub-samples
1	12
2	6
3	6
5	6
6	10
7	6
14	6
15	10
19	8

Marshes 1 and 2 are now treated as separate marshes to better understand spatial variability and outliers. Details on the location of the 2010 samples are provided in Appendix A. Due to natural changes in the footprint of the marsh areas, some sample locations visited in 2010 are no longer in marshes, but sediment samples were collected to ensure uniformity of the data set through time.

The Consent Decree states that the objective of the marsh performance standard is to attain an average mercury concentration in each marsh of less than 0.25 mg/Kg dry weight. Monitoring is to occur annually until the remediation goals are met for two consecutive events. If the marsh sediment monitoring data attain the remediation goal for two consecutive annual events in a given marsh, monitoring of that marsh is complete, even if monitoring of other marshes continues. Marsh 11 was dropped from the monitoring program in 2006 because the performance objective of attaining an average mercury sediment concentration of less than 0.25 mg/Kg dry weight in two consecutive years was met in 2005, as described in the 2005 RAAER (Alcoa, 2006a). The 2007 RAAER (Alcoa, 2008a) documented that Marshes 1, 2, 3 and 19 met the performance objective. These four marshes were monitored subsequently on a voluntary annual basis in an ongoing effort to better understand trends in fish tissue concentrations in the Closed Area of Lavaca Bay.

Based on review of the 2007 supplemental data presented in the Amended 2007 RAAER (Alcoa, 2008b), measurements of methyl mercury (MeHg) and total organic carbon (TOC) were added to the analytical suite for the 2008 and subsequent marsh monitoring programs.

2.4 Finfish and Shellfish Monitoring

The purpose of the Lavaca Bay Finfish and Shellfish OMMP is to collect and evaluate data to document whether the remediation goals have been met, and mercury levels in fish tissue have been reduced such that the overall risk throughout Lavaca Bay approaches that which would be present but for the historic Point Comfort Operations. Mercury concentrations in red drum tissue are used as a surrogate of risk, and the remediation goal for Lavaca Bay will be met when the mercury concentrations of red drum collected in the Closed Area have recovered to the levels measured in red drum collected from the Open Area. As discussed in Section 3.4, a rigorous statistical approach is used to compare the mercury concentrations of Closed Area and Open Area red drum tissue samples and to determine when the remediation goal has been met.

The OMMP also provides for collection of information to assess short-term trends in tissue recovery and to "qualitatively" evaluate remedy effectiveness. Trends in concentrations of red drum and juvenile blue crab are evaluated graphically. The OMMP states that increasing trends, based on multiple annual events, indicate that the sediment remediation efforts are not effective at reducing tissue concentrations, and would warrant consideration of additional remedial measures. Decreasing trends, also based on multiple annual events, indicate that the sediment remedies are having the desired effects, subject to quantitative confirmation by statistical comparison of Closed Area and Open Area red drum tissue samples. Static or fluctuating trends indicate that multiple parameters are influencing tissue concentrations, and further monitoring and possibly consideration of additional remedial measures may be necessary.

2.5 Dredge Island Inspections

An Engineering Evaluation/Cost Analysis (EE/CA) for a non-time-critical removal action was conducted by Alcoa for the Dredge Island in 1997 (Alcoa, 1997). A streamlined risk evaluation, prepared as part of the EE/CA, indicated that mercury from Dredge Island could enter Lavaca Bay via erosion of mercury-contaminated soils. Based on that finding, the EE/CA documented the selection of a removal action that minimized the potential for the release of mercury from the island due to either uncontrolled erosion during normal storm events or due to the effects of more intense storms (e.g., hurricanes).

The removal action was conducted between 1998 and 2001, and is referred to as the "Dredge Island Stabilization Project." The project included relocating the contents of the Dredge Materials Placement Areas (DMPAs) that contained elevated levels of mercury (approximately 523,000 cubic yards) into the Gypsum Placement Areas (GPAs). In addition, the containment dikes surrounding the GPAs were raised so that they would not be overtopped during a 100-year storm event (i.e., a storm event that has a probability of occurring once within 100 years). This required increasing 10,700 linear feet of dike to an approximate elevation of 30 feet MSL. As part of this work, most of the marshes on the north end of the island were removed. Erosion protection and runoff control structures were also installed on the island. The final design and as-built drawings for the Dredge Island remedy are contained in the Dredge Island Removal Action Plan, Volume 4 - Phase 1 Dredge Island Stabilization Completion Report (Alcoa, 2002).

The performance objective for the Dredge Island remedy is to interrupt the potential direct exposure pathway of contaminants in soils and sediments from Dredge Island as a result of a significant storm event or uncontrolled erosion during storm water runoff. The removal action and reconfiguration of Dredge Island was designed to achieve this objective through engineering means. Remaining tasks for Alcoa include preservation of the integrity of the reconfigured island through periodic inspections and maintenance and/or repairs, as needed.

The requirements provided in the OMMP for Dredge Island include inspection of the following primary components:

- The access bridge from mainland to northern shore of Dredge Island;
- The 10,500 lineal feet of the Alcoa Confined Disposal Facility (CDF) containment dikes;
- The storm protection on the Alcoa CDF dike exterior, including the armor layer, under-layer, and dike toe protection;
- The gravel erosion protection on the exterior dike slopes above the armor protections and the interior dike slopes above 26.5 ft (NGVD 1929);
- The 25-ft. long concrete emergency spillway;
- The two dredge decant structures including the discharge structures;
- The two water stops installed in the Calhoun County Navigation District (CCND) CDF dikes; and
- The road on the Alcoa CDF dikes.

The access bridge was damaged during Hurricane Claudette in 2003 and subsequent Dredge Island inspections have not included detailed inspection of the bridge. However, Alcoa continues to maintain signage and navigational lighting to prevent access to and collision with the bridge.

2.6 CAPA Soil Cap Inspections

Soils contaminated with mercury greater than the applicable risk-based values were identified during the RI at the CAPA. These soils were generally associated with the area to the west of former Building R-300, and encompassed an area of approximately 1.8 acres. The remedial action objective for CAPA soils was to reduce the future exposure potential of site workers to mercury in soils at the CAPA. A clay/gravel cap was installed, which was graded for storm water drainage, and the storm water management structures were modified to collect only surface runoff. The grades were obtained by compacting a clay sub-grade over the entire area, from approximately several inches thick at the perimeter to 1.2 feet thick at the center. A six-inch crushed limestone material was then placed over the compacted clay sub-grade. To limit usage of the area by Plant and contractor personnel, three-by-six feet warning signs were placed on the north and west sides of the capped area. Also, a memorandum was distributed to Plant employees to inform workers of the upgrades made to the area, the restrictions on the capped area, and disciplinary actions for not complying with the restrictions. Additional information is contained in the CAPA Soils RDR/OMMP. A similar memorandum is distributed annually for review by Site workers.

An inspection and maintenance program was developed for the capped area, as described in the RDR/OMMP. This program consists of quarterly inspections, and maintenance as required. The main components of the inspection are:

- Cap integrity (e.g., signs of vehicular traffic, burrowing, erosion, etc.);
- Vegetation growth;
- Signage integrity (e.g., upright and legible);
- Storm drains free of debris; and
- No equipment or waste storage.

All items noted on the inspections are corrected as soon as practicable.

2.7 Witco Area Inspections

Containment of DNAPL containing PAHs and capping of PAH-impacted soils at the Witco Area were components of the remedy as described in the Consent Decree. DNAPL and sediments/soil visibly contaminated with polyaromatic hydrocarbons (PAHs) had been observed at several locations at the Witco Area during previous investigations. In addition, surface soils in portions of the Witco Area exhibited elevated concentrations of PAHs that exceeded response action objectives (RAOs) associated with potential on-site worker exposure to surface soils. Additional information is contained in the Former Witco Area DNAPL Containment System and Witco Area Soils RDR/OMMPs.

Construction was performed during the period March 8, 2006 to December 29, 2006. The following remedial construction activities were performed:

- Construction of a new drainage channel, including the removal of visually-impacted sediments;
- Construction of a 100-foot long soil attapulgite slurry wall;
- Construction of a soil cap in the former tank farm area; and
- Removal of an oil/water separator and construction of a soil cap in the former processing area.

A Construction Completion Report was submitted in June 2007, and operations and maintenance activities were initiated in July 2007, as follows:

- Quarterly inspections (for two years, annual thereafter) of the drainage channel;
- Quarterly inspections of the soil caps at the former tank farm and oil/water separator;
- Placement of signage regarding prohibition of activities at the site (a Management Memo was developed and distributed at the facility);
- Inspections of the DNAPL collection sump (monthly for six months, quarterly thereafter until two years after construction, frequency to be reviewed at that time based on findings); and
- Removal of any DNAPL that collects in the sump.

A memorandum was distributed to Plant employees to inform workers of upgrades made to the area, the capped area restrictions and disciplinary actions for not complying with restrictions. A similar memorandum has been submitted annually for review by Site workers.

3.0 MONITORING RESULTS

3.1 Chlor-Alkali Process Area Groundwater Extraction and Treatment System

The primary monitoring results for the CAPA groundwater extraction and treatment system are provided in Tables 3.1-1, 3.1-2, 3.1-3, 3.1-4, and 3.1-5. Selected potentiometric data are shown on Figures 3.1-1, 3.1-2, 3.1-3, and 3.1-4. The potentiometric contours for the areas near Lavaca Bay utilize a surface water elevation for Lavaca Bay measured at a tidal gauge located south of the CAPA (CA Bay). In other words, contouring assumes that Lavaca Bay is in hydraulic connection with Zone B, as has been demonstrated previously due to the deep dredging of the Alcoa Industrial Channel. Graphs showing the concentrations of mercury and carbon tetrachloride in samples from the recovery wells over time are shown on Figures 3.1-5 and 3.1-6. The concentrations of mercury and carbon tetrachloride in the samples from the recovery wells have decreased over time since the groundwater extraction and treatment system has been operating. Field records and logs from system operational checks and maintenance activities are kept in project binders and maintained in the project filing system.

The data collected from the treatment system indicates that it is operating efficiently and as designed. Hydraulic control has been achieved and appears to be effectively reducing the potential for migration of mercury-impacted groundwater in Zone B west of former Building R-300 to Lavaca Bay. This conclusion is based on the observed potentiometric surface. Concentrations of mercury and volatile organic compounds in system effluent samples were all less than the discharge standards listed in the RDR/OMMP. Therefore, all performance standards were met during 2010.

3.2 Chlor-Alkali Process Area Offshore Surface Water Sampling

As stated in Section 2.2 of this report, the performance objective for this component of the OMMP was achieved in 2006 and it is no longer part of the annual monitoring program.

3.3 Sediment Monitoring

As discussed in Section 2.3, the long-term sediment monitoring program originally included open water sediment samples and marsh sediment samples within the Closed Area. The open water sediment monitoring objectives were completed with the 2005 monitoring event, as described in the 2005 RAAER (Alcoa, 2006a). Alcoa has continued monitoring of the northern half of the open water sediment sampling grid since 2006 voluntarily as part of its ongoing effort to better understand trends in tissue concentrations in the Closed Area of Lavaca Bay. In 2009 Alcoa decided to monitor the open water sediment sampling grid every two years (even years), Therefore, no open water sediment samples were collected during the 2009 monitoring event. Open water sediment samples were collected again in 2010.

Open-water sediment data from the 1996 RI monitoring activities and various subsequent annual sampling events are presented in Figure 3.3-1. As discussed in the 2008 RAAER (Alcoa, 2009), open-water surface sediment mercury concentrations in most of the northern half of the Closed Area are less than 0.5 mg/Kg dry weight, and many samples are less than 0.25 mg/Kg dry weight. The bar graphs of sediment data collected at each station reveal downward trends in total mercury concentrations over much of the Closed Area (e.g., the shallow area north of the former Smelter Channel). Downward concentration trends are also evident in the broad areas west of Dredge Island, although the rate of decrease is more subtle than north of the Smelter Channel because of the low initial concentrations of mercury in the western areas.

In certain areas the bar graphs illustrate considerable inter-annual variability in concentrations (e.g., the submerged areas exposed by the Dredge Island stabilization project dredging, and Witco Harbor). Variable concentrations in these localized areas may reflect greater ranges in sediment concentrations over small distances and/or greater re-suspension of sediment by natural or anthropogenic influences, relative to the areas north and west of Dredge Island.

The 2008 RAAER compared the 2008 open water sediment data to the 2007 data, and observed that:

1. Surficial sediment concentrations decreased at all but eight locations between 2007 and 2008; and

2. In general, the comparison of 2008 and 2007 open water sediment data indicate broad, area-wide decreases of sediment mercury concentrations over the most of the Closed Area, a trend consistent with natural recovery processes.

In the 2009 RAAER, empirical rates of sediment recovery over the 2004 to 2008 period were calculated to quantify the observed natural recovery process. As discussed in the Feasibility Study (Alcoa, 2000), recovery rates are characterized by the sediment mercury half-life, defined as the time needed for sediment concentrations to decrease by 50%. Empirical sediment mercury half-lives ($t_{1/2}$) were calculated for open water sediment locations with surficial sediment mercury data available for the 2004 and 2008 monitoring events (Hg_{2004} and Hg_{2008}, respectively) using the following formula:

$$t_{1/2} = [(2008yr-2004yr) \times (Hg_{2004} \times 0.5)] / (Hg_{2004} - Hg_{2008})$$

These recovery rates are termed empirical because they simply represent the observed change in mercury concentrations between two points in time. By definition, this empirical recovery rate assumes a linear decrease. Actual sediment recovery will typically occur in a non-linear fashion, with the rate of change decreasing asymptotically with time. Nonetheless, the empirical recovery rates provide useful real-time observations to compare against the projections presented in the Feasibility Study. The 2004/2008 recovery rates presented in the 2009 RAAER confirmed that much of the open-water sediment mercury concentrations decreased in the 2004 to 2008 period. There were several areas west of the north end of Dredge Island that increased slightly. The average 2004/2008 $t_{1/2}$ value in areas of decreasing sediment concentration is approximately 12 years; the minimum and maximum values are 4.3 and 29 years, respectively. By comparison, the average $t_{1/2}$ value for the Lavaca Bay sediment recovery stations measured in the RIFS is 7 years (Alcoa, 2000). Comparison of these results indicates that, based on empirical data, the natural recovery of open-water sediment mercury concentrations is occurring, but at a somewhat slower rate than originally predicted.

Empirical sediment mercury half-lives are calculated for the 2006 and 2010 data in this RAAER to begin to understand sediment recovery on a "moving window" basis, i.e., are empirical recovery rates similar with time, or is the rate of recovery increasing or decreasing? The empirical sediment mercury half-lives over the 2006 to 2010 window of time were calculated using the formula presented above and the results are mapped in Figure 3.3-2. Consistent with comparisons of prior time periods, most of the open-water sediment mercury concentrations decreased in the 2006 to 2010 period. The 2006/2010 calculations are compared to the 2004/2008 recovery half-lives in the following table:

Empirical Sediment Recovery Half-Lives (years)

Time Period	Mean	Minimum	Maximum
2004-2008	12	4	29
2006-2010	10	2	49

The mean recovery rate for the 2006-2010 time period is similar to the rate calculated for the 2004-2008 period, possibly within the precision of the estimation method. Both recovery rates are somewhat slower than the rate predicted in the RIFS.

As observed in the 2007/2008 data sets, there are areas of relatively low sediment concentrations west of the northern end of Dredge Island that have increased slightly in the 2006-2010 time period, along with several samples along Mainland Shoreline No. 3 and in the Witco Harbor and channel. The areas where sediment concentrations increased slightly between 2006 and 2010 appear to be associated with areas of re-suspension of Hg-bearing sediment and/or runoff from upland areas that contain Hg-bearing soil.

Much of the northern end of Dredge Island was removed or capped during the Dredge Island Stabilization Project, completed in 2002. Upland areas exceeding 0.69 mg/Kg, defined by a statistical test, and outside of the Dredge Island impoundments, were removed or capped. A polygon-shaped area that includes the current Marsh 14 and associated island was not removed or capped during the Dredge Island Stabilization Project. Part of the polygon has eroded into the bay and is no longer an emergent landform. Based on sediment concentrations observed in the remaining Marsh 14, it is reasonable to assume that part of the upland area eroded into the bay also contained elevated total mercury. Hydrodynamic modeling performed during the Remedial Investigation (Alcoa, 1999b), indicates that a counter-clockwise circulation pattern frequently occurs in the shallow bay water around the north end of Dredge Island. This current can be expected to transport re-suspended sediment and surface runoff to the west of the northern end of Dredge Island. The slight increases in sediment concentrations west of Dredge Island shown in Figure 3.3-2 may be caused by transport of Hg-bearing sediment from the Marsh 14 area. These trends support the recommendation that further runoff and erosion of the Marsh 14 island should be controlled (Section 4.4).

Long-term trends in open water sediment concentrations can be illustrated by cumulative probability graphs. A cumulative probability graph is a plot of the data in rank order (i.e., lowest to highest) against the probability of a value equal to less than each plotted value. The probabilities are calculated using the convention that such probability is defined by rank divided by the number of data points plus 1. The probability scale is set so that the data will plot as a straight line if they are samples from a normally distributed population. Gaps or inflection points in the plot indicates that the data contains multiple subpopulations.

Co-located data from the RI 1996 sediment monitoring event and the 2010 sampling event are shown on the cumulative probability graph in Figure 3.3-3. Comparison of the two lines provides a visual confirmation of the significant amount of sediment recovery that has occurred in this 14-year time period. The empirical sediment recovery half life at the 50% cumulative probability estimate shown in Figure 3.3-3 is 20 years. However, there are only 23 co-located data points in this data set The low sample count introduces more uncertainty in this estimated empirical sediment recovery rate than using the larger number of co-located data sets collected in monitoring events after 2004. In addition, re-suspension of sediment disturbed during the Dredge Island Stabilization Project (1998-2001) likely influenced the net sediment recovery rate between 1996 and 2010. Nonetheless, marked recovery of sediment has occurred since the RI activities in 1996.

The 2010 open water sediment data are contoured in Figure 3.3-4. Evaluation of the contoured data indicates that virtually the entire northern half of the Closed Area yielded surficial sediment samples with concentrations of less than 0.5 mg/Kg. Concentrations of greater than 0.5 mg/Kg are reported for some areas exposed by the Dredge Island Stabilization Project. Cumulative probability graphs of the 2007 and 2010 sediment data sets are presented in Figure 3.3-5, to help assess whether the elevated sediment concentrations reflect an ongoing internal source of sediment containing mercury. The 2007 sediment data are used because of the large number of samples collected during the supplemental sampling events performed in that year. The 2010 sediment data represent the most recent data. Sediment data from both years plot with a marked change in slope, indicating that two subpopulations of sediment are present. Most of the samples plot along a trend line with a slope flatter than the few samples to the right of the curve, which plot along a steeply dipping slope. The two subpopulations of sediment data are plotted in Figures 3.3-6 and 3.3-7 to gain insight as to where the subpopulation of higher concentrations occur. Review of these maps indicates that the subpopulation of elevated mercury (shown as blue dots) occur in the area of the Dredge Island Stabilization Project dredging areas and the remaining Marsh 14 Island, and the Witco Harbor and channel. The spatial relationships provide an additional weight of evidence that these areas are a source of sediment containing elevated mercury available for re-suspension and redistribution into other parts of the Closed Area.

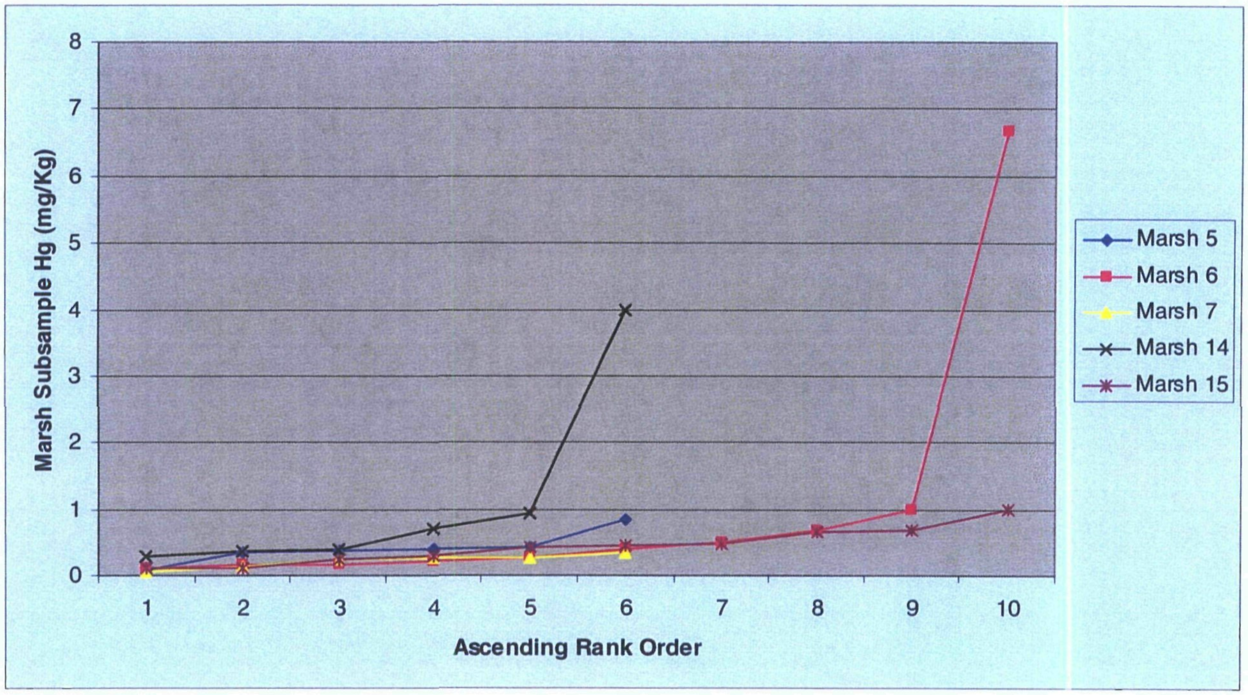
The 2010 marsh sediment data are provided in Appendix A and are summarized in Table 3.3-1, along with the results from the prior sediment sampling events. The temporal trends in the monitoring data are illustrated in Figure 3.3-8. The two graphs shown on Figure 3.3-8 separate the marsh trends into two groups, those that have met the remedial objective of less than 0.25 mg/Kg in two consecutive prior years, and those that have not.

Of the marshes that have met the remedial objective, Marshes 2 and 3 continue to provide sediment samples below 0.25 mg/Kg. The average concentration of the 2010 Marsh 1 sediment samples is 1.06 mg/Kg, well above samples from prior years. However, review of the Marsh 1 data indicates that the 2010 average is skewed by one elevated outlier, subsample Marsh 1-12R reported at 11.6 mg/Kg. The average of the remaining 2010 Marsh 1 samples is 0.11 mg/Kg, well below the remedial objective. Although most samples collected from Marsh 1 are well below the remedial objective of 0.25 mg/Kg, it appears there is a "nugget effect" in the distribution of mercury in the sediment, which occasionally results in elevated sample concentrations.

A similar "nugget effect" was observed in the analytical results from Marsh 19 samples collected in 2009. In 2009 the average of the eight samples from Marsh 19 was 1.1 mg/Kg. However, one sample was an outlier (7.41 mg/Kg). The average of the remaining 2009 Marsh 19 samples was 0.20 mg/Kg. The average of the eight samples collected from Marsh 19 in 2010 was 0.21 mg/Kg, and apparently did not include any outlier samples.

The average concentrations of total mercury measured in the remaining marshes continued to exceed the remedial objective of 0.25 mg/Kg, except in Marsh 7, which averaged 0.22 mg/Kg total mercury. 2010 was the first year that an average concentration below the remedial action objective was recorded for Marsh 7.

As discussed in prior RAAERs, the average concentrations of several of the remaining marshes appear to be influenced by bimodal distributions and/or the presence of outliers. The subsamples of the marshes shown in Figure 3.3-8 are depicted in ascending rank order.



The highest concentrations of mercury in the subsamples collected from Marshes 6 and 14 are visible outliers relative to the range in concentrations of the remaining subsamples from these marshes. Without the outliers, the average mercury concentrations of the Marshes 6 and 14 are 0.38 and 0.54 mg/Kg, respectively, and are lower than the averages measured in recent annual monitoring events.

It is difficult to determine temporal trends in marsh sediment concentrations when the average values are influenced by bimodal and/or outlier data distributions. As discussed in the 2009 RAAER, it is appropriate to review the statistical design of the marsh sediment monitoring program and assess whether the number and placement of samples should be modified to better capture the variability in sediment concentrations in the marshes and to improve our understanding of temporal trends. Although not completed in 2010, Alcoa will propose a refined marsh sampling program prior to the 2011 monitoring event designed to provide a more robust analytical data set.

The Amended 2007 RAAER (Alcoa 2008b) presented supplemental information on the distributions of MeHg and TOC in Closed Area and Open Area marshes at juvenile blue crab monitoring locations. Comparison of Closed Area and Open Area 2007 marsh data suggested that lower TOC-normalized MeHg concentrations were associated with lower juvenile blue crab concentrations. MeHg and TOC have been measured in Closed Area marsh sediment monitoring locations since 2007. The 2010 data are presented in Appendix A, and Figure 3.3-9. The post-2007 Closed Area marsh MeHg and TOC results are graphed with the 2007 supplemental data in Figure 3.3-9. Review of this figure indicates that the post-2007 TOC measurements are generally shifted to higher concentrations than the 2007 measurements, and encompass the range of TOC concentrations observed in Open Area marshes in 2007.

The post-2007 MeHg data for the Closed Area are similar to the data collected in 2007 in that most Closed Area MeHg measurements are within the range observed in the Open Area. There is, however, a small subset, or skewed "tail" of the Closed Area data that is higher than the concentrations observed in the Open Area.

When the 2007 Closed Area data were normalized to TOC concentrations (Alcoa 2008b), a greater distinction between the Closed Area and Open Area data sets were observed (i.e., a noticeable subset of 2007 data in the Closed Area exceeded the range of TOC-normalized MeHg concentrations observed in the Open Area). The post-2007 Closed Area data also contain a subset of samples that exceed the range of TOC-normalized MeHg concentrations observed in the Open Area. However, there are fewer such samples in the post-2007 data than were observed in 2007. That is, the majority of the post-2007 Closed Area normalized data plot within the range of Open Area data collected in 2007. Only two Closed Area marsh subsamples collected in 2010 exceeded the range of TOC-normalized MeHg concentrations observed in the Open Area in 2007.

The similar range of many of the TOC-normalized MeHg concentrations in the data sets does not provide insight into specific mechanisms that increase MeHg uptake to biota in the Closed Area relative to the Open Area. One reason might be that these sediment samples report a single concentration for the entire 5-cm depth of the core sample. Mercury reconnaissance studies performed at the beginning of the Remedial Investigation (Alcoa, 1999b) indicate that methylation occurs in a sharp redox boundary, often only one or two centimeters at depth. A smaller core sample interval, closer to the sediment surface, or even in the seston layer at the surface of sediment, may provide more useful information about where and how MeHg enters the food web. Although not completed prior to the 2010 monitoring event, Alcoa will evaluate the marsh sediment core sampling design and discuss conclusions and potential recommendations with the agency prior to initiating the 2011 monitoring event.

3.4 Finfish and Shell Fish Monitoring

3.4.1 Red Drum Monitoring

As described in Section 2.4, the evaluation of red drum mercury monitoring data includes both a qualitative review of temporal trends in red drum tissue concentrations and a quantitative statistical review of red drum concentrations from the Closed and Open Areas.

3.4.1.1 Qualitative Review of Red Drum Trends

A summary of the mean mercury concentrations in red drum tissue measured in samples collected during Fall monitoring events since 1997 is provided in Table 3.4-1, and a box-and-whisker plot of the data is shown in Figure 3.4-1. A box-and-whisker plot (Tukey, 1977) displays differences between populations without making assumptions about the underlying statistical distribution (a quantitative statistical evaluation of the data is provided in Section 3.4.1.2). The box-and-whisker plot displays the minimum value, the lower quartile, the median, the upper quartile, and the maximum value, and allows empirical observation of the spread and skewness in the data trends. Over the period since 1997, the box-and-whisker plot indicates there is considerable spread in the data from year to year. There are positive and negative inter-annual variations of the median, and the "box" defined by the upper and lower quartile values generally tends to mimic the trends of the median value (e.g., when the median value trends upward, the quartile "box" tends to trend upward, and vice versa).

The mean values of red drum samples in the 2010 Closed and Open Area data sets are similar to the mean values measured in 2008 and 2009. The mean concentration of red drum sampled in the Closed Area in 2010 was 0.88 mg/Kg versus 0.85 mg/Kg in 2009 and 0.90 mg/Kg in 2008 However, the range in concentrations, as measured in the quartile, maximum and minimum values is smaller in the 2010 data than in the 2008 and 2009 data.

In the 2008 RAAER (Alcoa, 2009) red drum data for the Closed Area were evaluated to identify the presence of subpopulations of red drum that might provide insight into recovery trends and progress towards remedial objectives. The process used to identify subpopulations was provided in the Amended 2007 RAAER (Alcoa, 2008b), and is based upon cumulative probability graphs (defined previously). The cumulative probability graph for the 2010 data is provided in Figure 3.4-2, and indicates that similar to prior years, the red drum data include three subpopulations: low, intermediate and high mercury concentrations. The gap between the intermediate and high subpopulations is about the same as observed previously (i.e., about 1.5 mg/Kg). The gap between the intermediate and low subpopulations is similar to the 2009 data (about 0.6 mg/Kg), which is slightly higher than in prior years (about 0.5 mg/Kg). Variations in the number of organisms caught in each sub-population likely contribute to the subtle changes in the threshold concentrations between each subpopulation, though the consistent year-to-year presence of three subpopulations is an important characteristic of the distribution and uptake of methylmercury in red drum. As discussed in Alcoa (2008b), the three red drum subpopulations may reflect foraging in different areas. The low subpopulation may represent fish that obtain the majority of their prey items from areas of the Bay with low rates of methyl mercury uptake to prey items, possibly including areas outside of the Closed Area. The high subpopulation may reflect feeding primarily in areas of elevated uptake of methyl mercury to prey items. The intermediate subpopulation may feed in areas of less focused uptake of methyl mercury to prey items and/or migrate between the low and high methylmercury uptake areas.

Geographic distributions of low, intermediate, and high subpopulations of red drum measured in 2010 are illustrated in Figure 3.4-3. The high subpopulation samples are collected in the marshes north and east of Dredge Island (as has been observed in prior earlier data sets) and in the Witco Harbor. The intermediate and low subpopulations of red drum collected in 2010 were found throughout the Closed Area. The average concentrations of red drum collected in the northern half of the Closed Area (Zones 1 and 2) are plotted versus corresponding concentrations of red drum collected in the southern half of the Closed Area (Zone 3 and 4) in Figure 3.4-4. The 2010 data are consistent with data from prior monitoring events, indicating that tissue samples collected in the northern part of the Closed Area typically contain more of the high subpopulation fish than samples from the southern part of the Closed Area.

A cumulative probability analysis of juvenile blue crab mercury data is presented in Figure 3.4-5. Similar to the earlier data sets, three subpopulations are identified in the 2010 data: low (less than 0.15 mg/Kg, intermediate (between 0.15 mg/Kg and 0.30 mg/Kg) and high (greater than 0.30 mg/Kg). Also similar to observations made in prior years, samples from the high subpopulation of juvenile blue crabs collected in 2010 are consistently from the area north and east of Dredge Island. Geographic distributions of low, medium and high subpopulations of juvenile blue crabs measured in 2010 are illustrated in Figure 3.4-6.

The average concentrations of juvenile blue crab collected in the northern half of the Closed Area (Zones 1 and 2) are plotted versus corresponding concentrations of juvenile blue crab collected in the southern half of the Closed Area (Zone 3 and 4) in Figure 3.4-7. This graph indicates that juvenile blue crab samples collected in the northern part of the Closed Area continue to contain more mercury than samples of juvenile blue crab from the southern part of the Closed Area. This continuing trend supports the hypothesis presented in the Amended 2007 RAAER that the focused area of uptake of methyl mercury to the high subpopulation of red drum is primarily in the fringe marsh areas north and east of Dredge Island.

3.4.1.2 Quantitative Review of Red Drum Trends

The following statistical analyses were conducted to quantitatively evaluate the 2010 red drum monitoring data in accordance with the methods prescribed in the OMMP. Specifically, the OMMP specifies the following steps:

- Sample up to 30 red drum each from the Open and Closed Areas for mercury analysis. Due to logistical constraints, this target number may not be achievable; but as long as the total sample sizes from each area are reasonably close to the target, the statistical test can accommodate the variability from the ideal target sample size.
- Evaluate assumptions of normality using normal quantile plots and a Kolmogorov-Smirnov goodness of fit test. Evaluate equality of variance using Bartlett's test.
    - Transformations to the data should be made as appropriate. If the data are better fitted to a log-normal distribution, a logarithmic transformation may be appropriate prior to conducting the means testing. Quantile plots and a Kolmogorov-Smirnov goodness of fit test will be used to determine whether the untransformed or transformed data are more appropriate for use in the means test.
- If data are normally distributed, conduct a parametric means test (t-test). If the data are not normally distributed, also conduct a non-parametric means test (Wilcoxon/Mann-Whitney or equivalent).
- Conduct a post-hoc power analysis using the variance, mean differences, and sample size from the data to establish the event-specific decision error rates.
    - If necessary, discuss deviations from the statistical test assumptions
    - For years that [Hg $_{\text{Closed}}$] > [Hg $_{\text{Open}}$], the post-hoc power analysis will not inform the decision making.
    - For years when [Hg $_{\text{Closed}}$] = [Hg $_{\text{Open}}$], the post-hoc power analysis will provide the probability that a false positive error might have been made. To ensure that a Type II error has not been made when the null hypothesis is not rejected, statistical test assumptions should be met and the test power should be greater than 95 percent.

A total of 60 red drum tissue samples were collected in the 2010 monitoring event, 30 from the Closed Area and 30 from the Open Area. Details of the 2010 red drum sampling and analysis event are provided in Appendix B. The distribution of all red drum samples was evaluated visually and statistically to assess normality.

Figure 3.4-8 depicts histograms and normal quantile plots of the untransformed data. The heavy solid line on the histogram depicts the predicted normal distribution, and the light solid line depicts the predicted log-normal distribution. The predicted distributions are based on the scale and shape of the actual data. The histogram depiction of the data shows that a log-normal distribution is a better fit to the data. The normal quantile plot in figure 3.4-8a depicts the data and the expected confidence intervals. Where the data points fall generally within the expected confidence intervals, the data can be assumed to be relatively normally distributed.

Figure 3.4-8 also depicts a histogram and normal quantile plot of the log-transformed data. The heavy line on the histogram depicts the predicted normal distribution on the log-transformed data. The light line depicts the predicted log-normal distribution of the transformed data. The normal distribution line provides the best fit to the log-transformed data. The log-transformed data points on the quantile plot generally fall between the confidence intervals and were assumed to be normally distributed.

In addition to the above visual analysis, a Kolmogorov-Smirnov goodness of fit test was used to evaluate the data. The Kolmogorov-Smirnov goodness of fit test to the untransformed data indicated that the data were not statistically different from a log-normal distribution ($p<0.01$). Therefore, based on the above analyses, the data were natural log transformed for the subsequent means test. The transformed data were normally distributed.

Using the log-transformed data, the equality of the variance of the Open and Closed areas was assessed using a Bartlett test. The variance was determined to be unequal for these two groups ($p=0.001$).

Based on the determination that the log-transformed data were normally distributed and that the variances of the Open and Closed groups were unequal, a t-test and non-parametric Wilcoxon test were both used for evaluating the test hypothesis:

Null Hypothesis: $[Hg_{\text{Closed}}] = [Hg_{\text{Open}}]$ or $[Hg_{\text{Closed}}] - [Hg_{\text{Open}}] = 0$

Alternative Hypothesis: $[Hg_{Closed}] > [Hg_{Open}]$ or $[Hg_{Closed}] - [Hg_{Open}] > 0$

Table 3.4-2 presents the summary data for the 2010 annual red drum monitoring event. Both the t-test and non-parametric Wilcoxon results indicate that the mean of the Closed Area samples was significantly higher than the mean of the Open Area samples ($p<0.001$ for the log transformed data for both tests). In summary, these tests indicate that the mean of the Closed Area red drum samples remains statistically elevated compared to the Open Area red drum samples, and the remedial objective has not been achieved.

3.4.2 Juvenile Blue Crab Monitoring

The short-term trends in juvenile blue crab are used to qualitatively evaluate the remedy effectiveness. Juvenile blue crab are selected for this purpose because they are lower trophic level organisms with a much smaller foraging range than red drum, and consequently should demonstrate a more focused response than red drum to changes in mercury availability.

As discussed in Section 2.4, the direction of the juvenile blue crab concentration trends (increasing versus decreasing) and the magnitude of the trend (how fast are concentrations increasing or decreasing) may provide a preliminary assessment of remedy effectiveness.

The exponential trend line calculated by the Excel spreadsheet program of the average mercury concentrations of juvenile blue crabs from the northern half of the Closed Area is shown in Figure 3.4-7. Although there are inter-annual variations, a downward trend line for the period of record continues to be measured for juvenile blue crabs collected in the northern part of the Closed Area. This is the area where uptake of methylmercury is focused based on congruent trends in red drum and juvenile blue crab concentrations. A downward trend is not evident in the average of the juvenile blue crab concentrations measured in the southern part of the Closed Area. Biological and chemical processes that cause inter-annual fluctuations in methylmercury uptake may make the downward trends due to remediation more difficult to observe in crab collected from the southern part of the Closed Area due to their generally lower range of concentrations.

The average concentrations of mercury in red drum and juvenile blue crab collected in the northern part of the Closed Area are plotted in Figure 3.4-9. Trends in the average concentrations of the two groups of organisms are somewhat similar with the exception of the 2006 and 2007 data. This observation suggests that other and perhaps multiple, non-remediation factors are periodically influencing the concentrations of mercury measured in red drum between annual monitoring events. These physical and biological factors could include inter-annual fluctuations in salinity, recruitment, growth rates, etc. There are myriad combinations of these processes that may be occurring in Lavaca Bay. One hypothesis is described in the 2006 RAAER (Alcoa, 2007) but there could be many others.

The 2006 RAAER (Alcoa, 2007) discussed the hypothesis that changes in diet of the red drum from year to year may influence the mercury trends in red drum tissue samples. The supposition was that the red drum diet may be influenced by inter-annual changes in salinity (which could change the relative abundance of shrimp and juvenile blue crab. Each food source has a different body burden for mercury, which would result in dissimilar uptake by red drum). The trends of red drum mercury concentration and salinity of the upper Lavaca Bay system measured by Texas Parks and Wildlife Department have been updated with data from 2010 (Figure 3.4-10). The data appear to be somewhat congruent except for the 2007, 2008, and 2009 data sets. 2007 was an unusually wet year, and 2008 and 2009 were drought years. The changes from normal precipitation patterns may have altered the normal physical and biological factors that influence the red drum feeding strategies in the Closed Area and the associated uptake of mercury. Additionally, there may be seasonal influences within a given year that contribute to the mercury levels measured in red drum collected during the fall event. Alcoa plans to review the TPWD salinity data on a seasonal basis to assess whether the salinity observed during specific seasons (e.g., spring or summer) may correlate better with red drum mercury concentrations.

3.5 Dredge Island Inspections

Dredge Island inspections were conducted quarterly throughout 2010. The inspection records are provided in Appendix C. The inspections indicate that the island is in good shape and the performance objectives are met. Erosion of the interior side slopes of the confined disposal facility (CDF) caused by wave action of water in the CDF continues to be the most significant maintenance issue. Repairs to the interior side slopes will be made during 2011 as required by the Dredge Island OMMP. The following additional items will also be addressed:

- Erosion of the un-vegetated areas of the exterior side-slopes;
- Possible damage to a the northeast decant structure below the mud line;
- Corrosion of metal portions of the decant structures; and
- Vegetation within the stone armor on the exterior side-slopes.

3.6 CAPA Soil Cap Inspections

Quarterly inspections were conducted during 2010. The inspection records are contained in Appendix D. The most common maintenance issue is the presence of vegetation, which must be controlled to maintain cap integrity. A soil sterilizer is used to control vegetation. Erosion at the southwest corner of the cap was observed during inspections in 2010 and was repaired in February 2011 by placement of additional clay and stone.

3.7 Witco Area Inspections

Inspections were conducted at the Witco Area in 2010 as required by the RDRs/OMMPs. Inspections records are contained in Appendix E.

The major conclusions of the 2010 inspections are as follows:

- No DNAPL has been observed in the collection sump since its installation. Several methods have been used to detect the presence of DNAPL, including the use of an interface probe, a weighted bailer, and weighted rope (to check for visual evidence of dark or oily substances).
- The soil caps are functioning well and no damage has been observed. Mowing is now performed on a regular basis.

Inspections and maintenance will continue at the frequency described in the RDR/OMMPs.

3.8 Verification of Site Conditions and Land Use

Site conditions and land uses within the Site remain consistent with those described in the ROD. The Texas Department of Health Order against taking of finfish and shellfish within the Closed

Area remains current. The Alcoa PCO plant continues to operate and periodic maintenance dredging in the Alcoa and Matagorda Ship Channel continues to occur.

The 2006 RAAER reported that permit applications had been submitted for industrial developments within the CCND harbor and that a project to widen and deepen the Matagorda Ship Channel had been proposed. The permitting process for both of these activities involves input and coordination with USEPA and Alcoa to assure that the remediation objectives of the Site are met and that construction is consistent with the sediment management framework contained in the CERCLA Feasibility Study. At the time of preparation of the 2010 RAAER, Alcoa is not aware of any activity on these permit applications.

4.0 CONCLUSIONS

4.1 Comparisons to Performance Standards

Monitoring data collected in 2010 support the following conclusions:

- The CAPA groundwater extraction and treatment system continues to effectively control the discharge of mercury to the Bay System from Zone B groundwater beneath the CAPA. This conclusion is supported by the system effluent concentration data and the potentiometric data obtained from the groundwater extraction and treatment system.
- The performance standard for open water sediment was met in 2005. Ongoing voluntary monitoring of surface sediment mercury concentrations indicates that most of the northern half of the Closed Area continues to be less than 0.5 mg/Kg dry weight, and many samples are less than 0.25 mg/Kg dry weight.
- Empirical sediment recovery rates measured over both the 2004 – 2008 and 2006 – 2010 "moving window" time periods indicate that the natural recovery of open-water sediment mercury concentrations is occurring, but at a somewhat slower rate that predicted in the Feasibility Study.
- Comparison of co-located data collected in 1996 and 2010 confirms that marked recovery of sediment has occurred since the RI.
- There were slight year-over-year increases in surficial sediment mercury concentrations observed in the area west of the northern end of Dredge Island, and a few stations in the vicinity of Mainland Shoreline No. 3 and the Witco Harbor and channel. These locations appear to be associated with areas of re-suspension of Hg-bearing sediment and/or runoff from upland areas that contain Hg-bearing soil.
- Of the marshes that have met the remedial objective, Marshes 2, 3 and 19 provided sediment samples below the remedial objective of 0.25 mg/Kg in 2010. The average of the samples from Marsh 1 collected in 2010 appears to be skewed by a single outlier sample. The average total mercury content of Marsh 1 subsamples without the outlier is 0.11 mg/Kg.
- The average concentrations of total mercury measured in the remaining marshes exceed the remedial objective except for Marsh 7, along Mainland Shoreline No. 3. The average concentration of total mercury measured in Marsh 7 subsamples in 2010 was 0.22. This is the first year that the average sediment concentration from Marsh 7 was below the remedial objective.
- The presence of bimodal and outlier sediment distributions complicates the determination temporal trends in marsh sediment concentrations. Alcoa will propose a statistically more robust marsh sampling design prior to the 2011 monitoring event.
- Methyl mercury (MeHg) and total organic carbon (TOC) measurements were again collected in marshes in 2010. The post-2007 MeHg data for the Closed Area are similar to the data collected in 2007 in that most Closed Area MeHg measurements are within the range observed in the Open Area, although there is a small subset, or

skewed "tail" of the Closed Area data that is higher than the concentrations observed in the Open Area marsh data.

- The post-2007 TOC measurements from Closed Area marshes are generally higher than the 2007 TOC measurements from the Closed Area. The majority of the Closed Area marsh data collected after 2007 are depicted within the same range graphically as 2007 Open Area marsh data when both are normalized to TOC concentrations.
- The mean concentration of mercury measured in red drum during 2010 is similar to the 2008 and 2009 mean values for both the Closed Area and the Open Area data sets. The mean concentration of mercury in red drum sampled in the Closed Area in 2010 was 0.88 mg/Kg versus 0.85 mg/Kg in 2009 and 0.90 mg/Kg in 2008. As discussed in the OMMP, fluctuating trends in tissue concentrations are likely indicative of the influence of multiple parameters on the uptake of mercury by red drum and juvenile blue crab. Some of these parameters are related to remedial actions and others are likely beyond the influence of remedial actions.
- The geographic trends in 2010 red drum and juvenile blue crab concentrations continue to confirm the trends initially presented in the Amended 2007 RAAER (Alcoa, 2008b), that suggests the focused uptake of methyl mercury to red drum occurs in the Closed Area north and east of Dredge Island.
- The concentrations of mercury in the 2010 red drum samples from the Closed Area remain statistically elevated relative to the concentrations of red drum samples collected from the Open Area.
- Juvenile blue crab samples collected in the northern part of the Closed Area typically contain more mercury than samples of juvenile blue crab from the southern part of the Closed Area. This trend continues to supports the hypothesis presented in the Amended 2007 RAAER that the focused area of methyl mercury uptake to the subpopulation of red drum with elevated methyl mercury is primarily in the fringe marsh areas north and east of Dredge Island.
- The overall trend of the average concentrations of mercury in juvenile blue crabs collected in the northern part of the Closed Area is downward over the period 2002 to 2010, although there are inter-annual fluctuations.
- The 2010 inspections of Dredge Island indicate that the island is in stable condition and the performance objectives are met.
- No significant maintenance issues were noted for the CAPA soil cap during inspections performed in 2010. Erosion in the southwest corner of the cap observed in 2010 was repaired in early 2011.
- Inspections of the Witco Area indicate that no DNAPL has accumulated and that soil caps are functioning well.

4.2 Plans for Subsequent Monitoring

All required annual monitoring activities conducted in 2010 will be continued in 2011 (red drum, juvenile blue crab and marsh sediment sampling).

Alcoa will voluntarily continue to perform sediment sampling in marshes in the northern part of the Closed Area that have met the remedial objective of 0.25 mg/Kg in two consecutive years as part of the ongoing effort to better understand trends in tissue concentrations in the Closed Area of Lavaca Bay. The marsh sampling analytical suite will include total mercury, MeHg, TOC, and moisture content. Alcoa will evaluate the marsh sampling design relative to the bimodal and outlier distributions of data observed in some marshes (i.e., number and location of samples), as well as marsh sample depth interval, and will discuss any conclusions and potential recommendations with the agency prior to initiating the 2011 monitoring event.

The annual rate of change in open water sediment mercury concentrations is relatively low. Sediment recovery can be tracked in an efficient manner by continuing the voluntary open water sediment sampling program on a biannual basis. Therefore, Alcoa will collect the open water sediment data in the northern half of the Closed Area again in the fall of 2012.

Although not a monitoring activity, Alcoa plans to review the TPWD salinity data on a seasonal basis in 2011 to assess whether the salinity observed during specific seasons (e.g., spring or summer) may correlate better with red drum mercury concentrations.

4.3 Summary of Overall Remedy Effectiveness

In summary, the completed and ongoing remedial activities and natural recovery processes have resulted in downward trends in open water sediment and marsh sediment mercury concentrations in many parts of the Closed Area. A total of five marshes have met the remediation goal (Marshes 1, 2, 3, 11 and 19). The average for Marsh 1 was skewed by an outlier subsample in 2010.

The mean open water sediment recovery half-life for the 2006-2010 time period is similar to the half-life calculated for the 2004-2008 period. Both recovery rates are somewhat slower than the rate predicted in the RIFS. Overall, a significant amount of sediment recovery has occurred since the RI sampling was performed in 1996.

Small localized areas of open water sediment are not recovering as expected (e.g., west of the northern end of Dredge Island and in some areas adjacent to Mainland Shoreline No. 3 and the Witco Harbor and channel). These trends are possibly due to residual effects of the Dredge

Island Stabilization Project performed in the period 1998 – 2001 (i.e., the residual island containing Marsh 14) and to a lesser extent, possibly runoff from Mainland Shoreline No. 3 and marine operations in the Witco Harbor.

Average mercury concentrations of red drum measured in the Closed Area continue to exhibit positive and negative inter-annual fluctuations. These fluctuations appear to be related in part to remediation and in part to physical, chemical and biologic conditions not influenced by remedial activities (e.g., salinity of upper Lavaca Bay). The mercury concentrations of red drum collected in the Closed Area remain statistically elevated relative to red drum collected in the Adjacent Open Area.

4.4 Recommendations

As discussed in Section 3.3, the Marsh 14 Island left by the Dredge Island stabilization project, and perhaps to a lesser extent Mainland Shoreline No. 3 and the Witco Harbor and channel, appear to serve as an ongoing source of Hg-bearing soil and sediment to the bay. These soils and sediments are apparently decreasing the rate of sediment recovery predicted in the Feasibility Study. The major elements of the remedy for the Site are source control and sediment recovery. These additional sources were not identified during the Remedial Investigation, but subsequent monitoring data suggest that the Site-wide remedy will be expedited if the areas are subject to additional remediation. Logical controls would be removal or capping, which would be consistent with the remedial actions required by the Record of Decision.

To assess whether the rate of tissue recovery can be accelerated, Alcoa proposes to submit to the agency in 2011 a plan to perform a focused, additional remedial measure in the area of the Dredge Island Stabilization Project. This plan will involve a combination of capping and dredging, consistent with the original Dredge Island Stabilization Project and the Consent Decree for the Site. The area of focus will be north of Dredge Island, and east of the bridge rampart, within the footprint of the former upland area, and including the Marsh 14 Island. This area is large enough that a measurable impact to sediment concentrations and tissue concentrations can be expected. The need for and scope of further remedial activities can be assessed after a period of future monitoring.

5.0 REFERENCES

Alcoa, 1997. Engineering Evaluation/Cost Analysis (EE/CA) for a Non-Time Critical Removal Action at the Dredge Island, Alcoa (Point Comfort)/Lavaca Bay Superfund Site. July.

_____, 1998. Chlor-Alkali Process Area Focused Investigation Data Report (Volume B6L), Alcoa (Point Comfort)/Lavaca Bay Superfund Site. July.

_____, 1999a. Chlor-Alkali Process Area Groundwater Treatability Study Data Report (Volume M3), Alcoa (Point Comfort)/Lavaca Bay Superfund Site. October.

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

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

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

_____, 2005a. Remediation Action Work Plan, Alcoa (Point Comfort)/Lavaca Bay Superfund Site. August.

_____, 2005b. Interim Data Deliverable, Alcoa (Point Comfort)/Lavaca Bay Superfund Site. December.

_____, 2006a. 2005 Remedial Action Annual Effectiveness Report, Alcoa (Point Comfort)/Lavaca Bay Superfund Site. March 3.

_____, 2006b. Revisions to Lavaca Bay Marsh Monitoring Program, memorandum dated October 6, 2006, submitted to USEPA October 13, 2006.

_____, 2007. 2006 Remedial Action Annual Effectiveness Report, Alcoa (Point Comfort)/Lavaca Bay Superfund Site. March 30.

_____, 2008a. 2007 Remedial Action Annual Effectiveness Report, Alcoa (Point Comfort)/Lavaca Bay Superfund Site. March 31.

_____, 2008b. Amended 2007 Remedial Action Annual Effectiveness Report, Alcoa (Point Comfort)/Lavaca Bay Superfund Site. October 23.

Tukey, J.W., 1977, Box-and-Whisker Plots" § 2C in Exploratory Data Analysis, Addison-Wiley, pp. 39-43.

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

United States et al. v. Alcoa Inc., et al., 2005. Consent Decree for CERCLA Response Actions and Response Costs (Civil Action Number V: 04-CV-119). February.

TABLES

TABLE 3.1-1
CAPA GROUNDWATER TREATMENT SYSTEM
ANALYTICAL RESULTS
TREATMENT SYSTEM EFFLUENT

SAMPLE TAP	DATE	ANALYTICAL RESULTS (mg/L)[1]																		pH	COMMENTS
		MERCURY			CARBON TETRACHLORIDE			CHLOROFORM			METHYLENE CHLORIDE			TETRACHLOROETHENE			TRICHLOROETHENE				
		Q[2]	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG		
TREATED GROUNDWATER DISCHARGE STANDARDS (mg/L)[3]			0.01			0.38			0.325			NA[4]			0.164			NA			
ST-C[5]	5/18/98		0.0019		<	0.001		<	0.001		<	0.001		<	0.001		<	0.001			
	5/29/98		0.00035		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001			
	6/4/98		0.00021		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001			
	6/9/98																			7.00	
	6/10/98		0.00041		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001			
	6/18/98		0.00021		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001			
	6/24/98		0.00027		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001			
	7/1/98		0.00017			0.00041	J	<	0.001		<	0.002		<	0.001		<	0.001			
	7/1/98		0.0009																		Duplicate
	7/2/98																			5.17	
	7/8/98		0.00016		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		5.20	
	7/15/98		0.00018		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		6.00	
	7/22/98		0.00027		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001			
	7/28/98		0.00042		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		6.45	
	8/5/98		0.00047		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		6.42	
	8/12/98		0.00042		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		6.52	
	8/19/98		0.00075		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001			
	8/25/98		0.00052		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		6.86	
	9/2/98		-0.0007	J	<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		6.73	
	9/9/98		0.00027	J	<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		6.82	
	9/16/98		0.0010		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001			
	9/23/98		0.0010		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		7.10	
	10/1/98		0.00076		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001			
	10/7/98		0.00090		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		7.12	
	10/14/98		0.00173		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		6.40	
	10/21/98		0.00053		<	0.001		<	0.001		<	0.002			0.0001	J	<	0.001		6.23	
	10/28/98		0.00050		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		6.31	
	11/4/98		0.00053		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		6.41	
	11/11/98		0.00007		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		6.45	
	11/18/98		0.00045		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		6.56	
	11/24/98		0.00012	J	<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		6.51	
	12/2/98		0.00034		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		6.64	
	12/9/98		0.00038		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		6.85	
	12/16/98		0.00070		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		6.89	
	12/22/98		0.0010		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		6.92	
	12/29/98		0.0008			0.00028	J	<	0.001		<	0.002		<	0.001		<	0.001		5.53	
	1/6/99		0.00073		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		6.03	
	1/13/99		0.00033	J	<	0.001		<	0.001			0.00008	J	<	0.001		<	0.001		5.74	
	1/20/99		NS			NS			NS			NS			NS			NS			
	1/26/99		0.00048		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		5.70	
	2/3/99		0.00058		<	0.001		<	0.001			0.001	J		0.00029	J	<	0.001		7.08	
	2/17/99		0.00078	J	<	0.001		<	0.001			0.0012	J		0.00036	J	<	0.001		7.13	
	2/24/99		0.00128		<	0.001		<	0.001			0.0019	J		0.00037	J	<	0.001		6.63	
	3/5/99		0.00159		<	0.001		<	0.001			0.0018	J		0.00036	J	<	0.001		6.65	
	3/10/99		0.00116		<	0.001		<	0.001			0.0017	J	<	0.001		<	0.001		6.68	
	3/17/99		0.00064		<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		7.08	
	3/24/99		0.00002	J	<	0.001		<	0.001			0.0016	J		0.000042	J	<	0.001		7.06	
	4/1/99		0.00023	J	<	0.001			0.00027	J		0.0022			0.00014	J	<	0.001		6.96	
	4/6/99		0.00020	J	<	0.001		<	0.001			0.0019	J	<	0.001		<	0.001		6.87	
	4/13/99		0.00070	J	<	0.001			0.00075	J		0.002	J	<	0.001		<	0.001		6.98	
	4/21/99		0.00120		<	0.001			0.00104			0.0018	J	<	0.001		<	0.001		6.98	
	4/28/99		0.00110		<	0.001			0.00224		<	0.002			0.00037	J	<	0.001		6.97	
	5/5/99		0.00066		<	0.001			0.00363		<	0.002			0.00029	J	<	0.001		7.00	
	5/12/99		0.00143			0.00065	J		0.00644		<	0.002		<	0.001		<	0.001		7.15	
	5/19/99		0.00169			0.00039	J		0.00482			0.00076	J	<	0.001		<	0.001		6.82	
	5/26/99		0.00135			0.00131			0.00884			0.00051	J	<	0.001		<	0.001		7.25	
	6/2/99		0.00201			0.00261			0.01224			0.00046	J	<	0.001		<	0.001		6.93	
	6/9/99		0.00181			0.00915			0.01922			0.000302	J	<	0.001		<	0.001		7.02	
	6/16/99		0.00148			0.01192			0.02667			0.00022	J	<	0.001		<	0.001		6.92	
	6/23/99		0.00228			0.0214			0.03472			0.000117	J	<	0.001		<	0.001		7.23	
	6/30/99		0.00076			0.01999			0.03766		<	0.002		<	0.001		<	0.001		6.68	
	7/14/99																			7.04	

TABLE 3.1-1
CAPA GROUNDWATER TREATMENT SYSTEM
ANALYTICAL RESULTS
TREATMENT SYSTEM EFFLUENT

SAMPLE TAP	DATE	ANALYTICAL RESULTS (mg/L)[1]																		pH	COMMENTS
		MERCURY			CARBON TETRACHLORIDE			CHLOROFORM			METHYLENE CHLORIDE			TETRACHLOROETHENE			TRICHLOROETHENE				
		Q[2]	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG		
TREATED GROUNDWATER DISCHARGE STANDARDS (mg/L)[3]			0.01			0.38			0.325			NA[4]			0.164			NA			
ST-A	7/22/99																			7.82	Carbon change out
	7/28/99																			7.82	
	8/4/99																			7.23	
	8/11/99																			7.51	
	8/18/99																			6.92	
	8/25/99		0.00086			0.004364			0.000146	J	<	0.002		<	0.001		<	0.001		6.94	
	9/1/99		0.00014	J		0.00486		<	0.001		<	0.002		<	0.001		<	0.001		6.95	
	9/8/99		0.00043	J		0.003008		<	0.001		<	0.002		<	0.001		<	0.001		7.21	
	9/15/99		0.00043	J		0.002892			0.000185	J	<	0.002		<	0.001		<	0.001		7.06	
	9/22/99		0.00089			0.002616			0.000152	J	<	0.002		<	0.001		<	0.001		7.21	
	9/29/99		0.00006	J		0.003224		<	0.001		<	0.002		<	0.001		<	0.001		7.27	
	10/6/99		0.00018	J		0.002757			0.000408		<	0.002		<	0.001		<	0.001		7.49	
	10/13/99		0.00021	J		0.00291			0.000788	J	<	0.002		<	0.001		<	0.001		7.36	
	10/20/99		0.00059			0.00136			0.001111		<	0.002		<	0.001		<	0.001		7.28	
	10/27/99		0.00033	J		0.003327			0.00275		<	0.002		<	0.001		<	0.001		7.22	
	11/3/99		0.00002	J		0.003567			0.004421		<	0.002		<	0.001		<	0.001		7.61	
	11/10/99		0.00118	J		0.003112			0.00622		<	0.002		<	0.001		<	0.001		7.50	
	11/17/99		0.00089	J		0.004599			0.009552		<	0.002		<	0.001		<	0.001		7.65	
	11/23/99		0.00062	J		0.007814			0.012587		<	0.002		<	0.001		<	0.001		7.22	
	12/2/99		0.00072	J		0.012289			0.016635		<	0.002		<	0.001		<	0.001		7.14	
	12/8/99		0.00072	J		0.011109			0.017479		<	0.002		<	0.001		<	0.001		7.33	
	12/15/99		0.00041	J		0.014068			0.013601		<	0.002		<	0.001		<	0.001		7.37	
	12/22/99		0.00040	J		0.01353			0.013122		<	0.002		<	0.001		<	0.001		7.40	
	12/29/99		0.00013	J		0.010233			0.016454		<	0.002		<	0.001		<	0.001		7.00	
	1/5/00		0.00074	J		0.021707			0.025836		<	0.002		<	0.001		<	0.001		7.41	
	1/12/00		0.00011	J		0.035346			0.036077		<	0.002		<	0.001		<	0.001		7.38	
	1/19/00		0.00061	J		0.062926			0.048082		<	0.002		<	0.001		<	0.001		7.06	
	1/26/00		0.00044	J		0.07067			0.042044		<	0.002		<	0.001		<	0.001		6.86	
	2/2/00		0.00010	J		0.115509			0.052529		<	0.002		<	0.001		<	0.001		6.82	
	2/9/00		0.00014	J		0.155503			0.059467		<	0.002		<	0.001		<	0.001		7.01	
	2/16/00		0.00016	J		0.177621			0.060686		<	0.002		<	0.001		<	0.001		6.80	
	2/24/00		0.00097			0.00194		<	0.001		<	0.002		<	0.001		<	0.001		7.66	
ST-B	3/3/00		0.00026	J	<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		8.90	Carbon change out
	3/9/00		0.00011	J	<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		7.20	
	3/15/00		0.00034	J	<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		7.70	
	3/22/00		0.00002	J	<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		7.10	
	3/29/00		0.00030	J	<	0.001		<	0.001		<	0.002		<	0.001		<	0.001		7.05	
	4/4/00		0.00030		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.58	
	4/12/00		0.00060			0.008		<	0.001		<	0.005		<	0.001		<	0.001		7.10	
	4/19/00	<	0.00020		<	0.001		<	0.001		<	0.005			0.004		<	0.001		7.06	
	4/26/00	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.60	
	5/3/00	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.57	
	5/10/00	<	0.00040		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.49	
	5/17/00	<	0.00040		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.55	
	5/24/00		0.00110		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.45	
	5/31/00	<	0.00020		<	0.001			0.003		<	0.005		<	0.001		<	0.001		6.80	
	6/7/00	<	0.00020			0.01			0.005		<	0.005		<	0.001		<	0.001		6.87	
	6/14/00	<	0.00020		<	0.001			0.011		<	0.005		<	0.001		<	0.001			
	6/21/00		0.00030		<	0.001			0.019		<	0.005		<	0.001		<	0.001			
	6/29/00	<	0.00020			0.01			0.022		<	0.005		<	0.001		<	0.001			
	7/6/00		0.00020			0.013			0.029		<	0.005		<	0.001		<	0.001		6.75	
	7/12/00	<	0.00040			0.012			0.026		<	0.005		<	0.001		<	0.001		6.57	
	7/19/00	<	0.00020			0.02			0.032		<	0.005		<	0.001		<	0.001		7.05	
	7/26/00	<	0.00020			0.026			0.041		<	0.005		<	0.001		<	0.001		6.58	
	8/2/00		0.00030			0.038			0.037		<	0.005		<	0.001		<	0.001		6.35	
	8/9/00		0.00020			0.055			0.042		<	0.005		<	0.001		<	0.001			
	8/16/00		0.00030			0.07			0.05		<	0.005		<	0.001		<	0.001		6.41	
	8/23/00		0.00030			0.076			0.051		<	0.005		<	0.001		<	0.001		6.80	
	8/29/00		0.00020			0.095			0.052		<	0.005		<	0.001		<	0.001		6.43	
ST-C	9/6/00		0.00580		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		8.43	Carbon change out
	9/12/00	<	0.00100		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.91	
	9/19/00	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		8.27	

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CAPA GROUNDWATER TREATMENT SYSTEM
ANALYTICAL RESULTS
TREATMENT SYSTEM EFFLUENT

SAMPLE TAP	DATE	ANALYTICAL RESULTS (mg/L)[1]																		pH	COMMENTS
		MERCURY			CARBON TETRACHLORIDE			CHLOROFORM			METHYLENE CHLORIDE			TETRACHLOROETHENE			TRICHLOROETHENE				
		Q[2]	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG		
TREATED GROUNDWATER DISCHARGE STANDARDS (mg/L)[3]			0.01			0.38			0.325			NA[4]			0.164			NA			
ST-C Continued	9/27/00		0.00100		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.12	
	10/3/00	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.97	
	10/11/00	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.21	
	10/18/00		0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.88	
	10/25/00		0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.95	
	11/1/00		0.00030		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.13	
	11/8/00		0.00030		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.18	
	11/15/00		0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.40	
	11/21/00		0.00040		<	0.001			0.001		<	0.005		<	0.001		<	0.001		7.36	
	11/28/00		0.00040		<	0.001			0.002		<	0.005		<	0.001		<	0.001		7.01	
	12/6/00		0.00040		<	0.001			0.002		<	0.005		<	0.001		<	0.001		7.56	
	12/13/00		0.00030			0.001			0.002		<	0.005		<	0.001		<	0.001		6.98	
	12/20/00		0.00040			0.002			0.003		<	0.005		<	0.001		<	0.001		7.34	
	12/27/00		0.00030			0.003			0.004		<	0.005		<	0.001		<	0.001		7.64	
	1/3/01		0.00020			0.003			0.003		<	0.005		<	0.001		<	0.001		7.14	
	1/10/01		0.00040			0.007			0.005		<	0.005		<	0.001		<	0.001		7.20	
	1/17/01		0.00040			0.011			0.006		<	0.005		<	0.001		<	0.001		7.48	
	1/24/01		0.00030			0.014			0.007		<	0.005		<	0.001		<	0.001		7.27	
	1/30/01		0.00040			0.018			0.008		<	0.005		<	0.001		<	0.001		7.29	
	2/6/01		0.00030			0.021			0.009		<	0.005		<	0.001		<	0.001		7.30	
	2/14/01		0.00040			0.026			0.01		<	0.005		<	0.001		<	0.001		7.36	
	2/22/01		0.00030			0.032			0.011		<	0.005		<	0.001		<	0.001		7.40	
	2/28/01		0.00030			0.033			0.011		<	0.005		<	0.001		<	0.001		7.38	
	3/7/01		0.00630			0.039			0.013		<	0.005		<	0.001		<	0.001		7.48	
	3/15/01		0.00040			0.071			0.02		<	0.005		<	0.001		<	0.001		7.16	
	3/21/01		0.00040			0.087			0.023		<	0.005		<	0.001		<	0.001		6.89	
	3/28/01		0.00040			0.087			0.02		<	0.005		<	0.001		<	0.001		6.79	
	4/4/01		0.00050			0.12			0.025		<	0.005		<	0.001		<	0.001		6.54	
	4/11/01		0.00040			0.14			0.03		<	0.005		<	0.001		<	0.001		7.49	
ST-A	4/19/01	<	0.00020			0.001		<	0.001		<	0.005		<	0.001		<	0.001		8.98	Carbon change out
	4/26/01	<	0.00020			0.0001		<	0.001		<	0.005		<	0.001		<	0.001		8.71	
	5/2/01	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.80	
	5/9/01		0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.08	
	5/16/01	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.95	
	5/23/01	<	0.00020			0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.90	
	5/30/01	<	0.00020			0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.92	
	6/7/01	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.05	
	6/13/01	<	0.00020			0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.85	
	6/20/01	<	0.00020			0.002		<	0.001		<	0.005		<	0.001		<	0.001		7.04	
	6/27/01	<	0.00020			0.002		<	0.001		<	0.005		<	0.001		<	0.001		6.94	
	7/3/01	<	0.00020			0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.96	
	7/11/01	<	0.00020			0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.94	
	7/17/01	<	0.00200			0.001		<	0.001		<	0.005		<	0.001		<	0.001			
	7/25/01	<	0.00020			0.18			0.01		<	0.005		<	0.001		<	0.001		6.99	
	8/1/01	<	0.00020			0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.01	
	8/9/01	<	0.00020			0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.93	
	8/15/01		0.00020			0.001			0.002		<	0.005		<	0.001		<	0.001		6.80	
	8/21/01	<	0.00020			0.001			0.003		<	0.005		<	0.001		<	0.001		6.90	
	8/30/01		0.00030			0.001			0.004		<	0.005		<	0.001		<	0.001		6.96	
	9/5/01		0.00020			0.002			0.005		<	0.005		<	0.001		<	0.001		6.98	
	9/14/01	<	0.00020			0.003			0.009		<	0.005		<	0.001		<	0.001			
	9/21/01	<	0.00020			0.005			0.012		<	0.005		<	0.001		<	0.001		6.94	
	9/24/01		0.00020			0.006			0.012		<	0.005		<	0.001		<	0.001		6.98	
	10/1/01	<	0.00020			0.006			0.01		<	0.005		<	0.001		<	0.001		7.01	
	10/9/01	<	0.00100			0.006			0.011		<	0.005		<	0.001		<	0.001		6.91	
	10/15/01	<	0.00100			0.008			0.011		<	0.005		<	0.001		<	0.001		6.94	
	10/22/01	<	0.00020			0.009			0.013		<	0.005		<	0.001		<	0.001		7.44	
	10/29/01		0.00050			0.014			0.013		<	0.005		<	0.001		<	0.001		7.03	
	11/5/01	<	0.00100			0.16			0.015		<	0.005		<	0.001		<	0.001		7.07	
	11/12/01	<	0.00100			0.019			0.015		<	0.005		<	0.001		<	0.001		7.51	
	11/20/01	<	0.00100			0.015			0.012		<	0.005		<	0.001		<	0.001		7.73	
	11/28/01		0.00100			0.014			0.011		<	0.005		<	0.001		<	0.001		7.30	

TABLE 3.1-1
CAPA GROUNDWATER TREATMENT SYSTEM
ANALYTICAL RESULTS
TREATMENT SYSTEM EFFLUENT

SAMPLE TAP	DATE	ANALYTICAL RESULTS (mg/L)[1]																		pH	COMMENTS
		MERCURY			CARBON TETRACHLORIDE			CHLOROFORM			METHYLENE CHLORIDE			TETRACHLOROETHENE			TRICHLOROETHENE				
		Q[2]	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG		
TREATED GROUNDWATER DISCHARGE STANDARDS (mg/L)[3]			0.01			0.38			0.325			NA[4]			0.164			NA			
ST-A Continued	12/4/01	<	0.00100			0.02			0.013		<	0.005		<	0.001		<	0.001		7.49	
	12/10/01		0.00020			0.022			0.013		<	0.005		<	0.001		<	0.001		7.44	
	12/21/01		0.00020			0.038			0.015		<	0.005		<	0.001		<	0.001		7.26	
	12/27/01		0.00030			0.046			0.015		<	0.005		<	0.001		<	0.001		7.21	
	1/2/02	<	0.00020			0.0039			0.014		<	0.005		<	0.001		<	0.001		7.20	
	1/7/02	<	0.00020			0.038			0.013		<	0.005		<	0.001		<	0.001		7.20	
	1/14/02		0.00030			0.055			0.17		<	0.005		<	0.001		<	0.001		7.14	
	1/21/02		0.00020			0.066			0.017		<	0.005		<	0.001		<	0.001		7.18	
	1/29/02		0.00030			0.066			0.017		<	0.005		<	0.001		<	0.001		7.11	
	2/4/02	<	0.00020			0.066			0.016		<	0.005		<	0.001		<	0.001		7.11	
	2/11/02	<	0.00020			0.069			0.014		<	0.005		<	0.001		<	0.001		7.15	
ST-B	2/21/02		0.07500		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		8.11	Carbon change out
	2/25/02		0.03100		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.69	
	3/4/02	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.32	
	3/11/02	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.17	
	3/18/02	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.14	
	3/25/02	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.07	
	4/2/02	<	0.00100		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.09	
	4/8/02	<	0.00100		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.07	
	4/15/02		0.02200		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.08	
	4/22/02		0.00100		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.11	
	4/30/02	<	0.00100		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.92	
	5/6/02		0.04800		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.98	
	5/13/02		0.14000		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.03	
	5/20/02	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.10	
	5/29/02	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.14	
	6/3/02	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.11	
	6/10/02	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.02	
	6/18/02		0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.10	
	6/24/02		0.00030		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.07	
	7/1/02	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.05	
	7/8/02		0.00030		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.13	
	7/15/02		0.00040		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.02	
	7/23/02		0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.10	
	7/29/02		0.00050		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.00	
	8/5/02		0.00050		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001			
	8/12/02	<	*0.00020*		<	*0.001*		<	*0.001*		<	*0.005*		<	*0.001*		<	*0.001*		8.16	
	8/19/02	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.10	
	8/26/02		0.00030		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.04	
	9/3/02	<	0.00020		<	0.001			0.001		<	0.005		<	0.001		<	0.001		7.16	
	9/11/02	<	0.00020		<	0.001			0.001		<	0.005		<	0.001		<	0.001		7.04	
	9/16/02	<	0.00020		<	0.001			0.002		<	0.005		<	0.001		<	0.001		7.06	
	9/23/02	<	0.00020		<	0.001			0.003		<	0.005		<	0.001		<	0.001		6.96	
	9/30/02	<	0.00020			0.002			0.005		<	0.005		<	0.001		<	0.001		6.99	
	10/8/02	<	0.00020			0.002			0.006		<	0.005		<	0.001		<	0.001			
	10/15/02	<	0.00020			0.002			0.006		<	0.005		<	0.001		<	0.001			
	10/22/02		0.00020			0.005			0.008		<	0.005		<	0.001		<	0.001		6.77	
	10/28/02		0.00040			0.008			0.01		<	0.005		<	0.001		<	0.001		7.13	
	11/4/02		0.00060			0.009			0.011		<	0.005		<	0.001		<	0.001		7.07	
	11/13/02	<	0.00020			0.013			0.011		<	0.005		<	0.001		<	0.001		6.80	
	11/20/02		0.00030			0.017			0.011		<	0.005		<	0.001		<	0.001		6.73	
	11/25/02		0.00020			0.018			0.013		<	0.005		<	0.001		<	0.001		6.91	
	12/2/02	<	0.00020			0.02			0.014		<	0.005		<	0.001		<	0.001		6.95	
	12/9/02	<	0.00020			0.027			0.014		<	0.005		<	0.001		<	0.001		7.20	
ST-C	12/16/02	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.91	Carbon change out
	12/23/02	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.22	
	1/3/03	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.13	
	1/6/03	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.04	
	1/14/03	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.21	
	1/22/03	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.43	
	1/27/03	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.15	
	2/3/03		0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.10	

TABLE 3.1-1
CAPA GROUNDWATER TREATMENT SYSTEM
ANALYTICAL RESULTS
TREATMENT SYSTEM EFFLUENT

SAMPLE TAP	DATE	ANALYTICAL RESULTS (mg/L)[1]																		pH	COMMENTS
		MERCURY			CARBON TETRACHLORIDE			CHLOROFORM			METHYLENE CHLORIDE			TETRACHLOROETHENE			TRICHLOROETHENE				
		Q[2]	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG		
TREATED GROUNDWATER DISCHARGE STANDARDS (mg/L)[3]			0.01			0.38			0.325			NA[4]			0.164			NA			
ST-C Continued	2/11/03	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.22	
	2/18/03		0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.04	
	2/24/03	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.15	
	3/3/03	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.11	
	3/10/03	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.17	
	3/18/03		0.00030		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001			
	3/24/03	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.20	
	4/3/03	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.88	
	4/8/03	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.15	
	4/15/03		0.00060		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.12	
	4/22/03	<	0.00020		<	0.001			0.001		<	0.005		<	0.001		<	0.001		6.61	
	4/29/03	<	0.00020		<	0.001			0.001		<	0.005		<	0.001		<	0.001		7.12	
	5/5/03	<	0.00020		<	0.001			0.002		<	0.005		<	0.001		<	0.001		7.01	
	5/13/03	<	0.00020		<	0.001			0.002		<	0.005		<	0.001		<	0.001			
	5/19/03	<	0.00020		<	0.001			0.003		<	0.005		<	0.001		<	0.001		7.10	
	5/28/03	<	0.00020		<	0.001			0.003		<	0.005		<	0.001		<	0.001		7.24	
	6/2/03	<	0.00020		<	0.001			0.004		<	0.005		<	0.001		<	0.001		7.21	
	6/9/03		0.00060		<	0.001			0.004		<	0.005		<	0.001		<	0.001		6.97	
	6/17/03		0.00040		<	0.001			0.005		<	0.005		<	0.001		<	0.001		6.84	
	6/23/03		0.00030		<	0.001			0.005		<	0.005		<	0.001		<	0.001		7.06	
	6/30/03	<	0.00020		<	0.001			0.005		<	0.005		<	0.001		<	0.001		7.14	
	7/8/03	<	0.00020		<	0.001			0.005		<	0.005		<	0.001		<	0.001		7.04	
	7/14/03	<	0.00020		<	0.001			0.005		<	0.005		<	0.001		<	0.001		7.03	
	7/21/03	<	0.00020		<	0.001			0.006		<	0.005		<	0.001		<	0.001		7.14	
	7/28/03	<	0.00020			0.001			0.007		<	0.005		<	0.001		<	0.001		7.12	
	8/5/03	<	0.00020			0.003			0.008		<	0.005		<	0.001		<	0.001		6.99	
	8/11/03	<	0.00020			0.003			0.008		<	0.005		<	0.001		<	0.001		6.93	
	8/20/03	<	0.00020			0.006			0.011		<	0.005		<	0.001		<	0.001		7.10	
	8/29/03	<	0.00020			0.006			0.01		<	0.005		<	0.001		<	0.001		7.24	
	9/1/03	<	0.00020			0.006			0.01		<	0.005		<	0.001		<	0.001		8.61	
	9/8/03	<	0.00020			0.011			0.009		<	0.005		<	0.001		<	0.001		6.89	
	9/17/03	<	0.00020			0.011			0.009		<	0.005		<	0.001		<	0.001		6.95	
	9/22/03	<	0.00020			0.016			0.01		<	0.005		<	0.001		<	0.001		6.90	
	9/29/03	<	0.00020			0.017			0.01		<	0.005		<	0.001		<	0.001		6.88	
	10/6/03	<	0.00020			0.025			0.013		<	0.005		<	0.001		<	0.001		6.98	
	10/13/03	<	0.00020			0.027			0.011		<	0.005		<	0.001		<	0.001		6.92	
	10/20/03	<	0.00020			0.03			0.011		<	0.005		<	0.001		<	0.001		7.00	
	10/27/03	<	0.00020			0.033			0.01		<	0.005		<	0.001		<	0.001		7.00	
	11/3/03	<	0.00020			0.041			0.012		<	0.005		<	0.001		<	0.001		6.97	
	11/11/03		0.00030			0.036			0.01		<	0.005		<	0.001		<	0.001		6.68	
	11/17/03	<	0.00020			0.046			0.011		<	0.005		<	0.001		<	0.001		6.70	
	11/25/03	<	0.00020			0.036			0.008		<	0.005		<	0.001		<	0.001		6.95	
ST-A	12/2/03		0.00140		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.01	Carbon change out
	12/8/03		0.00170		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.04	
	12/15/03		0.00140		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.73	
	12/22/03		0.00200		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.95	
	1/1/04		0.00220		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.90	
	1/7/04		0.00150		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.97	
	1/13/04		0.00220		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.86	
	1/21/04		0.00180		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.85	
	1/27/04		0.00140		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.90	
	2/4/04		0.00170		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.88	
	2/10/04		0.00140		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.89	
	2/17/04		0.00100		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.87	
	2/23/04		0.00100		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.88	
	3/1/04		0.00080		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.88	
	3/8/04		0.00030		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.10	
	3/19/04	<	0.00020			0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.32	
	3/22/04	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.74	
	4/2/04	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.87	
	4/5/04	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.18	
	4/12/04		0.00060		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.00	

TABLE 3.1-1
CAPA GROUNDWATER TREATMENT SYSTEM
ANALYTICAL RESULTS
TREATMENT SYSTEM EFFLUENT

SAMPLE TAP	DATE	ANALYTICAL RESULTS (mg/L)[1]																		pH	COMMENTS
		MERCURY			CARBON TETRACHLORIDE			CHLOROFORM			METHYLENE CHLORIDE			TETRACHLOROETHENE			TRICHLOROETHENE				
		Q[2]	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG		
TREATED GROUNDWATER DISCHARGE STANDARDS (mg/L)[3]			0.01			0.38			0.325			NA[4]			0.164			NA			
ST-A Continued	4/20/04	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.72	
	5/5/04	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.68	
	5/10/04		0.00040		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.56	
	5/20/04		0.00030		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.83	
	5/24/04	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.15	
	6/1/04	<	0.00020		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.82	
	6/8/04		0.00050		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.80	
	6/14/04		0.00070		<	0.005		<	0.005		<	0.05		<	0.005		<	0.005		6.67	
	6/22/04		0.00070		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.87	
	6/30/04		0.00130		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.77	
	7/7/04		0.00140		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.92	
	7/13/04		0.00060		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.00	
	7/22/04		0.00100		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.70	
	7/27/04		0.00060		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.86	
	8/2/04		0.00100		<	0.005		<	0.005		<	0.05		<	0.005		<	0.005		6.89	
	8/10/04		0.00120		<	0.005		<	0.005		<	0.05		<	0.005		<	0.005		6.73	
	8/18/04		0.00150		<	0.005		<	0.005		<	0.05		<	0.005		<	0.005		6.68	
	8/25/04		0.00150		<	0.005		<	0.005		<	0.05		<	0.005		<	0.005		6.60	
	9/3/04		0.00120		<	0.005		<	0.005		<	0.05		<	0.005		<	0.005		6.78	
	9/8/04		0.00140		<	0.005		<	0.005		<	0.05		<	0.005		<	0.005		6.79	
	9/13/04		0.00040		<	0.005		<	0.005		<	0.05		<	0.005		<	0.005		6.82	
	9/20/04		0.00070		<	0.005		<	0.005		<	0.05		<	0.005		<	0.005		6.80	
	9/27/04		0.00120		<	0.001			0.002		<	0.005		<	0.001		<	0.001		6.88	
	10/6/04		0.00170			0.001			0.002		<	0.005		<	0.001		<	0.001		6.83	
	10/11/04		0.00100			0.001			0.002		<	0.005		<	0.001		<	0.001		7.02	
	10/21/04		0.00050			0.001			0.002		<	0.005		<	0.001		<	0.001		6.79	
	10/26/04	<	0.00020		<	0.005		<	0.005		<	0.05		<	0.005		<	0.005		6.73	
	11/1/04		0.00210			0.001			0.002		<	0.005		<	0.001		<	0.001		6.77	
	11/8/04		0.00120			0.002			0.003		<	0.005		<	0.001		<	0.001		6.71	
	11/15/04		0.00160			0.003			0.004		<	0.005		<	0.001		<	0.001		6.52	
	11/22/04		0.00160			0.004			0.003		<	0.005		<	0.001		<	0.001		7.03	
ST-B	11/29/04		0.00130		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.35	Carbon change out
	12/8/04		0.00070		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.80	
	12/13/04		0.00090		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.13	
	12/20/04		0.00130		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.95	
	12/28/04		0.00080		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.87	
	1/3/05		0.0022		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.69	
	1/11/05		0.003		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		8.66	
	1/17/05		0.0003		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.73	
	1/25/05		0.0005		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.14	
	2/1/05		0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.60	
	2/9/05		0.0003		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.00	
	2/14/05		0.0002		<	0.005		<	0.005		<	0.005		<	0.005		<	0.005		6.94	
	2/21/05		0.0004		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.91	
	2/28/05		0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.98	
	3/7/05		0.00028		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.08	
	3/14/05	B	0.00013		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.05	
	3/21/05	<	0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.84	
	3/29/05		0.00029		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.15	
	4/5/05		0.00023		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.87	
	4/11/05		0.00033		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.84	
	4/19/05	<	0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.72	
	4/27/05	B	0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.12	
	5/2/05	B	0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.14	
	5/9/05		0.00051		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.90	
	5/16/05	B	0.00026		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.71	
	5/24/05		0.00051		<	0.001		J	0.0002		<	0.005		<	0.001		<	0.001		6.83	
	5/30/05		0.00074		<	0.001		J	0.0002		<	0.005		<	0.001		<	0.001		6.83	
	6/6/05		0.00035		<	0.001		J	0.0004		<	0.005		<	0.001		<	0.001		6.88	
	6/13/05	<	0.0002	B	<	0.001		J	0.0004		<	0.005		<	0.001		<	0.001		7.00	
	6/23/05	<	0.0002		<	0.001		J	0.0003		<	0.005		<	0.001		<	0.001		6.40	
	6/27/05		0.0005		J	0.0002		J	0.0006		<	0.005		<	0.001		<	0.001		7.82	

TABLE 3.1-1
CAPA GROUNDWATER TREATMENT SYSTEM
ANALYTICAL RESULTS
TREATMENT SYSTEM EFFLUENT

SAMPLE TAP	DATE	ANALYTICAL RESULTS (mg/L)[1]																		pH	COMMENTS
		MERCURY			CARBON TETRACHLORIDE			CHLOROFORM			METHYLENE CHLORIDE			TETRACHLOROETHENE			TRICHLOROETHENE				
		Q[2]	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG		
TREATED GROUNDWATER DISCHARGE STANDARDS (mg/L)[3]			0.01			0.38			0.325			NA[4]			0.164			NA			
ST-C	7/7/05	<	0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.40	Carbon change out 6/29/05
	7/11/05		0.00032		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		8.07	
	7/18/05	<	0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.82	
	7/25/05		0.00037		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.85	
	8/2/05	<	0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.82	
	8/9/05	B	0.00014		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.36	
	8/15/05	<	0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.68	
	8/23/05	<	0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.89	
	8/29/05	<	0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.80	
	9/6/05	<	0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.90	
	9/13/05		0.00065		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.77	
	9/20/05	<	0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.59	
	9/30/05	<	0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.76	
	10/4/05	<	0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.91	
	10/12/05	<	0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.68	
	10/17/05	<	0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.77	
	10/25/05	<	0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.78	
	11/2/05	B	0.00011		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.79	
	11/9/05	B	0.00018		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.56	
	11/14/05		0.0004		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.82	
	11/23/05	<	0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.77	
	11/29/05	<	0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.68	
	12/5/05	<	0.0001		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.55	
	12/16/05	<	0.0001		<	0.001		<	0.001		J	0.0005		<	0.001		<	0.001		6.75	
	12/19/05	<	0.0001		<	0.001		<	0.001		J	0.0002		<	0.001		<	0.001		7.60	
	12/28/05	<	0.0001	Y	<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		7.60	
	1/5/06	B	0.0001		<	0.001		<	0.001		J	0.0002		<	0.001		<	0.001		6.63	
	1/10/06	B	0.0001		<	0.001		<	0.001		J	0.0003		<	0.001		<	0.001		6.68	
	1/17/06		0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.82	
	1/25/06	B	0.00017		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.89	
	1/31/06		0.00024		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.79	
	2/6/06	<	0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.85	
	2/13/06	<	0.0002		<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		6.78	
	2/24/06	J	0.00019		<	0.0002		<	0.0002		<	0.0002		<	0.0002		<	0.0002		6.42	
	2/27/06	<	0.0001		<	0.0002		<	0.0002		<	0.0002		<	0.0002		<	0.0002		7.36	
	3/6/06	<	0.0001		H, <	0.0001		H, <	0.0002		H, <	0.0002		H, <	0.0002		H, <	0.0002		6.75	
	3/13/06		0.00057		<	0.0002		<	0.0002		<	0.0002		<	0.0002		<	0.0002		6.77	
	3/20/06		0.00032		<	0.0002		<	0.0002		<	0.0002		<	0.0002		<	0.0002		7.00	
	3/27/06	<	0.0001		<	0.0002		<	0.0002		<	0.0002		<	0.0002		<	0.0002		6.66	
	4/3/06	J	0.00018		<	0.0002		<	0.0002		<	0.0002		<	0.0002		<	0.0002		7.23	
	4/11/06	<	0.00013		<	0.00025		<	0.0002		<	0.00053		<	0.0002		<	0.00032		6.86	
	4/18/06	<	0.00013		<	0.00025		<	0.0002		<	0.00053		<	0.0002		<	0.00032		6.40	
	4/25/06	<	0.00013		<	0.00025		<	0.0002		<	0.00053		<	0.0002		<	0.00032		6.76	
	5/3/06	<	0.00013		<	0.00025		<	0.0002		<	0.00053		<	0.0002		<	0.00032		6.30	
	5/11/06		0.00052		<	0.00025		<	0.0002		<	0.00053		<	0.0002		<	0.00032		6.86	
	5/17/06		0.00038		<	0.00025		<	0.0002		<	0.00053		<	0.0002		<	0.00032		6.82	
	5/22/06	<	0.00013		<	0.00025		<	0.0002		<	0.00053		<	0.0002		<	0.00032		7.06	
	5/30/06	J	0.00015		<	0.00025		<	0.0002		<	0.00053		<	0.0002		<	0.00032		6.95	
	6/5/06	<	0.00013		<	0.00025		<	0.0002		<	0.00053		<	0.0002		<	0.00032		7.14	
	6/12/06	B	0.00038		<	0.00025		J	0.00026		<	0.00053		<	0.0002		<	0.00032		6.81	
	6/23/06	J	0.00016		<	0.00025		J	0.00039		<	0.00053		<	0.0002		<	0.00032		6.97	
	6/27/06	J	0.00018		<	0.00025		<	0.0002		<	0.00053		<	0.0002		<	0.00032		7.24	
	7/6/06	<	0.00013		<	0.00025		J	0.00048		<	0.00053		<	0.0002		<	0.00032		6.96	
	7/11/06	<	0.00013		<	0.00025		J	0.00053		<	0.00053		<	0.0002		<	0.00032		6.96	
	7/17/06	<	0.00013		<	0.00025			0.001		<	0.00053		<	0.0002		<	0.00032		7.01	
	7/24/06	B	0.00028		<	0.00025			0.001		<	0.00053		<	0.0002		<	0.00032		6.81	
	7/31/06		0.00026		J	0.00031			0.0017		<	0.00053		<	0.0002		<	0.00032		6.90	
	8/7/06		0.00022		J	0.00042			0.0017		<	0.00053		<	0.0002		<	0.00032		6.98	
	8/16/06	<	0.00013		J	0.0007			0.0024		<	0.00053		<	0.0002		<	0.00032		6.64	
	8/23/06	J	0.00018		J	0.00069			0.0026		<	0.00053		<	0.0002		<	0.00032		6.80	
	8/29/06	<	0.00013		J	0.00088			0.0029		<	0.00053		<	0.0002		<	0.00032		6.73	
	9/6/06	J	0.00017		J	0.00057			0.0022		<	0.00053		<	0.0002		<	0.00032		6.77	

TABLE 3.1-1
CAPA GROUNDWATER TREATMENT SYSTEM
ANALYTICAL RESULTS
TREATMENT SYSTEM EFFLUENT

SAMPLE TAP	DATE	ANALYTICAL RESULTS (mg/L)[1]																		pH	COMMENTS
		MERCURY			CARBON TETRACHLORIDE			CHLOROFORM			METHYLENE CHLORIDE			TETRACHLOROETHENE			TRICHLOROETHENE				
		Q[2]	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG		
TREATED GROUNDWATER DISCHARGE STANDARDS (mg/L)[3]			0.01			0.38			0.325			NA[4]			0.164			NA			
ST-C Continued	9/13/06	J	0.00017		J	0.00095			0.0027		<	0.00053		<	0.0002		<	0.00032		6.58	
	9/18/06	<	0.00013			0.001			0.0033		<	0.00053		<	0.0002		<	0.00032		6.94	
	9/26/06	<	0.00013			0.0015			0.0038		<	0.00053		<	0.0002		<	0.00032		6.88	
	10/3/06	<	0.00013			0.0017			0.0037		<	0.00053		<	0.0002		<	0.00032		6.78	
	10/9/06		0.00046			0.0015			0.0031		<	0.00053		<	0.0002		<	0.00032		6.88	
	10/17/06		0.00022		J	0.00084			0.0026		<	0.00053		<	0.0002		<	0.00032		6.58	
	10/24/06		0.00026			0.0013			0.0038		<	0.00053		<	0.0002		<	0.00032		7.06	
	11/2/06		0.00024			0.0016			0.0036		<	0.00053		<	0.0002		<	0.00032		6.67	
	11/8/06	<	0.00013			0.0015			0.004		<	0.00053		<	0.0002		<	0.00032		7.04	
	11/15/06	<	0.00013			0.0014		B	0.0035		<	0.00053		<	0.0002		<	0.00032		6.78	
	11/21/06	<	0.00013			0.0016			0.0031		<	0.00053		<	0.0002		<	0.00032		7.00	
	11/27/06		0.00034			0.0019			0.0039		<	0.00053		<	0.0002		<	0.00032		7.26	
	12/5/06		0.00071			0.0021			0.0034		<	0.00053		<	0.0002		<	0.00032		6.67	
	12/14/06	<	0.00013			0.0027			0.0037		<	0.00053		<	0.0002		<	0.00032		6.93	
	12/20/06		0.00022			0.0032			0.0034		<	0.00053		<	0.0002		<	0.00032		7.08	
	12/27/06		0.00051			0.0029			0.003		<	0.00053		<	0.0002		<	0.00032		7.04	
	1/2/07	<	0.00013			0.0026			0.0026		<	0.00053		<	0.0002		<	0.00032		6.70	
	1/11/07	<	0.00013			0.0029			0.003		<	0.00053		<	0.0002		<	0.00032		6.88	
	1/18/07	J	0.00016			0.0023			0.0022		<	0.00053		<	0.0002		<	0.00032		6.40	
	1/25/07		0.00023			0.0026			0.0025		<	0.00053		<	0.0002		<	0.00032		6.58	
	2/1/07	<	0.00013			0.0023			0.0023		<	0.00053		<	0.0002		<	0.00032		6.63	
	2/8/07		0.00025			0.003			0.0028		<	0.00053		<	0.0002		<	0.00032		6.70	
	2/13/07		0.00023			0.0026			0.0023		<	0.00053		<	0.0002		<	0.00032		6.90	
	2/20/07		0.00035			0.0045			0.0032		<	0.00053		<	0.0002		<	0.00032		6.96	
	3/1/07	<	0.00013			0.0036			0.0029		<	0.00053		<	0.0002		<	0.00032		6.65	
	3/8/07	<	0.00013			0.0039			0.0032		<	0.00053		<	0.0002		<	0.00032		6.58	
	3/16/07	<	0.00013			0.003			0.0027		<	0.00053		<	0.0002		<	0.00032		6.61	
	3/19/07	<	0.00013			0.0034			0.0032		<	0.00053		<	0.0002		<	0.00032		6.56	
	3/27/07	<	0.00013			0.0026			0.0026		<	0.00053		<	0.0002		<	0.00032		6.86	
	4/3/07	<	0.00013			0.0045			0.0031		<	0.00053		<	0.0002		<	0.00032		6.40	
	4/12/07	<	0.00013			0.0036			0.0025		<	0.00053		<	0.0002		<	0.00032		6.36	
	4/19/07	<	0.00013			0.0042			0.0024		<	0.00053		<	0.0002		<	0.00032		6.29	
	4/24/07	J	0.00013			0.005			0.0031		<	0.00053		<	0.0002		<	0.00032		6.30	
	5/1/07	<	0.00013			0.0051			0.0026		<	0.00053		<	0.0002		<	0.00032		6.80	
	5/10/07	<	0.00013			0.0032			0.0025		<	0.00053		<	0.0002		<	0.00032		6.63	
	5/18/07	<	0.00013			0.0032			0.0023		<	0.00053		<	0.0002		<	0.00032		6.50	
	5/25/07	B	0.00033			0.0038			0.0029		<	0.00053		<	0.0002		<	0.00032		5.49	
	5/31/07	B	0.00073			0.0047			0.0022		<	0.00053		<	0.0002		<	0.00032		6.51	
	6/6/07		0.00031			0.0039			0.0021		<	0.00053		<	0.0002		<	0.00032		6.32	
	6/15/07		0.00038			0.0058			0.0022		<	0.00053		<	0.0002		<	0.00032		6.19	
	6/21/07		0.00038			0.0066			0.0024		<	0.00053		<	0.0002		<	0.00032		6.90	
	6/25/07	<	0.00013			0.0056			0.0025		<	0.00053		<	0.0002		<	0.00032		6.87	
	7/6/07		0.00027			0.0053			0.0019		<	0.00053		<	0.0002		<	0.00032		6.88	
	7/11/07		0.0002			0.0055			0.0021		<	0.00053		<	0.0002		<	0.00032		6.89	
ST-A	7/20/07		0.00096		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		7.32	Carbon change out 7/16/07
	7/23/07		0.00027		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.82	
	7/30/07		0.00027		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		7.38	
	8/6/07	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.48	
	8/13/07	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.93	
	8/20/07	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.38	
	8/29/07	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.93	
	9/5/07	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.92	
	9/12/07	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.93	
	9/20/07	J	0.00019		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.19	
	9/26/07		0.00021		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.78	
	10/1/07	J	0.00014		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.78	
	10/10/07	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.78	
	10/18/07	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.78	
	10/25/07	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.97	
	10/29/07	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.65	
	11/7/07	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.20	
	11/16/07	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		5.98	

TABLE 3.1-1
CAPA GROUNDWATER TREATMENT SYSTEM
ANALYTICAL RESULTS
TREATMENT SYSTEM EFFLUENT

SAMPLE TAP	DATE	ANALYTICAL RESULTS (mg/L)[1]																		pH	COMMENTS
		MERCURY			CARBON TETRACHLORIDE			CHLOROFORM			METHYLENE CHLORIDE			TETRACHLOROETHENE			TRICHLOROETHENE				
		Q[2]	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG		
TREATED GROUNDWATER DISCHARGE STANDARDS (mg/L)[3]			0.01			0.38			0.325			NA[4]			0.164			NA			
ST-A Continued	11/19/07	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.81	
	11/29/07	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.28	
	12/3/07	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.30	
	12/11/07	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.38	
	12/17/07	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.66	
	12/26/07	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.38	
	1/3/08	J	0.0014		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.99	
	1/9/08	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.20	
	1/14/08	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.35	
	1/23/08	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.43	
	2/1/08		0.00027		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.22	
	2/7/08		0.00023		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.47	
	2/13/08		0.00031	B	<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.22	
	2/22/08	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032			
	2/27/08		0.00024		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		5.68	
	3/5/08	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		7.47	
	3/11/08	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.38	
	3/20/08	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.33	
	3/26/08	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.60	
	4/4/08	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.68	
	4/10/08	J	0.00017		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.65	
	4/18/08	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.49	
	4/24/08		0.00027		<	0.00025		<	0.0002		<	0.001		J,B	0.00089		<	0.00032		6.32	
	4/28/08		0.00022		<	0.00025		<	0.0002		<	0.001		J,B	0.00049		<	0.00032		6.33	
	5/8/08		0.00021		<	0.00025		J	0.00038		<	0.001		<	0.0002		<	0.00032		6.56	
	5/15/08	J	0.00019		<	0.00025		J	0.00048		<	0.001		<	0.0002		<	0.00032		6.35	
	5/22/08		0.00021		<	0.00025		J	0.00061		<	0.001		<	0.0002		<	0.00032		6.19	
	5/28/08	<	0.00013		<	0.00025		J	0.00071		<	0.001		<	0.0002		<	0.00032		6.05	
	6/4/08	<	0.00013		<	0.00025		<	0.0002		<	0.001		<	0.0002		<	0.00032		6.96	
	6/11/08	<	0.00013		<	0.00025		J	0.00097		<	0.001		<	0.0002		<	0.00032		6.88	
	6/20/08	<	0.00013		<	0.00025			0.0011		<	0.001		<	0.0002		<	0.00032		6.88	
	6/27/08		0.00049		<	0.00025			0.0012		<	0.001		<	0.0002		<	0.00032		6.76	
	7/2/08	<	0.00013		<	0.00025			0.0013		<	0.001		<	0.0002		<	0.00032		6.75	
	7/8/08	J	0.00016		<	0.00025			0.0013		<	0.002		<	0.0002		<	0.00032		6.75	
	7/14/08		0.00033		<	0.00025			0.0014		<	0.002		<	0.0002		<	0.00032		7.07	
	7/22/08	J	0.00016		<	0.00025		<	0.0002		<	0.002		<	0.0002		<	0.00032		6.88	
	7/31/08	<	0.00013			0.0011			0.0016		<	0.002		<	0.0002		<	0.00032		6.74	
	8/4/08		0.00021		J	0.00083			0.0021		<	0.002		<	0.0002		<	0.00032		6.74	
	8/11/08	<	0.00013			0.0011			0.0019		<	0.002		<	0.0002		<	0.00032		6.34	
	8/21/08		0.00026			0.0018			0.002		<	0.002		<	0.0002		<	0.00032		6.74	
	8/25/08		0.00028			0.0036			0.0018		<	0.002		<	0.0002		<	0.00032		6.55	
	9/4/08		0.00051			0.033			0.0033		<	0.002		<	0.0002		<	0.00032		6.77	Stripper blower/motor replaced
	9/8/08		0.00038			0.057			0.005		<	0.002		<	0.0002		<	0.00032		6.74	
	9/19/08	<	0.00013			0.065			0.0071		<	0.002		<	0.0002		<	0.00032		6.67	
	9/25/08	<	0.00013			0.09			0.0089		<	0.002		<	0.0002		<	0.00032		6.93	
ST-B	10/3/08		0.00072			0.0017		<	0.0002		<	0.002		<	0.0002		<	0.00032		6.64	Carbon change out 10/2/08
	10/9/08		0.00086		J	0.00096		<	0.0002		<	0.002		<	0.0002		<	0.00032		6.64	
	10/13/08		0.00091		J	0.00059		<	0.0002		<	0.002		<	0.0002		<	0.00032		7.01	
	10/22/08		0.00071		J	0.00062		<	0.0002		<	0.002		<	0.0002		<	0.00032		6.95	
	10/27/08		0.00093		<	0.00025		<	0.0002		<	0.002		<	0.0002		<	0.00032		6.95	
	11/6/08		0.00048		J	0.0007		<	0.0002		<	0.002		<	0.0002		<	0.00032		6.93	
	11/14/08		0.00038		<	0.00025		<	0.0002		<	0.002		<	0.0002		<	0.00032		6.44	
	11/21/08		0.00027		J	0.00043		<	0.0002		<	0.002		<	0.0002		<	0.00032		6.93	
	11/26/08		0.00055		<	0.00025		<	0.0002		<	0.002		<	0.0002		<	0.00032		6.66	
	12/3/08		0.00032		<	0.00025		<	0.0002		<	0.002		<	0.0002		<	0.00032		6.77	
	12/11/08		0.00029		J	0.00044		<	0.0002		<	0.002		<	0.0002		<	0.00032		6.60	
	12/19/08		0.00025		<	0.00025		<	0.0002		<	0.002		<	0.0002		<	0.00032		6.90	
	12/22/08		0.00033		<	0.00025		<	0.0002		<	0.002		<	0.0002		<	0.00032		7.01	
	12/31/08		0.00022		<	0.00025		<	0.0002		<	0.002		<	0.0002		<	0.00032		6.84	

TABLE 3.1-1
CAPA GROUNDWATER TREATMENT SYSTEM
ANALYTICAL RESULTS
TREATMENT SYSTEM EFFLUENT

SAMPLE TAP	DATE	ANALYTICAL RESULTS (mg/L)[1]																		pH	COMMENTS
		MERCURY			CARBON TETRACHLORIDE			CHLOROFORM			METHYLENE CHLORIDE			TETRACHLOROETHENE			TRICHLOROETHENE				
		Q[2]	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG		
TREATED GROUNDWATER DISCHARGE STANDARDS (mg/L)[3]			0.01			0.38			0.325			NA[4]			0.164			NA			
ST-B Continued	1/7/09		0.000419		U	0.0005		U	0.0005		J	0.00076		U	0.0006		U	0.0005		6.70	ALS Laboratory Group (2009)
	1/13/09		0.00026		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		6.97	
	1/23/09		0.00119		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		6.97	
	1/29/09		0.000288		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.07	
	2/4/09		0.000282		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.04	
	2/10/09	J	0.00009		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		6.72	
	2/19/09	J	0.000091		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		6.59	
	2/26/09	J	0.000079		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		6.98	
	3/4/09	J	0.0016		J	0.0017		U	0.0005		U	0.0005		U	0.0006		U	0.0005		6.77	
	3/10/09	J	0.00012		J	0.0022		J	0.00069		U	0.0005		U	0.0006		U	0.0005		6.90	
	3/19/09	J	0.000057		J	0.0025		J	0.00079		U	0.0005		U	0.0006		U	0.0005		6.60	
	3/26/09	J	0.000191		U	0.0005		J	0.0013		U	0.0005		U	0.0006		U	0.0005		6.65	
	4/2/09		0.000213			0.0072		J	0.0018		U	0.0005		U	0.0006		U	0.0005		7.11	
	4/7/09	J	0.000196			0.0074		J	0.0018		U	0.0005		U	0.0006		U	0.0005		6.61	
	4/17/09	J	0.000155			0.0099		J	0.0024		U	0.0005		U	0.0006		U	0.0005		6.75	
	4/23/09		0.00021			0.014		J	0.0031		U	0.0005		U	0.0006		U	0.0005		6.67	
	5/1/09	J	0.000045			0.012		J	0.0032		U	0.0005		U	0.0006		U	0.0005		6.72	
	5/5/09	J	0.000151			0.015		J	0.0034		U	0.0005		U	0.0006		U	0.0005		7.18	
	5/15/09	J	0.00017			0.019		J	0.0044		U	0.0005		U	0.0006		U	0.0005		6.90	
	5/21/09		0.000357			0.023		J	0.0041		U	0.0005		U	0.0006		U	0.0005		7.16	
	5/29/09		0.000266			0.018		J	0.0044		U	0.0005		U	0.0006		U	0.0005		7.01	
	6/1/09		0.000251			0.025			0.0051		U	0.0005		U	0.0006		U	0.0005		6.98	
	6/8/09		0.000379			0.031			0.0056		U	0.0005		U	0.0006		U	0.0005		6.87	
	6/18/09		0.000284			0.03			0.0059		U	0.0005		J	0.00065		U	0.0005		7.13	
	6/22/09		0.000222			0.03			0.0059		U	0.0005		U	0.0006		U	0.0005		7.20	
ST-C[5]	7/3/09	U	0.000042		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.94	
	7/9/09	U	0.000042		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.40	
	7/15/09	U	0.000042		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		6.95	
	7/22/09	J	0.000074		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		6.93	
	7/31/09	J	0.000065		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.05	
	8/7/09	J	0.000074		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.03	
	8/13/09	J	0.000082		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.59	
	8/20/09	J	0.000096		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.38	
	8/26/09	J	0.000094		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.40	
	9/3/09	J	0.000111		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.18	
	9/11/09	J	0.00014		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.09	
	9/15/09	J	0.000158		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.20	
	9/25/09	J	0.000126		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.36	
	10/1/09	J	0.000127		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		6.93	
	10/6/09	J	0.000188		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		6.76	
	10/16/09	J	0.000096		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		6.90	
	10/22/09	J	0.00014		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.04	
	10/28/09	J	0.000176		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		6.99	
	11/4/09	J	0.000156		J	0.0027		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.00	
	11/10/09	J	0.000106		U	0.0005		J	0.0005		U	0.0005		U	0.0006		U	0.0005		7.09	
	11/16/09	J	0.000122		U	0.0005		J	0.00061		U	0.0005		U	0.0006		U	0.0005		6.99	
	11/24/09	J	0.000132		U	0.0005		J	0.00065		U	0.0005		U	0.0006		U	0.0005		7.05	
	11/30/09	J	0.000165		J	0.0027		J	0.00091		U	0.0005		U	0.0006		U	0.0005		6.97	
	12/8/09	J	0.00014		J	0.0015		J	0.0011		U	0.0005		U	0.0006		U	0.0005		7.04	
	12/15/09	J	0.00014		U	0.005		J	0.0013		U	0.0005		U	0.0006		U	0.0005		7..05	
	12/21/09	J	0.000096			0.0052		J	0.0014		U	0.0005		U	0.0006		U	0.0005		6.97	
	12/28/09	J	0.000165		J	0.0045		J	0.0016		U	0.0005		U	0.0006		U	0.0005		7.17	
	1/5/10	J	0.000096			0.0063		J	0.0017		U	0.0005		U	0.0006		U	0.0005		7.08	
	1/12/10	J	0.000131			0.0116		J	0.0046		J	0.002		U	0.0006		U	0.0005		6.42	
	1/19/10	J	0.000131			0.0069		J	0.0026		U	0.0005		U	0.0006		U	0.0005		6.18	
	1/25/10	J	0.000092		J	0.0039		J	0.0018		U	0.0005		U	0.0006		U	0.0005		6.38	
	2/1/10	J	0.000139			0.013		J	0.0037		U	0.0005		U	0.0006		U	0.0005		7.73	
	2/11/10	J	0.000141			0.033			0.0076		U	0.0005		U	0.0006		U	0.0005		6.60	
	2/17/10	J	0.000144			0.036			0.0082		U	0.0005		U	0.0006		U	0.0005		7.32	
	2/22/10	J	0.000108			0.032			0.0089		U	0.0005		U	0.0006		U	0.0005		6.77	
	3/2/10	J	0.000145			0.038			0.0083		U	0.0005		U	0.0006		U	0.0005		7.03	

TABLE 3.1-1
CAPA GROUNDWATER TREATMENT SYSTEM
ANALYTICAL RESULTS
TREATMENT SYSTEM EFFLUENT

SAMPLE TAP	DATE	ANALYTICAL RESULTS (mg/L)[1]																		pH	COMMENTS
		MERCURY			CARBON TETRACHLORIDE			CHLOROFORM			METHYLENE CHLORIDE			TETRACHLOROETHENE			TRICHLOROETHENE				
		Q[2]	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG		
TREATED GROUNDWATER DISCHARGE STANDARDS (mg/L)[3]			0.01			0.38			0.325			NA[4]			0.164			NA			
ST-C Continued	3/10/10	J	0.00016			0.044			0.009		U	0.0005		U	0.0006		U	0.0005		6.39	Carbon change out
ST-A	3/17/10	U	0.000042		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		8.14	
	3/22/10	U	0.000042		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		8.46	
	3/31/10	U	0.000042		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.03	
	4/6/10	J	0.000084		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.20	
	4/12/10	U	0.000042		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.63	
	4/22/10	U	0.000042		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.44	
	4/28/10	J	0.000083		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		6.87	
	5/4/10	J	0.000043		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		6.62	
	5/10/10	J	0.000081		U	0.0005		J	0.00078		U	0.0005		U	0.0006		U	0.0005		6.75	
	5/20/10	U	0.000042		U	0.0005		J	0.0014		J	0.00077		U	0.0006		U	0.0005		6.58	
	5/24/10	J	0.000149		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		6.76	
	6/2/10	U	0.000042		U	0.0005		J	0.0017		U	0.0005		U	0.0006		U	0.0005		7.02	
	6/7/10	J	0.000066		J	0.0043		J	0.0019		U	0.0005		U	0.0006		U	0.0005		7.00	
	6/14/10	J	0.000088		J	0.0011		J	0.0021		U	0.0005		U	0.0006		U	0.0005		7.28	
	6/23/10	J	0.000159		J	0.0025		J	0.0032		U	0.0005		U	0.0006		U	0.0005		6.71	
	7/1/10	U	0.000042		J	0.0032		J	0.0044		U	0.0005		U	0.0006		U	0.0005		6.51	
	7/6/10	J	0.000049			0.066		J	0.0042		U	0.0005		U	0.0006		U	0.0005		6.48	
	7/12/10	U	0.000042			0.0061			0.0055		U	0.0005		U	0.0006		U	0.0005		6.99	
	7/22/10	J	0.000092			0.0084			0.007		U	0.0005		U	0.0006		U	0.0005		7.64	
	7/26/10	J	0.000069			0.0085			0.0071		U	0.0005		U	0.0006		U	0.0005		7.61	
	8/2/10	J	0.000069			0.015			0.0076		U	0.0005		U	0.0006		U	0.0005		7.40	
	8/12/10	U	0.000042			0.012			0.0081		U	0.0005		U	0.0006		U	0.0005		6.39	
	8/18/10	J	0.000078			0.016			0.0082		U	0.0005		U	0.0006		U	0.0005		6.51	
	8/23/10	J	0.00008			0.021			0.0096		U	0.0005		U	0.0006		U	0.0005		6.79	
	8/30/10	J	0.000075			0.02			0.0096		U	0.0005		U	0.0006		U	0.0005		6.85	
	9/8/10	U	0.000042			0.021			0.0092		U	0.0005		U	0.0006		U	0.0005		6.34	Carbon change out 9/10/10
ST-C	9/14/10	U	0.000042		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		8.53	
	9/20/10	J	0.000043		U	0.0005		U	0.0005		U	0.0005		J	0.0011		U	0.0005		7.37	
	9/27/10	U	0.000042		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		8.12	
	10/4/10	U	0.000042		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.15	
	10/12/10	U	0.000042		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.13	
	10/18/10		0.000439		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.18	
	10/28/10	J	0.000043		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		6.86	
	11/4/10	U	0.000042		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.62	
	11/8/10	U	0.000042		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.15	
	11/15/10	J	0.000048		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.43	
	11/23/10	U	0.000042		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		6.33	
	11/29/10	U	0.000042		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		6.96	
	12/6/10	J	0.000043		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		7.11	
	12/14/10	U	0.000042		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		6.83	
	12/21/10	J	0.000075		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		6.88	
	12/28/10	J	0.000061		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		4.78	

NOTES:
1) mg/L - milligrams per liter
2) Q - Qualifier
< - Not detected (ND) at a value greater than the reporting limit (RL), for data prior to 2/24/06.
< - Not detected at a value greater than the method detection limit (MDL). (noted in Result column, for data 2/24/06 to 12/31/09.
B - Indicates that a value for an inorganic analysis is an estimate. It is used when a compound is determined to be 12/31/08 but at a concentration less than the quantitation limit of the method, for data prior to 2/24/06.
B - Indicates that the compound was found in the blank sample for both inorganic and metals analysis, for data 2/24/06 to 12/31/09.
H - Indicates a sample was prepped or analyzed beyond the specified holding time
J - Value for an organic analysis is an estimate, for data prior to 2/24/06.
J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value, for data 2/24/06 to 12/31/09.
* - LCS or LCSD exceeds the control limits
Flag
B - Indicates that an analyte is present in the method blank as well as in the sample.
J - Value is an estimate; result falls within the MDL and the limit of quantitation (LQ) (Lancaster Laboratories).
Y - Used to identify a spike or spike duplicate recovery is outside the specified quality control limits
3) Treated groundwater discharge limitations recommended by the EPA in a letter dated 7/20/1998 to Mr. Ron Weddell.
4) NA - Not applicable
5) ST - Sample tap; sample tap either (A, B, or C) depends on arrangement of carbon canisters, which changes after each carbon change out.

TABLE 3.1-2
CAPA GROUNDWATER TREATMENT SYSTEM
ANALYTICAL RESULTS
RECOVERY WELLS

SAMPLE	DATE	ANALYTICAL RESULTS (mg/L)[1]																	
		MERCURY			CARBON TETRACHLORIDE			CHLOROFORM			METHYLENE CHLORIDE			TETRACHLOROETHENE			TRICHLOROETHENE		
		Q[2]	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG
CA050B	5/18/98		3.9			52			1.3		<	0.5			0.33		<	0.5	
	5/29/98		4.2			116			1.8		<	0.2			0.34		<	0.1	
	7/1/98		4.0			125			2.1		<	0.1			0.34		<	0.1	
	7/28/98		3.3			128			1.9		<	0.2			0.31		<	0.1	
	8/25/98		3.4			130			2.0		<	0.2			0.29		<	0.1	
	12/22/98		2.2			142			2.3			0.012	J		0.24			0.004	J
	4/28/99		1.8			89			1.6		<	0.2			0.19		<	0.1	
	6/30/99		1.7			50			1.4		<	0.1			0.16		<	0.05	
	10/20/99		1.52			44.3			0.9		<	0.1			0.099		<	0.05	
	2/2/00		1.46			77.4			0.9		<	0.05			0.11		<	0.025	
	9/27/00		0.44			40			1.1		<	1		<	0.2		<	0.2	
	1/10/01		1.08			74			1.1		<	2		<	0.4		<	0.4	
	5/30/01		0.94			74			1.1		<	2		<	0.5		<	0.5	
	10/22/01		0.78			75			0.9		<	4		<	0.8		<	0.8	
	3/25/02		0.45			14			0.5		<	0.5		<	0.1		<	0.1	
	8/12/02		0.69			53			0.7		<	2		<	0.5		<	0.5	
	1/3/03		0.7			65			0.7		<	2		<	0.5		<	0.5	
	5/19/03		0.87			70			0.8		<	2		<	0.4		<	0.4	
	10/6/03		0.79			64			0.8		<	2		<	0.5		<	0.5	
	2/23/04		0.41			64			0.9		<	2		<	0.5		<	0.5	
	7/13/04		0.71			68			0.8		<	2		<	0.5		<	0.5	
	11/29/04		0.96			78			0.8		<	2		<	0.4		<	0.4	
	5/16/05		0.813			34			0.5		<	1		J	0.11		<	0.2	
	5/3/06		0.59			38			0.6		J,B	0.13		J	0.14		<	0.064	
	9/20/07		1.6			69			0.7		<	0.4		J	0.26		<	0.13	
	10/13/08		0.54			39			0.5		<	0.8		J	0.14		<	0.12	
	7/9/09		0.503			40			0.4		U	0.0005			0.12			0.013	
	7/9/09		0.503			40			0.4		<	0.0005			0.12			0.013	
	7/6/10		0.393			52			0.5		U	0.0005			0.14			0.013	
CA051B	5/18/98		0.98			73			1.2		<	0.5		<	0.5		<	0.5	
	5/29/98		0.88			94			1.6		<	0.2			0.11		<	0.1	
	7/1/98		0.76			79			1.8		<	0.2			0.11		<	0.1	
	7/28/98		0.61			69			1.5		<	0.1			0.078		<	0.05	
	8/25/98		0.54			64			1.6		<	0.05			0.075			0.007	J
	12/22/98		0.36			59			2.0		<	0.02			0.083		<	0.02	
	4/28/99		0.37			37			1.6		<	0.05			0.061			0.004	J
	6/30/99		0.33			29			1.6			0.005	J		0.063			0.004	J
	10/20/99		0.342			37.2			1.5		<	0.02			0.072			0.006452	J
	2/2/00		0.312			40.5			1.4		<	0.02			0.06			0.00478	J
	9/27/00		0.201			21			1.5		<	1		<	0.2		<	0.2	
	1/10/01		0.37			11			1.0		<	0.2			0.06		<	0.05	
	5/30/01		0.16			12			1.0		<	0.5		<	0.1		<	0.1	
	10/22/01		0.56			52			7.0		<	2		<	0.4		<	0.4	
	3/25/02		0.045			13			1.2		<	0.5		<	0.1		<	0.1	
	8/12/02		0.072			15			1.2		<	0.005			0.05			0.005	
	1/3/03		0.067			5.6			0.9		<	0.001			0.04		<	0.002	
	5/19/03		0.101			17			0.9		<	0.1			0.04		<	0.02	
	10/6/03		0.096			15			0.9		<	0.5		<	0.1		<	0.1	
	2/23/04		0.049			4.4			0.7		<	0.1			0.04		<	0.02	
	7/13/04		0.04			4.3			0.8		<	0.1			0.05		<	0.02	
	11/29/04		0.15			21			0.9		<	1		<	0.2		<	0.2	
	5/16/05		0.116			9.7			0.7		<	0.25		J	0.038		<	0.05	
	5/3/06		0.081			12			0.7		J,B	0.052		J	0.045		<	0.016	
	9/20/07		0.13			12			0.8		<	0.08		J	0.029		<	0.026	
	10/13/08		0.065			12			0.5		<	0.16		J	0.04		<	0.025	
	7/9/09		0.0958			8.5			0.4		U	0.0005			0.03		J	0.0044	
	7/9/09		0.0958			8.5			0.4		<	0.0005			0.03		J	0.0044	
	7/6/10		0.0134			1.6			0.3		U	0.0005			0.02		J	0.0067	
CA052B	5/18/98		5.8			49			1.8		<	0.5			1.4		<	0.5	
	5/29/98		0.30			64			2.5		<	0.2			1.8			0.092	J
	7/1/98		0.32			66			2.2		<	0.2			1.5			0.076	J
	7/28/98		0.24			72			1.6		<	0.1			1.0			0.051	
	8/25/98		0.27			207			1.8		<	0.2			1.2			0.062	J
	4/28/99		0.25			34			1.4		<	0.1			0.4			0.02	J

TABLE 3.1-2
CAPA GROUNDWATER TREATMENT SYSTEM
ANALYTICAL RESULTS
RECOVERY WELLS

SAMPLE	DATE	ANALYTICAL RESULTS (mg/L)[1]																	
		MERCURY			CARBON TETRACHLORIDE			CHLOROFORM			METHYLENE CHLORIDE			TETRACHLOROETHENE			TRICHLOROETHENE		
		Q[2]	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG
CA052B Continued	6/30/99		0.09			23			0.9		<	0.04			0.4			0.016	J
	10/20/99		0.87			55.1			2.3			0.029			0.48			0.025	J
	2/2/00		0.0472			12			0.7			0.00125	J		0.15			0.00795	
	9/27/00		0.044			25			1.1		<	1		<	0.2		<	0.2	
	1/10/01		0.06			16			0.6		<	0.5		<	0.1		<	0.1	
	5/30/01		0.031			21			0.8		<	0.5			0.1		<	0.1	
	10/22/01		0.036			21			0.6		<	1		<	0.2		<	0.2	
	3/25/02		0.024			22			0.6		<	1		<	0.2		<	0.2	
	8/12/02		0.025			22			0.5		<	0.5			0.1		<	0.1	
	1/3/03		0.025			16			0.6		<	0.5			0.1		<	0.1	
	5/19/03		0.025			17			0.5		<	0.5			0.1		<	0.1	
	10/6/03		0.023			18			0.5		<	0.5			0.1		<	0.1	
	2/23/04		0.025			18			0.5		<	0.5			0.1		<	0.1	
	7/13/04		0.018			19			0.4		<	0.5			0.2		<	0.1	
	11/29/04		0.02			17			0.4		<	0.5			0.1		<	0.1	
	5/16/05		0.0197			12			0.39		<	0.5		J	0.077		<	0.1	
	5/3/06		0.016			10			0.38		J,B	0.11		J	0.079		<	0.032	
	9/20/07		0.025			13			0.4		<	0.08			0.14		<	0.026	
	10/13/08		0.014			8			0.3		<	0.16		J	0.056		<	0.025	
	7/9/09		0.0134			10			0.27		<	0.0005			0.074		J	0.0027	
	7/9/09		0.0134			10			0.3		U	0.0005			0.074		J	0.0027	
	7/6/10		0.007			8.8			0.26		U	0.0005			0.098		J	0.0031	
CA0U23B	5/18/98		3.9			88			2.6		<	0.5		<	0.5		<	0.5	
	5/29/98		2.5			118			3.4			0.04	J		0.64			0.026	J
	7/1/98		2.4			112			3.4			0.055	J		0.63			0.025	J
	7/28/98		2.4			119			3.4			0.025	J		0.62		<	0.1	
	8/25/98		2.8			124			3.4			0.032			0.55		<	0.1	
	12/22/98		1.4			127			3.6			0.039	J		0.79			0.044	
	4/28/99		1.2			81			2.8		<	0.2			0.60		<	0.1	
	6/30/99		1.2			54			3.0			0.043	J		0.59			0.031	J
	10/20/99		0.0887			23.6			0.8			0.004479	J		0.30			0.016	
	2/2/00		0.705			58.9			2.2			0.01564	J		0.47			0.0258	
	9/27/00		0.78			45			2.0		<	1			0.40		<	0.2	
	1/10/01		0.044			48			2.0		<	1			0.40		<	0.2	
	5/30/01		0.5			25			0.8		<	1			0.20		<	0.2	
	10/22/01		0.41			38			1.3		<	1			0.50		<	0.2	
	3/25/02		0.22			52			19.0		<	2			0.50		<	0.4	
	8/12/02		0.45			36			1.3		<	1			0.40		<	0.2	
	1/3/03		0.49			44			1.4		<	2			0.50		<	0.4	
	5/19/03		0.23			31			1.8		<	1			0.40		<	0.2	
	10/6/03		0.26			31			2.2		<	1			0.50		<	0.2	
	2/23/04		0.27			32			2.0		<	1			0.60		<	0.2	
	7/13/04		0.3			36			1.5		<	1			0.60		<	0.2	
	11/29/04		0.31			40			1.6		<	1			0.60		<	0.2	
	5/16/05		0.259			36			1.6		J	0.042			0.52		J	0.064	
	5/3/06		0.14			28			1.7		J,B	0.15			0.41		<	0.064	
	9/20/07		0.25			26			1.2		<	0.2			0.38		J	0.076	
	10/13/08		0.14			21			1.1		<	0.4			0.35		<	0.063	
	7/9/09		0.141			20			1.0		J	0.0036			0.31			0.039	
	7/6/10		0.123			20			1.2		J	0.0034			0.45			0.051	

NOTE:
1) mg/L - milligrams per liter
2) Q - Qualifier
< - Not detected (ND) at a value greater than the reporting limit (RL), for data prior to 2/24/06.
<, U - Not detected at a value greater than the method detection limit (MDL), noted in Result column, for data since 2/24/06.
B - Indicates that the compound was found in the blank sample for both inorganic and metals analysis, for data 2/24/06 to 12/31/08.
J - Value for an organic analysis is an estimate, for data prior to 2/24/06.
J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value, for data 2/24/06 to 12/31/08.
Flag
J - Value is an estimate; result falls within the MDL and the limit of quantitation (LQ) (Lancaster Laboratories).

TABLE 3.1-3
CAPA GROUNDWATER TREATMENT SYSTEM
ANALYTICAL RESULTS
STRIPPER EFFLUENT

SAMPLE TAP	DATE	ANALYTICAL RESULTS (mg/L)[1]																		COMMENTS
		MERCURY			CARBON TETRACHLORIDE			CHLOROFORM			METHYLENE CHLORIDE			TETRACHLOROETHENE			TRICHLOROETHENE			
		Q[2]	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	Q	RESULT	FLAG	
ST-9	5/18/98					0.63			0.034			0.0016			0.002		<	0.001		
	5/29/98		1.7																	
	6/10/98		1.0																	
	6/24/98		0.6																	
	7/1/98					0.33			0.018			0.00047	J		0.00079	J	<	0.001		
	7/28/98					0.32			0.019			0.00017	J		0.00062	J	<	0.001		
	8/25/98					0.26			0.018		<	0.002			0.00062	J	<	0.001		
	9/23/98					0.17			0.013		<	0.002			0.001		<	0.001		
	10/1/98					0.29			0.021		<	0.002			0.0008	J	<	0.001		
	10/7/98					0.037			0.006		<	0.002		<	0.001		<	0.001		
	12/16/98					0.026			0.0009		<	0.002		<	0.001		<	0.001		
	2/17/99					0.146			0.00324		<	0.002			0.001		<	0.001		
	3/10/99					0.050415			0.001822		<	0.002			0.00034	J	<	0.001		
	4/6/99					0.30273			0.006957		<	0.002			0.003346		<	0.001		
	5/5/99					0.872			0.062		<	0.002			0.007			0.0004	J	
	9/1/99					0.178			0.007		<	0.002			0.000979	J	<	0.001		
	9/29/99					0.033			0.0009		<	0.002			0.000204	J	<	0.001		
	10/27/99					11.931			0.516	J	<	0.002			0.172	J	<	0.001		
	2/24/00					0.00607			0.000256	J	<	0.002		<	0.001		<	0.001		
	8/9/00				<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		
	10/5/00					0.048			0.011		<	0.005		<	0.001		<	0.001		
	1/10/01					0.001		<	0.001		<	0.005		<	0.001		<	0.001		
	5/30/01					0.005			0.021		<	0.005		<	0.001		<	0.001		
	10/22/01				<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		
	3/25/02				<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		
	8/12/02				<	0.001			0.006		<	0.005		<	0.001		<	0.001		
	1/3/03					0.003		<	0.001		<	0.005		<	0.001		<	0.001		
	5/19/03					0.001		<	0.001		<	0.005		<	0.001		<	0.001		
	10/6/03					0.001		<	0.001		<	0.005		<	0.001		<	0.001		
	11/3/03					0.001		<	0.001		<	0.005		<	0.001		<	0.001		
	2/23/04					0.002		<	0.001		<	0.005		<	0.001		<	0.001		
	7/13/04				<	0.001		<	0.001		<	0.005		<	0.001		<	0.001		
	11/29/04					0.001		<	0.001		<	0.005		<	0.001		<	0.001		
	5/16/05					0.001		J	0.4		<	0.005		<	0.001		<	0.001		
	6/13/05		0.106	B																
	1/5/06				J	0.0007		J	0.0002		<	0.005		<	0.001		<	0.001		
	9/18/06				<	0.00025			0.001		<	0.00053		<	0.0002		<	0.00032		
	7/20/07				<	0.00025			0.0016		<	0.001		<	0.0002		<	0.00032		
	11/29/07				J	0.00042		<	0.0002		<	0.001		<	0.0002		<	0.00032		
	3/20/08				J	0.00073		<	0.0002		<	0.001		<	0.0002		<	0.00032		
	10/22/08					0.034			0.0014		<	0.002		J	0.0005		<	0.00032		Blower and motor replaced 9/4/08
	11/26/08					0.0023		J	0.0002		<	0.002		<	0.0002		<	0.00032		
	3/4/09				J	0.0016		U	0.0005		U	0.0005		U	0.0006		U	0.0005		ALS Laboratory Group (2009)
	12/8/09				J	0.00069		U	0.0005		U	0.0005		U	0.0006		U	0.0005		
	3/10/10				U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		
	8/18/10				J	0.0038		J	0.0037		U	0.0005		U	0.0006		U	0.0005		
	8/30/10		0.18		U	0.0005		U	0.0005		U	0.0005		U	0.0006		U	0.0005		

NOTES:
1) mg/L - milligrams per liter
2) Q - Qualifier
< - Not detected (ND) at a value greater than the reporting limit (RL), for data prior to 2/24/06.
< - Not detected at a value greater than the method detection limit (MDL), noted in Result column, for data 2/24/06 to 12/31/08.
B - Indicates that a value for an inorganic analysis is an estimate. It is used when a compound is determined to be 12/31/08 but at a concentration less than the quantitation limit of the method, for data prior to 2/24/06.
J - Value for an organic analysis is an estimate, for data prior to 2/24/06.
J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value, for data 2/24/06 to 12/31/08.
Flag
B - Indicates that an analyte is 12/31/08 in the method blank as well as in the sample.
J - Value is an estimate; result falls within the MDL and the limit of quantitation (LQ) (Lancaster Laboratories).

TABLE 3.1-4
CAPA GROUNDWATER TREATMENT SYSTEM
RECOVERY WELL PUMPING DATA

YEAR	MONTH	CA050B (gal)[1]	CA051B (gal)	CA052B (gal)	CA0U23B (gal)	TOTAL INFLUENT (gal)
1998	June	94,940	120,650	44,346	59,007	318,943
	July	94,464	143,035	46,670	103,993	388,162
	August	82,659	123,384	0	86,436	292,479
	September	52,560	168,124	27,020	13,602	261,306
	October	148,429	106,740	0	45,082	300,251
	November	84,170	70,057	0	90,008	244,235
	December	134,556	143,925	0	140,915	419,396
	TOTAL	**691,778**	**875,915**	**118,036**	**539,043**	**2,224,772**
1999	January	56,244	58,568	38,400	57,835	211,047
	February	43,480	41,230	14,454	66,873	166,037
	March	32,402	52,900	17,521	57,332	160,155
	April	86,908	73,850	25,635	89,265	275,658
	May	52,110	43,020	30,810	53,470	179,410
	June	51,070	50,110	32,000	52,310	185,490
	July	94,520	137,330	70,210	98,850	400,910
	August	60,300	91,700	62,790	63,870	278,660
	September	54,440	84,460	55,250	61,830	255,980
	October	59,750	118,130	65,400	82,860	326,140
	November	61,620	84,320	63,950	67,910	277,800
	December	33,170	41,080	38,180	37,680	150,110
	TOTAL	**686,014**	**876,698**	**514,600**	**790,085**	**2,867,397**
	CUMULATIVE TOTAL, ALL WELLS					**5,092,169**
2000	January	63,290	84,390	71,800	77,950	297,430
	February	77,580	96,090	84,360	79,630	337,660
	March	79,810	101,600	81,090	70,760	333,260
	April	58,820	75,800	63,660	56,470	254,750
	May	90,340	67,330	76,340	74,720	308,730
	June	94,060	111,140	73,990	83,730	362,920
	July	88,230	65,640	46,950	67,490	268,310
	August	60,300	91,700	62,790	63,870	278,660
	September	37,980	84,460	55,250	61,830	239,520
	October	103,210	67,430	77,250	96,270	344,160
	November	102,960	71,210	91,510	93,480	359,160
	December	90,830	2,450	76,480	41,210	210,970
	TOTAL	**947,410**	**919,240**	**861,470**	**867,410**	**3,595,530**
	CUMULATIVE TOTAL, ALL WELLS					**8,687,699**
2001	January	106,250	57,650	83,430	88,310	335,640
	February	65,070	29,070	75,050	100,330	269,520
	March	69,460	62,430	65,310	86,790	283,990
	April	71,520	57,640	52,830	63,090	245,080
	May	120,620	79,750	81,700	52,480	334,550
	June	61,820	56,160	89,260	47,550	254,790
	July	52,500	61,180	74,640	66,440	254,760
	August	69,270	72,300	118,580	81,120	341,270
	September	44,410	49,250	77,680	77,570	248,910
	October	107,030	33,520	66,620	47,870	255,040
	November	59,710	16,210	53,650	48,180	177,750
	December	81,500	81,500	71,100	60,800	294,900
	TOTAL	**909,160**	**656,660**	**909,850**	**820,530**	**3,296,200**
	CUMULATIVE TOTAL, ALL WELLS					**11,983,899**
2002	January	98,390	36,800	95,520	61,250	291,960
	February	74,600	28,450	72,020	52,110	227,180
	March	42,770	58,080	55,110	54,960	210,920
	April	84,520	85,820	75,770	82,670	328,780
	May	50,210	49,080	68,130	70,820	238,240
	June	83,990	77,020	64,090	73,860	298,960
	July	103,700	91,110	123,550	89,760	408,120
	August	79,220	75,700	80,840	73,170	308,930
	September	68,450	67,680	65,470	57,150	258,750
	October	83,260	83,700	83,860	86,470	337,290
	November	47,870	49,790	71,700	70,480	239,840
	December	83,500	74,330	67,720	82,790	308,340
	TOTAL	**900,480**	**777,560**	**923,780**	**855,490**	**3,457,310**
	CUMULATIVE TOTAL, ALL WELLS					**15,441,209**
2003	January	84,500	58,060	51,490	73,880	267,930
	February	49,680	48,730	52,040	23,230	173,680
	March	110,080	110,650	62,330	75,600	358,660
	April	83,350	64,460	73,230	60	221,100
	May	56,140	67,810	66,560	36,000	226,510
	June	80,680	89,200	62,490	35,640	268,010
	July	91,660	93,820	96,350	39,310	321,140
	August	64,540	77,480	94,940	29,610	266,570
	September	94,950	104,220	127,540	49,560	376,270
	October	36,780	83,190	100,920	68,590	289,480
	November	231,100	38,770	88,930	58,910	417,710
	December	110,190	27,090	108,400	24,090	269,770
	TOTAL	**1,093,650**	**863,480**	**985,220**	**514,480**	**3,456,830**
	CUMULATIVE TOTAL, ALL WELLS					**18,898,039**
2004	January	129,290	55,140	128,330	4,280	317,040
	February	97,630	59,860	58,300	35,060	250,850
	March	118,330	82,990	104,600	80,830	386,750
	April	76,220	51,410	52,430	61,080	241,140
	May	46,090	57,900	43,250	44,740	191,980
	June	66,830	62,810	64,390	49,780	243,810
	July	65,080	47,690	60,780	44,380	217,930
	August	67,980	79,900	61,700	45,780	255,360
	September	16,150	98,950	71,040	51,720	237,860
	October	15,930	42,940	69,920	50,340	179,130
	November	103,390	93,870	93,770	54,780	345,810
	December	64,540	77,000	76,890	56,320	274,750
	TOTAL	**867,460**	**810,460**	**885,400**	**579,090**	**3,142,410**
	CUMULATIVE TOTAL, ALL WELLS					**22,040,449**

TABLE 3.1-4
CAPA GROUNDWATER TREATMENT SYSTEM
RECOVERY WELL PUMPING DATA

YEAR	MONTH	CA050B (gal)[1]	CA051B (gal)	CA052B (gal)	CA0U23B (gal)	TOTAL INFLUENT (gal)
2005	January	78,750	35,700	65,760	47,560	227,770
	February	103,650	88,410	92,250	65,270	349,580
	March	95,120	47,260	78,380	51,580	272,340
	April	96,680	51,890	81,280	51,610	281,460
	May	103,370	102,640	89,680	38,940	334,630
	June	95,330	11,800	29,580	16,830	153,540
	July	64,660	54,670	56,790	18,940	195,060
	August	74,190	68,130	64,470	22,380	229,170
	September	73,810	75,280	63,620	38,040	250,750
	October	84,450	20,350	73,040	52,010	229,850
	November	125,440	18,950	99,370	38,910	282,670
	December	94,040	62,280	53,740	16,780	226,840
	TOTAL	**1,089,490**	**637,360**	**847,960**	**458,850**	**3,033,660**
	CUMULATIVE TOTAL, ALL WELLS					**25,074,109**
2006	January	91,090	65,510	62,440	67,880	286,920
	February	99,040	69,830	180	24,420	193,470
	March	82,410	69,150	40,220	50,430	242,210
	April	107,470	96,190	105,340	43,880	352,880
	May	130,240	79,280	127,530	73,690	410,740
	June	95,670	96,640	102,141	57,010	351,461
	July	114,830	110,010	131,199	67,870	423,909
	August	86,450	83,190	108,970	57,850	336,460
	September	5,190	113,640	146,870	74,010	339,710
	October	0	95,820	99,390	16,770	211,980
	November	36,240	93,710	68,760	43,920	242,630
	December	93,760	66,030	48,040	27,460	235,290
	TOTAL	**942,390**	**1,039,000**	**1,041,080**	**605,190**	**3,627,660**
	CUMULATIVE TOTAL, ALL WELLS					**28,701,769**
2007	January	56,240	73,810	0	59,320	189,370
	February	47,980	68,410	33,980	28,040	178,410
	March	41,510	41,310	34,260	33,140	150,220
	April	56,420	67,350	57,220	51,730	232,720
	May	57,130	55,440	56,500	28,740	197,810
	June	76,370	79,230	68,240	45,520	269,360
	July	86,610	70,410	43,660	31,250	231,930
	August	22,350	100,910	6,030	41,540	170,830
	September	58,700	73,050	51,800	12,340	195,890
	October	81,650	115,960	88,890	18,300	304,800
	November	17,440	77,710	80,430	50	175,630
	December	39,410	83,380	101,580	30,440	254,810
	TOTAL	**641,810**	**906,970**	**622,590**	**380,410**	**2,551,780**
	CUMULATIVE TOTAL, ALL WELLS					**31,253,549**
2008	January	75,870	85,800	71,610	48,490	281,770
	February	49,440	52,010	49,930	21,670	173,050
	March	28,360	89,270	77,750	34,140	229,520
	April	115,960	111,690	123,590	54,420	405,660
	May	61,950	65,360	97,900	43,270	268,480
	June	117,100	59,990	77,420	24,440	278,950
	July	90,450	96,410	113,900	51,380	352,140
	August	89,370	94,570	86,520	57,080	327,540
	September	77,560	88,830	37,870	56,980	261,240
	October	111,200	119,510	130,040	49,750	410,500
	November	117,320	89,360	107,970	45,400	360,050
	December	118,970	99,220	109,240	44,320	371,750
	TOTAL	**1,053,550**	**1,052,020**	**1,083,740**	**531,340**	**3,720,650**
	CUMULATIVE TOTAL, ALL WELLS					**34,974,199**
2009	January	102,620	98,940	68,640	39,400	309,600
	February	89,130	133,220	88,930	42,180	353,460
	March	89,510	97,320	84,060	44,870	315,760
	April	120,620	66,890	106,260	63,360	357,130
	May	78,350	90,300	101,380	60,280	330,310
	June	80,660	77,260	88,190	45,520	291,630
	July	91,040	100,080	98,360	53,990	343,470
	August	75,240	72,520	88,650	39,080	275,490
	September	89,350	75,160	91,560	46,250	302,320
	October	96,500	95,480	102,630	49,900	344,510
	November	113,300	99,640	111,400	52,860	377,200
	December	105,430	124,530	76,840	46,590	353,390
	TOTAL	**1,131,750**	**1,131,340**	**1,106,900**	**584,280**	**3,954,270**
	CUMULATIVE TOTAL, ALL WELLS					**38,928,469**
2010	January	52,720	57,060	56,230	38,510	204,520
	February	83,730	89,630	91,960	59,560	324,880
	March	65,750	84,780	103,060	63,970	317,560
	April	90,970	89,470	94,390	34,190	309,020
	May	61,190	68,940	84,160	55,090	269,380
	June	60,580	60,580	81,780	55,590	258,530
	July	87,350	93,790	89,940	66,060	337,140
	August	75,280	80,100	98,830	77,610	331,820
	September	78,290	68,920	82,540	28,350	258,100
	October	70,800	62,941	86,310	45,620	265,671
	November	84,990	93,090	87,220	71,100	336,400
	December	80,300	74,120	78,910	62,000	295,330
	TOTAL	**891,950**	**923,421**	**1,035,330**	**657,650**	**3,508,351**
	CUMULATIVE TOTAL, ALL WELLS					**42,436,820**

NOTE:
1) gal - gallons

TABLE 3.1-5
CAPA GROUNDWATER TREATMENT SYSTEM
APPROXIMATE MASS OF MERCURY REMOVED
RECOVERY WELLS

YEAR	MONTH	CA050B CUMULATIVE FLOW	CA050B MERCURY		CA051B CUMULATIVE FLOW	CA051B MERCURY		CA052B CUMULATIVE FLOW	CA052B MERCURY		CA0U23B CUMULATIVE FLOW	CA0U23B MERCURY		MERCURY REMOVED, ALL WELLS
		(gal)[1]	(mg/L)[2,3]	(lbs)[4]	(gal)	(mg/L)	(lbs)	(gal)	(mg/L)	(lbs)	(gal)	(mg/L)	(lbs)	(lbs)
1998	June	94,940	4.2	3.33	120,650	0.88	0.89	44,346	0.30	0.11	59,007	2.5	1.23	5.56
	July	94,464	4	3.15	143,035	0.76	0.91	46,670	0.32	0.12	103,993	2.4	2.08	6.27
	August	82,659	3.3	2.28	123,384	0.61	0.63	0	0.24	0.00	86,436	2.4	1.73	4.64
	September	52,560	3.4	1.49	168,124	0.54	0.76	27,020	0.27	0.06	13,602	2.8	0.32	2.63
	October	148,429	3.4	4.21	106,740	0.54	0.48	0	0.27	0.00	45,082	2.8	1.05	5.75
	November	84,170	3.4	2.39	70,057	0.54	0.32	0	0.27	0.00	90,008	2.8	2.10	4.81
	December	134,556	3.4	3.82	143,925	0.54	0.65	0	0.27	0.00	140,915	2.8	3.29	7.76
	TOTAL	**691,778**		**20.67**	**875,915**		**4.62**	**118,036**		**0.30**	**539,043**		**11.81**	**37.40**
1999	January	56,244	2.2	1.03	58,568	0.36	0.18	38,400	0.27	0.09	57,835	1.4	0.68	1.97
	February	43,480	2.2	0.80	41,230	0.36	0.12	14,454	0.27	0.03	66,873	1.4	0.78	1.74
	March	32,402	2.2	0.59	52,900	0.36	0.16	17,521	0.27	0.04	57,332	1.4	0.67	1.46
	April	86,908	2.2	1.60	73,850	0.36	0.22	25,635	0.27	0.06	89,265	1.4	1.04	2.92
	May	52,110	1.8	0.78	43,020	0.37	0.13	30,810	0.25	0.06	53,470	1.2	0.54	1.52
	June	51,070	1.8	0.77	50,110	0.37	0.15	32,000	0.25	0.07	52,310	1.2	0.52	1.51
	July	94,520	1.7	1.34	137,330	0.33	0.38	70,210	0.09	0.05	98,850	1.2	0.99	2.76
	August	60,300	1.7	0.86	91,700	0.33	0.25	62,790	0.09	0.05	63,870	1.2	0.64	1.79
	September	54,440	1.7	0.77	84,460	0.33	0.23	55,250	0.09	0.04	61,830	1.2	0.62	1.67
	October	59,750	1.7	0.85	118,130	0.33	0.33	65,400	0.09	0.05	82,860	1.2	0.83	2.05
	November	61,620	1.52	0.78	84,320	0.342	0.24	63,950	0.87	0.46	67,910	0.0887	0.05	1.54
	December	33,170	1.52	0.42	41,080	0.342	0.12	38,180	0.87	0.28	37,680	0.0887	0.03	0.84
	TOTAL	**686,014**		**10.59**	**876,698**		**2.51**	**514,600**		**1.28**	**790,085**		**7.39**	**21.77**
	CUMULATIVE TOTAL	***1,377,792***		***31.26***	***1,752,613***		***7.14***	***632,636***		***1.58***	***1,329,128***		***19.20***	***59.17***
2000	January	63,290	1.52	0.80	84,390	0.342	0.24	71,800	0.87	0.52	77,950	0.0887	0.06	1.62
	February	77,580	1.46	0.95	96,090	0.312	0.25	84,360	0.0472	0.03	79,630	0.705	0.47	1.70
	March	79,810	1.46	0.97	101,600	0.312	0.26	81,090	0.0472	0.03	70,760	0.705	0.42	1.69
	April	58,820	1.46	0.72	75,800	0.312	0.20	63,660	0.0472	0.03	56,470	0.705	0.33	1.27
	May	90,340	1.46	1.10	67,330	0.312	0.18	76,340	0.0472	0.03	74,720	0.705	0.44	1.75
	June	94,060	1.46	1.15	111,140	0.312	0.29	73,990	0.0472	0.03	83,730	0.705	0.49	1.96
	July	88,230	1.46	1.08	65,640	0.312	0.17	46,950	0.0472	0.02	67,490	0.705	0.40	1.66
	August	60,300	1.46	0.73	91,700	0.312	0.24	62,790	0.0472	0.02	63,870	0.705	0.38	1.37
	September	37,980	1.46	0.46	84,460	0.312	0.22	55,250	0.0472	0.02	61,830	0.705	0.36	1.07
	October	103,210	0.44	0.38	67,430	0.201	0.11	77,250	0.044	0.03	96,270	0.78	0.63	1.15
	November	102,960	0.44	0.38	71,210	0.201	0.12	91,510	0.044	0.03	93,480	0.78	0.61	1.14
	December	90,830	0.44	0.33	2,450	0.201	0.00	76,480	0.044	0.03	41,210	0.78	0.27	0.63
	TOTAL	**947,410**		**9.05**	**919,240**		**2.28**	**861,470**		**0.83**	**867,410**		**4.85**	**17.00**
	CUMULATIVE TOTAL	***2,325,202***		***40.30***	***2,671,853***		***9.42***	***1,494,106***		***2.40***	***2,196,538***		***24.05***	***76.17***
2001	January	106,250	1.08	0.96	57,650	0.37	0.18	83,430	0.06	0.04	88,310	0.044	0.03	1.21
	February	65,070	1.08	0.59	29,070	0.37	0.09	75,050	0.06	0.04	100,330	0.044	0.04	0.75
	March	69,460	1.08	0.63	62,430	0.37	0.19	65,310	0.06	0.03	86,790	0.044	0.03	0.88
	April	71,520	1.08	0.64	57,640	0.37	0.18	52,830	0.06	0.03	63,090	0.044	0.02	0.87
	May	120,620	1.08	1.09	79,750	0.37	0.25	81,700	0.06	0.04	52,480	0.044	0.02	1.39
	June	61,820	0.94	0.48	56,160	0.16	0.07	89,260	0.031	0.02	47,550	0.5	0.20	0.78
	July	52,500	0.94	0.41	61,180	0.16	0.08	74,640	0.031	0.02	66,440	0.5	0.28	0.79
	August	69,270	0.94	0.54	72,300	0.16	0.10	118,580	0.031	0.03	81,120	0.5	0.34	1.01
	September	44,410	0.94	0.35	49,250	0.16	0.07	77,680	0.031	0.02	77,570	0.5	0.32	0.76
	October	107,030	0.94	0.84	33,520	0.16	0.04	66,620	0.031	0.02	47,870	0.5	0.20	1.10
	November	59,710	0.78	0.39	16,210	0.56	0.08	53,650	0.036	0.02	48,180	0.41	0.16	0.65
	December	81,500	0.78	0.53	81,500	0.56	0.38	71,100	0.036	0.02	60,800	0.41	0.21	1.14
	TOTAL	**909,160**		**7.45**	**656,660**		**1.71**	**909,850**		**0.33**	**920,530**		**1.85**	**11.34**
	CUMULATIVE TOTAL	***3,234,362***		***47.75***	***3,328,513***		***11.13***	***2,403,956***		***2.73***	***3,017,068***		***25.90***	***87.51***
2002	January	98,390	0.78	0.64	36,800	0.56	0.17	95,520	0.036	0.03	61,250	0.41	0.21	1.05
	February	74,600	0.78	0.49	28,450	0.56	0.13	72,020	0.036	0.02	52,110	0.41	0.18	0.82
	March	42,770	0.78	0.28	58,080	0.56	0.27	55,110	0.036	0.02	54,960	0.41	0.19	0.75
	April	84,520	0.45	0.32	85,820	0.045	0.03	75,770	0.024	0.02	82,670	0.22	0.15	0.52
	May	50,210	0.45	0.19	49,080	0.045	0.02	68,130	0.024	0.01	70,820	0.22	0.13	0.35
	June	83,990	0.45	0.32	77,020	0.045	0.03	64,090	0.024	0.01	73,860	0.22	0.14	0.49
	July	103,700	0.45	0.39	91,110	0.045	0.03	123,550	0.024	0.02	89,760	0.22	0.16	0.61
	August	79,220	0.69	0.46	75,700	0.072	0.05	80,840	0.025	0.02	73,170	0.45	0.27	0.79
	September	68,450	0.69	0.39	67,680	0.072	0.04	65,470	0.025	0.01	57,150	0.45	0.21	0.66
	October	83,260	0.69	0.48	83,700	0.072	0.05	83,860	0.025	0.02	86,470	0.45	0.32	0.87
	November	47,870	0.69	0.28	49,790	0.072	0.03	71,700	0.025	0.01	70,480	0.45	0.26	0.59
	December	83,500	0.69	0.48	74,330	0.072	0.04	67,720	0.025	0.01	82,790	0.45	0.31	0.85
	TOTAL	**900,480**		**4.70**	**777,560**		**0.90**	**923,780**		**0.21**	**855,490**		**2.55**	**8.36**
	CUMULATIVE TOTAL	***4,134,842***		***52.45***	***4,106,073***		***12.03***	***3,327,736***		***2.94***	***3,872,558***		***28.45***	***95.87***

TABLE 3.1-5
CAPA GROUNDWATER TREATMENT SYSTEM
APPROXIMATE MASS OF MERCURY REMOVED
RECOVERY WELLS

YEAR	MONTH	CA050B CUMULATIVE FLOW	CA050B MERCURY		CA051B CUMULATIVE FLOW	CA051B MERCURY		CA052B CUMULATIVE FLOW	CA052B MERCURY		CA0U23B CUMULATIVE FLOW	CA0U23B MERCURY		MERCURY REMOVED, ALL WELLS
		(gal)[1]	(mg/L)[2,3]	(lbs)[4]	(gal)	(mg/L)	(lbs)	(gal)	(mg/L)	(lbs)	(gal)	(mg/L)	(lbs)	(lbs)
2003	January	84,500	0.7	0.49	58,060	0.067	0.03	51,490	0.025	0.01	73,880	0.49	0.30	0.84
	February	49,680	0.7	0.29	48,730	0.067	0.03	52,040	0.025	0.01	23,230	0.49	0.09	0.42
	March	110,080	0.7	0.64	110,650	0.067	0.06	62,330	0.025	0.01	75,600	0.49	0.31	1.03
	April	83,350	0.7	0.49	64,460	0.067	0.04	73,230	0.025	0.02	60	0.49	0.00	0.54
	May	56,140	0.7	0.33	67,810	0.067	0.04	66,560	0.025	0.01	36,000	0.49	0.15	0.53
	June	80,680	0.87	0.59	89,200	0.101	0.08	62,490	0.025	0.01	35,640	0.23	0.07	0.74
	July	91,660	0.87	0.67	93,820	0.101	0.08	96,350	0.025	0.02	39,310	0.23	0.08	0.84
	August	64,540	0.87	0.47	77,480	0.101	0.07	94,940	0.025	0.02	29,610	0.23	0.06	0.61
	September	94,950	0.87	0.69	104,220	0.101	0.09	127,540	0.025	0.03	49,560	0.23	0.10	0.90
	October	36,780	0.79	0.24	83,190	0.096	0.07	100,920	0.023	0.02	68,590	0.26	0.15	0.48
	November	231,100	0.79	1.52	38,770	0.096	0.03	88,930	0.023	0.02	58,910	0.26	0.13	1.70
	December	110,190	0.79	0.73	27,090	0.096	0.02	108,400	0.023	0.02	24,090	0.26	0.05	0.82
	TOTAL	**1,093,650**		**7.14**	**863,480**		**0.62**	**985,220**		**0.20**	**514,480**		**1.48**	**9.45**
	CUMULATIVE TOTAL	***5,228,492***		***59.60***	***4,969,553***		***12.65***	***4,312,956***		***3.14***	***4,387,038***		***29.93***	***105.32***
2004	January	129,290	0.79	0.85	55,140	0.096	0.04	128,330	0.023	0.02	4,280	0.26	0.01	0.93
	February	97,630	0.79	0.64	59,860	0.096	0.05	58,300	0.023	0.01	35,060	0.26	0.08	0.78
	March	118,330	0.41	0.40	82,990	0.049	0.03	104,600	0.025	0.02	80,830	0.27	0.18	0.64
	April	76,220	0.41	0.26	51,410	0.049	0.02	52,430	0.025	0.01	61,080	0.27	0.14	0.43
	May	46,090	0.41	0.16	57,900	0.049	0.02	43,250	0.025	0.01	44,740	0.27	0.10	0.29
	June	66,830	0.41	0.23	62,810	0.049	0.03	64,390	0.025	0.01	49,780	0.27	0.11	0.38
	July	65,080	0.71	0.39	47,690	0.04	0.02	60,780	0.018	0.01	44,380	0.3	0.11	0.52
	August	67,980	0.71	0.40	79,900	0.04	0.03	61,700	0.018	0.01	45,780	0.3	0.11	0.55
	September	16,150	0.71	0.10	98,950	0.04	0.03	71,040	0.018	0.01	51,720	0.3	0.13	0.27
	October	15,930	0.71	0.09	42,940	0.04	0.01	69,920	0.018	0.01	50,340	0.3	0.13	0.25
	November	103,390	0.71	0.61	93,870	0.04	0.03	93,770	0.018	0.01	54,780	0.3	0.14	0.80
	December	64,540	0.96	0.52	77,000	0.15	0.10	76,890	0.02	0.01	56,320	0.31	0.15	0.77
	TOTAL	**867,460**		**4.66**	**810,460**		**0.41**	**885,400**		**0.16**	**579,090**		**1.38**	**6.61**
	CUMULATIVE TOTAL	***6,095,952***		***64.25***	***5,780,013***		***13.07***	***5,198,356***		***3.30***	***4,966,128***		***31.31***	***111.93***
2005	January	78,750	0.96	0.63	35,700	0.15	0.04	65,760	0.02	0.01	47,560	0.31	0.12	0.81
	February	103,650	0.96	0.83	88,410	0.15	0.11	92,250	0.02	0.02	65,270	0.31	0.17	1.13
	March	95,120	0.96	0.76	47,260	0.15	0.06	78,380	0.02	0.01	51,580	0.31	0.13	0.97
	April	96,680	0.96	0.77	51,890	0.15	0.06	81,280	0.02	0.01	51,610	0.31	0.13	0.99
	May	103,370	0.813	0.70	102,640	0.116	0.10	89,680	0.0197	0.01	38,940	0.259	0.08	0.90
	June	95,330	0.813	0.65	11,800	0.116	0.01	29,580	0.0197	0.00	16,830	0.259	0.04	0.70
	July	64,660	0.813	0.44	54,670	0.116	0.05	56,790	0.0197	0.01	18,940	0.259	0.04	0.54
	August	74,190	0.813	0.50	68,130	0.116	0.07	64,470	0.0197	0.01	22,380	0.259	0.05	0.63
	September	73,810	0.813	0.50	75,280	0.116	0.07	63,620	0.0197	0.01	38,040	0.259	0.08	0.67
	October	84,450	0.813	0.57	20,350	0.116	0.02	73,040	0.0197	0.01	52,010	0.259	0.11	0.72
	November	125,440	0.813	0.85	18,950	0.116	0.02	99,370	0.0197	0.02	38,910	0.259	0.08	0.97
	December	94,040	0.813	0.64	62,280	0.116	0.06	53,740	0.0197	0.01	16,780	0.259	0.04	0.74
	TOTAL	**1,089,490**		**7.85**	**637,360**		**0.68**	**847,960**		**0.14**	**458,850**		**1.08**	**9.76**
	CUMULATIVE TOTAL	***7,185,442***		***72.11***	***6,417,373***		***13.75***	***6,046,316***		***3.44***	***5,424,978***		***32.39***	***121.68***
2006	January	91,090	0.813	0.62	65,510	0.116	0.06	62,440	0.0197	0.01	67,880	0.259	0.15	0.84
	February	99,040	0.813	0.67	69,830	0.116	0.07	180	0.0197	0.00	24,420	0.259	0.05	0.79
	March	82,410	0.813	0.56	69,150	0.116	0.07	40,220	0.0197	0.01	50,430	0.259	0.11	0.74
	April	107,470	0.813	0.73	96,190	0.116	0.09	105,340	0.0197	0.02	43,880	0.259	0.09	0.93
	May	130,240	0.59	0.64	79,280	0.081	0.05	127,530	0.016	0.02	73,690	0.14	0.09	0.80
	June	95,670	0.59	0.47	96,640	0.081	0.07	102,141	0.016	0.01	57,010	0.14	0.07	0.62
	July	114,830	0.59	0.57	110,010	0.081	0.07	131,199	0.016	0.02	67,870	0.14	0.08	0.74
	August	86,450	0.59	0.43	83,190	0.081	0.06	108,970	0.016	0.01	57,850	0.14	0.07	0.56
	September	5,190	0.59	0.03	113,640	0.081	0.08	146,870	0.016	0.02	74,010	0.14	0.09	0.21
	October	0	0.59	0.00	95,820	0.081	0.06	99,390	0.016	0.01	16,770	0.14	0.02	0.10
	November	36,240	0.59	0.18	93,710	0.081	0.06	68,760	0.016	0.01	43,920	0.14	0.05	0.30
	December	93,760	0.59	0.46	66,030	0.081	0.04	48,040	0.016	0.01	27,460	0.14	0.03	0.54
	TOTAL	**942,390**		**5.35**	**1,039,000**		**0.79**	**1,041,080**		**0.15**	**605,190**		**0.89**	**7.18**
	CUMULATIVE TOTAL	***8,127,832***		***77.45***	***7,456,373***		***14.54***	***7,087,396***		***3.58***	***6,030,168***		***33.28***	***128.86***

TABLE 3.1-5
CAPA GROUNDWATER TREATMENT SYSTEM
APPROXIMATE MASS OF MERCURY REMOVED
RECOVERY WELLS

YEAR	MONTH	CA050B CUMULATIVE FLOW	CA050B MERCURY		CA051B CUMULATIVE FLOW	CA051B MERCURY		CA052B CUMULATIVE FLOW	CA052B MERCURY		CA0U23B CUMULATIVE FLOW	CA0U23B MERCURY		MERCURY REMOVED, ALL WELLS
		(gal)[1]	(mg/L)[2,3]	(lbs)[4]	(gal)	(mg/L)	(lbs)	(gal)	(mg/L)	(lbs)	(gal)	(mg/L)	(lbs)	(lbs)
2007	January	56,240	0.59	0.28	73,810	0.081	0.05	0	0.016	0.00	59,320	0.14	0.07	0.40
	February	47,980	0.59	0.24	68,410	0.081	0.05	33,980	0.016	0.00	28,040	0.14	0.03	0.32
	March	41,510	0.59	0.20	41,310	0.081	0.03	34,260	0.016	0.00	33,140	0.14	0.04	0.28
	April	56,420	0.59	0.28	67,350	0.081	0.05	57,220	0.016	0.01	51,730	0.14	0.06	0.39
	May	57,130	0.59	0.28	55,440	0.081	0.04	56,500	0.016	0.01	28,740	0.14	0.03	0.36
	June	76,370	0.59	0.38	79,230	0.081	0.05	68,240	0.016	0.01	45,520	0.14	0.05	0.49
	July	86,610	0.59	0.43	70,410	0.081	0.05	43,660	0.016	0.01	31,250	0.14	0.04	0.52
	August	22,350	0.59	0.11	100,910	0.081	0.07	6,030	0.016	0.00	41,540	0.14	0.05	0.23
	September	58,700	0.59	0.29	73,050	0.081	0.05	51,800	0.016	0.01	12,340	0.14	0.01	0.36
	October	81,650	1.6	1.09	115,960	0.13	0.13	88,890	0.025	0.02	18,300	0.25	0.04	1.27
	November	17,440	1.6	0.23	77,710	0.13	0.08	80,430	0.025	0.02	50	0.25	0.00	0.33
	December	39,410	1.6	0.53	83,380	0.13	0.09	101,580	0.025	0.02	30,440	0.25	0.06	0.70
	TOTAL	**641,810**		**4.33**	**906,970**		**0.73**	**622,590**		**0.10**	**380,410**		**0.49**	**5.65**
	CUMULATIVE TOTAL	***8,769,642***		***81.78***	***8,363,343***		***15.26***	***7,709,986***		***3.69***	***6,410,578***		***33.77***	***134.50***
2008	January	75,870	1.6	1.01	85,800	0.13	0.09	71,610	0.025	0.01	48,490	0.25	0.10	1.22
	February	49,440	1.6	0.66	52,010	0.13	0.06	49,930	0.025	0.01	21,670	0.25	0.05	0.77
	March	28,360	1.6	0.38	89,270	0.13	0.10	77,750	0.025	0.02	34,140	0.25	0.07	0.56
	April	115,960	1.6	1.55	111,690	0.13	0.12	123,590	0.025	0.03	54,420	0.25	0.11	1.81
	May	61,950	1.6	0.83	65,360	0.13	0.07	97,900	0.025	0.02	43,270	0.25	0.09	1.01
	June	117,100	1.6	1.56	59,990	0.13	0.07	77,420	0.025	0.02	24,440	0.25	0.05	1.70
	July	90,450	1.6	1.21	96,410	0.13	0.10	113,900	0.025	0.02	51,380	0.25	0.11	1.44
	August	89,370	1.6	1.19	94,570	0.13	0.10	86,520	0.025	0.02	57,080	0.25	0.12	1.43
	September	77,560	1.6	1.04	88,830	0.13	0.10	37,870	0.025	0.01	56,980	0.25	0.12	1.26
	October	111,200	0.54	0.50	119,510	0.065	0.06	130,040	0.014	0.02	49,750	0.14	0.06	0.64
	November	117,320	0.54	0.53	89,360	0.065	0.05	107,970	0.014	0.01	45,400	0.14	0.05	0.64
	December	118,970	0.54	0.54	99,220	0.065	0.05	109,240	0.014	0.01	44,320	0.14	0.05	0.65
	TOTAL	**1,053,550**		**10.99**	**1,052,020**		**0.97**	**1,083,740**		**0.19**	**531,340**		**0.98**	**13.14**
	CUMULATIVE TOTAL	***9,823,192***		***92.77***	***9,415,363***		***16.24***	***8,793,726***		***3.88***	***6,941,918***		***34.75***	***147.65***
2009	January	102,620	0.54	0.46	98,940	0.065	0.05	68,640	0.014	0.01	39,400	0.14	0.05	0.57
	February	89,130	0.54	0.40	133,220	0.065	0.07	88,930	0.014	0.01	42,180	0.14	0.05	0.53
	March	89,510	0.54	0.40	97,320	0.065	0.05	84,060	0.014	0.01	44,870	0.14	0.05	0.52
	April	120,620	0.54	0.54	66,890	0.065	0.04	106,260	0.014	0.01	63,360	0.14	0.07	0.67
	May	78,350	0.54	0.35	90,300	0.065	0.05	101,380	0.014	0.01	60,280	0.14	0.07	0.48
	June	80,660	0.54	0.36	77,260	0.065	0.04	88,190	0.014	0.01	45,520	0.14	0.05	0.47
	July	91,040	0.503	0.38	100,080	0.0958	0.08	98,360	0.0134	0.01	53,990	0.141	0.06	0.54
	August	75,240	0.503	0.32	72,520	0.0958	0.06	88,650	0.0134	0.01	39,080	0.141	0.05	0.43
	September	89,350	0.503	0.38	75,160	0.0958	0.06	91,560	0.0134	0.01	46,250	0.141	0.05	0.50
	October	96,500	0.503	0.41	95,480	0.0958	0.08	102,630	0.0134	0.01	49,900	0.141	0.06	0.55
	November	113,300	0.503	0.48	99,640	0.0958	0.08	111,400	0.0134	0.01	52,860	0.141	0.06	0.63
	December	105,430	0.503	0.44	124,530	0.0958	0.10	76,840	0.0134	0.01	46,590	0.141	0.05	0.61
	TOTAL	**1,131,750**		**4.92**	**1,131,340**		**0.76**	**1,106,900**		**0.13**	**584,280**		**0.69**	**6.50**
	CUMULATIVE TOTAL	***10,954,942***		***97.70***	***10,546,703***		***17.00***	***9,900,626***		***4.01***	***7,526,198***		***35.44***	***154.14***
2010	January	52,720	0.503	0.22	57,060	0.0958	0.05	56,230	0.0134	0.01	38,510	0.141	0.05	0.32
	February	83,730	0.503	0.35	89,630	0.0958	0.07	91,960	0.0134	0.01	59,560	0.141	0.07	0.50
	March	65,750	0.503	0.28	84,780	0.0958	0.07	103,060	0.0134	0.01	63,970	0.141	0.08	0.43
	April	90,970	0.503	0.38	89,470	0.0958	0.07	94,390	0.0134	0.01	34,190	0.141	0.04	0.50
	May	61,190	0.503	0.26	68,940	0.0958	0.06	84,160	0.0134	0.01	55,090	0.141	0.06	0.39
	June	60,580	0.503	0.25	60,580	0.0958	0.05	81,780	0.0134	0.01	55,590	0.141	0.07	0.38
	July	87,350	0.393	0.29	93,790	0.0134	0.01	89,940	0.007	0.01	66,060	0.123	0.07	0.37
	August	75,280	0.393	0.25	80,100	0.0134	0.01	98,830	0.007	0.01	77,610	0.123	0.08	0.34
	September	78,290	0.393	0.26	68,920	0.0134	0.01	82,540	0.007	0.00	28,350	0.123	0.03	0.30
	October	70,800	0.393	0.23	62,941	0.0134	0.01	86,310	0.007	0.01	45,620	0.123	0.05	0.29
	November	84,990	0.393	0.28	93,090	0.0134	0.01	87,220	0.007	0.01	71,100	0.123	0.07	0.37
	December	80,300	0.393	0.26	74,120	0.0134	0.01	78,910	0.007	0.00	62,000	0.123	0.06	0.34
	TOTAL	**891,950**		**3.31**	**923,421**		**0.41**	**1,035,330**		**0.09**	**657,650**		**0.72**	**4.53**
	CUMULATIVE TOTAL	***11,846,892***		***101.00***	***11,470,124***		***17.41***	***10,935,956***		***4.10***	***8,183,848***		***36.16***	***158.67***

Notes:
1) gal - gallons
2) mg/L - milligrams per liter
3) Mercury samples collected during the first half of the month were reported as that months' concentration. Mercury samples collected during the second half of the month were reported as the following month's concentration. If a sample was not collected during a specific month, the previous month's result was reported.
4) lbs - pounds

TABLE 3.3-1
SUMMARY OF MARSH SEDIMENT MERCURY CONCENTRATIONS

MARSH ID	2004	2005	2006	2007	2008	2009	2010
Marsh 1/2	0.263	0.495					
Marsh 1			0.111	0.153	0.097	0.112	1.0616
Marsh 2			0.066	0.064	0.084	0.073	0.0809
Marsh 3	0.279	0.298	0.129	0.211	0.111	0.155	0.1478
Marsh 5	0.644	0.369	0.367	0.275	0.375	0.399	0.4047
Marsh 6	N.A.	N.A.	0.377	0.386	0.748	0.678	1.0124
Marsh 7	0.625	0.347	0.297	0.279	0.422	0.391	0.2194
Marsh 11	0.019	0.0205	N.A.	N.A.	N.A.	N.A.	N.A.
Marsh 14	0.626	0.587	1.05	0.909	1.261	1.109	1.1095
Marsh 15	0.943	0.273	0.369	0.327	0.413	0.374	0.4396
Marsh 19	0.447	0.478	0.126	0.214	0.348	1.102	0.2103

Notes:

1. Concentrations are milligrams per Kilogram dry weight.
2. Marsh locations shown in Figure 2, Appendix A.
3. Basic data provided in Appendix A.
4. Remediation goal is 0.25 mg/Kg measured in two consecutive years
   (highlighted if goal is met)
5. N.A. - Not analyzed
6. Marshes 1 and 2 were sampled as a single marsh in 2004 and 2005, but beginning in 2006 are sampled separately.

TABLE 3.4-1

SUMMARY OF RED DRUM AND JUVENILE BLUE CRAB TISSUE DATA 1997-2010

	Closed Area		Adjacent Open Area	
Red Drum Sampling Event	**Number of Samples**	**Mean Hg (mg/Kg ww)**	**Number of Samples**	**Mean Hg (mg/Kg ww)**
4Q97	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	0.87	36	0.48
2006 Annual	30	1.17	30	0.43
2007 Annual	30	1.29	30	0.65
2008 Annual	30	0.90	30	0.40
2009 Annual	30	0.85	30	0.38
2010 Annual	30	0.88	30	0.38
Juvenile Blue Crab Sampling Event	**Number of Samples**	**Mean Hg (mg/Kg ww)**	**Number of Samples**	**Mean Hg (mg/Kg ww)**
4Q97	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

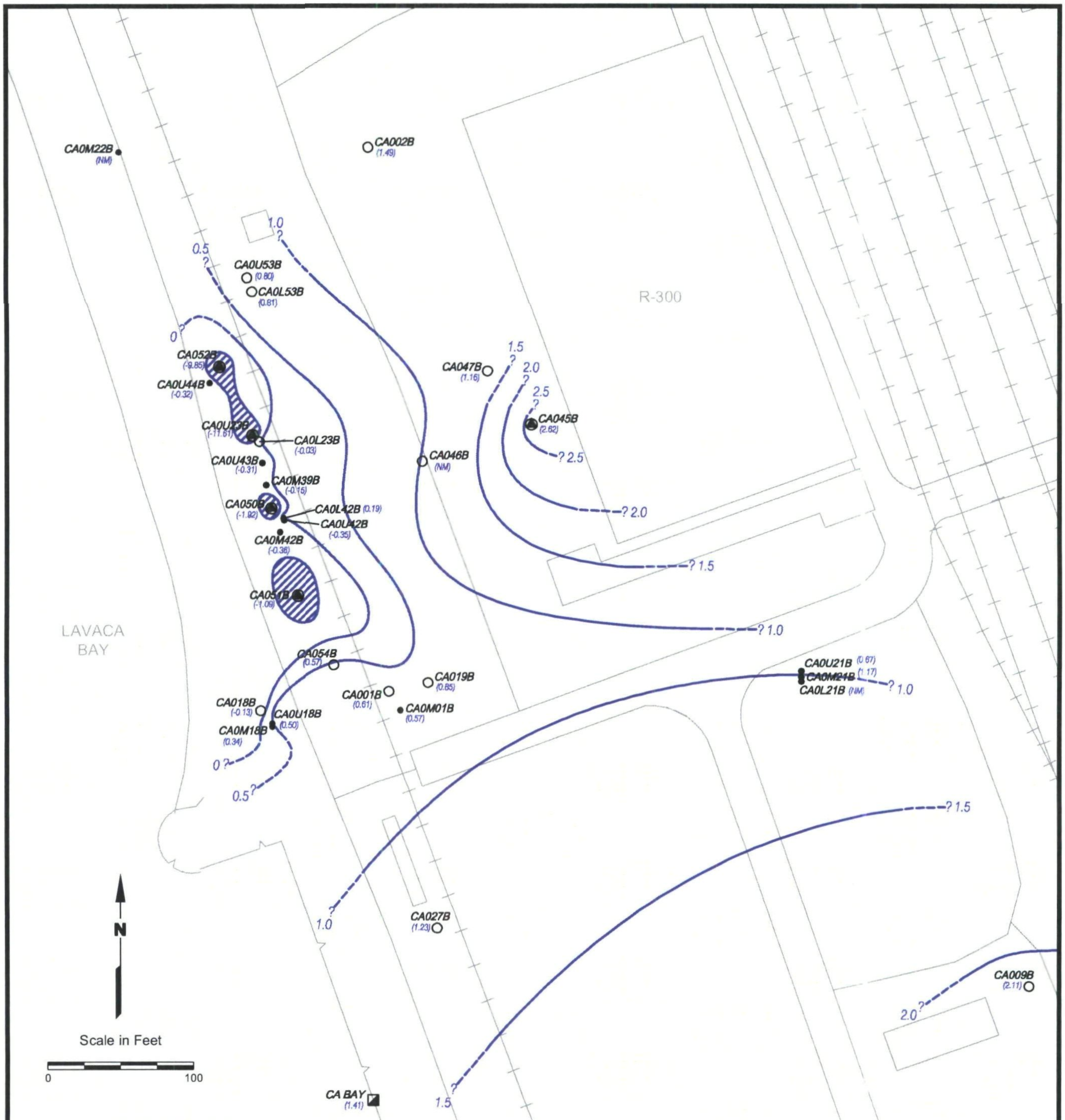
TABLE 3.4-2
SUMMARY OF 2010 RED DRUM TISSUE MERCURY RESULTS

Area	Sample Size	Mean Hg (mg/kg ww)[1]	Standard Deviation
Closed	30	0.877	0.370
Open	30	0.381	0.092

Note:

1) mg/kg ww – milligrams per kilogram wet weight

FIGURES



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)

Notes:

1. Groundwater elevations measured in pumping wells are probably influenced by well inefficiencies.
2. Groundwater elevations are corrected for salinity effects.
3. NM = Not measured.
4. Only wells measured for water levels are shown on this figure.
5. Surface water elevation used for contouring is from tidal gauge located south of CAPA (CA Bay).

ALCOA

FIGURE 3.1-1

POTENTIOMETRIC SURFACE OF ZONE B GROUNDWATER (4/28/2010)

PROJECT: 3220	DATE: MARCH, 2011	
REV:	BY: KBD	CHECKED: MKW

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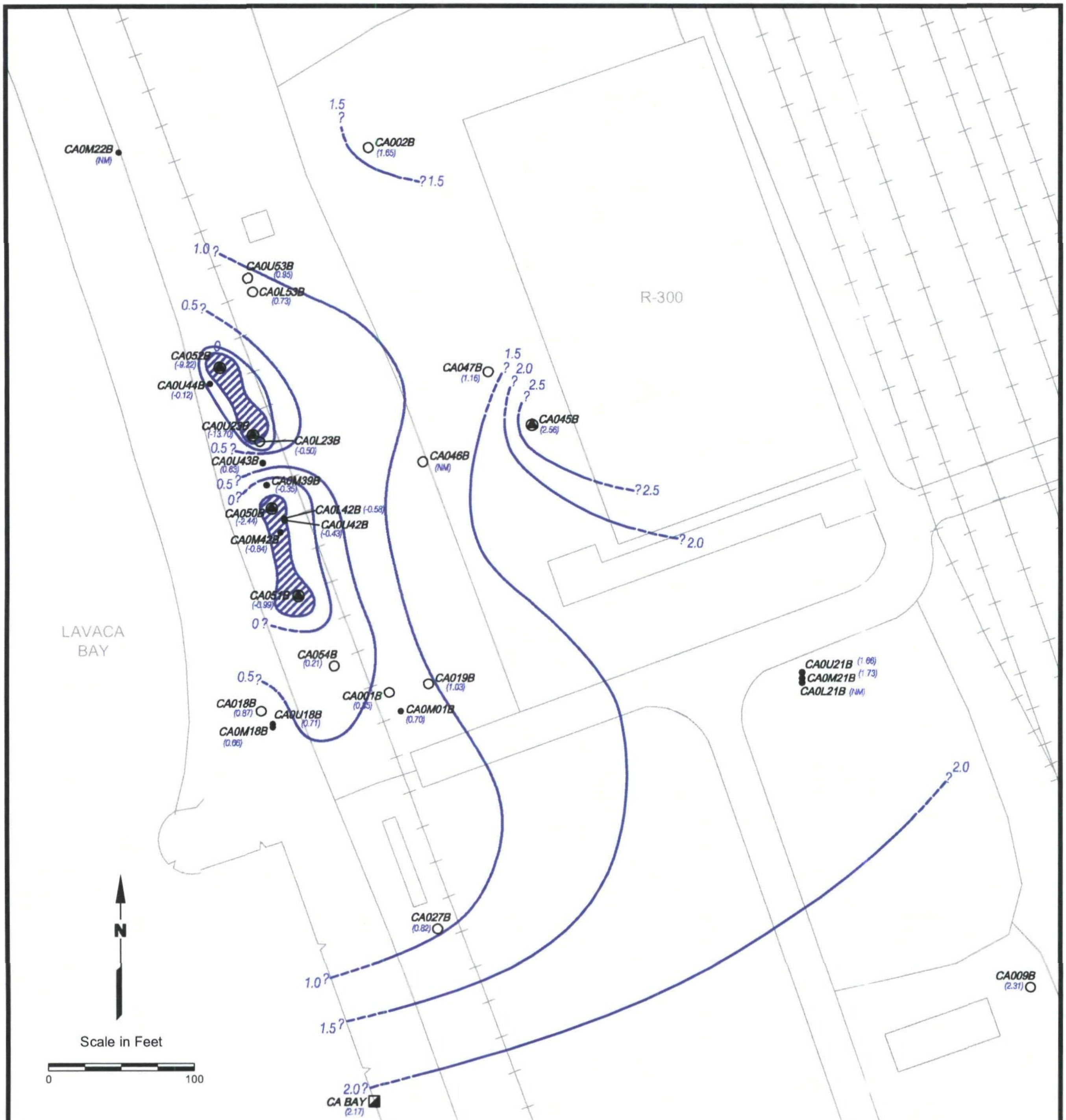
Point Comfort Operations



EXPLANATION

CA018B	Well Designation
○	Monitoring Well
•	Piezometer
◉	Recovery Well
◪	Tidal Gauge
— *1.5* —	Estimated Potentiometric Surface Contour (Ft) C.I. = 0.5 Ft
(hatched area)	Area of Drawdown of Potentiometric Surface Caused by Pumping (not contoured)

Notes:
1. Groundwater elevations measured in pumping wells are probably influenced by well inefficiencies.
2. Groundwater elevations are corrected for salinity effects.
3. NM = Not measured.
4. Only wells measured for water levels are shown on this figure.
5. Surface water elevation used for contouring is from tidal gauge located south of CAPA (CA Bay).

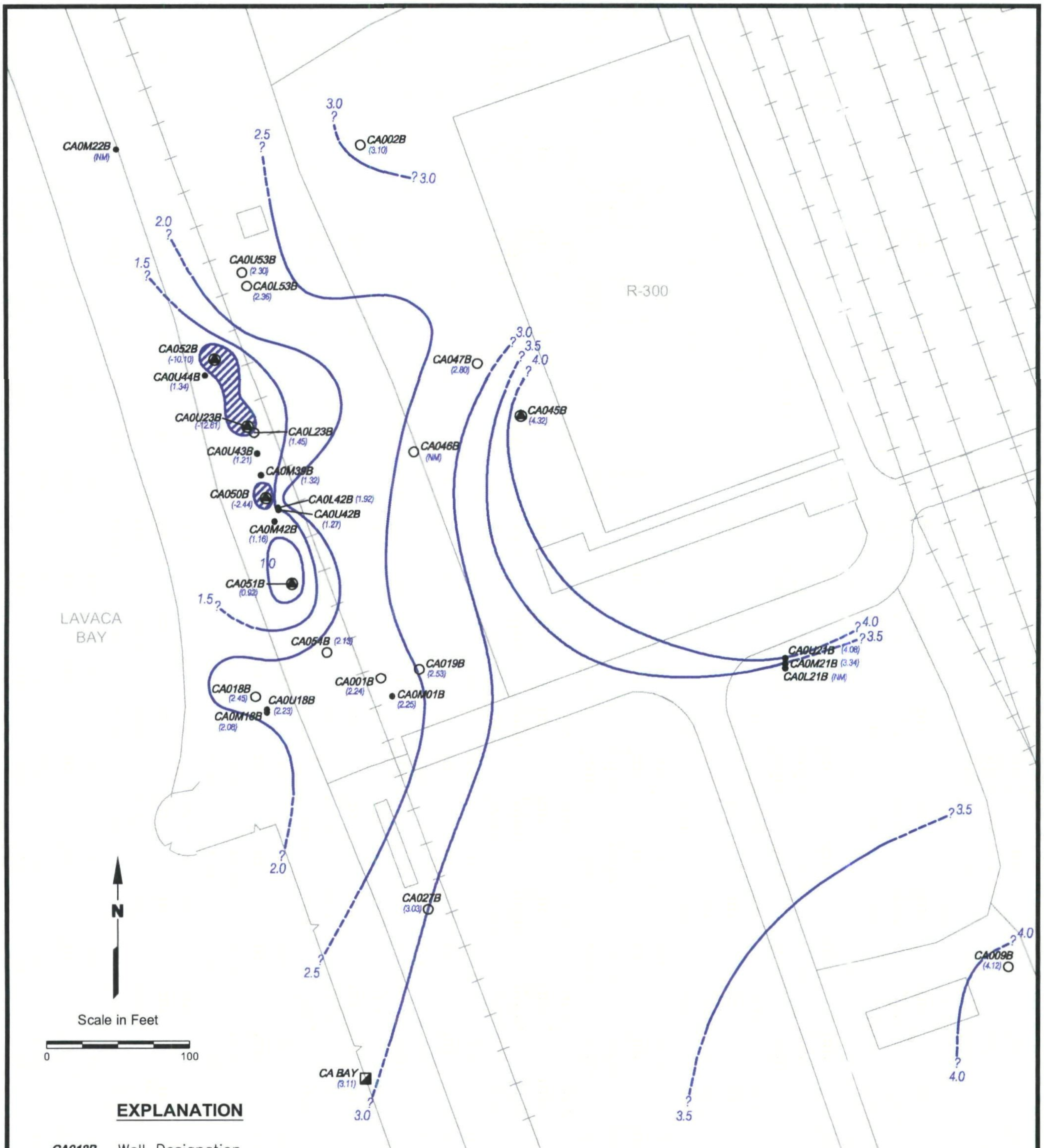
ALCOA

FIGURE 3.1-2

POTENTIOMETRIC SURFACE OF ZONE B GROUNDWATER (6/24/2010)

PROJECT: 3220	DATE: MARCH, 2011	
REV:	BY: KBD	CHECKED: MKW

ALCOA
Point Comfort Operations



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)

Notes:
1. Groundwater elevations measured in pumping wells are probably influenced by well inefficiencies.
2. Groundwater elevations are corrected for salinity effects.
3. NM = Not measured.
4. Only wells measured for water levels are shown on this figure.
5. Surface water elevation used for contouring is from tidal gauge located south of CAPA (CA Bay).

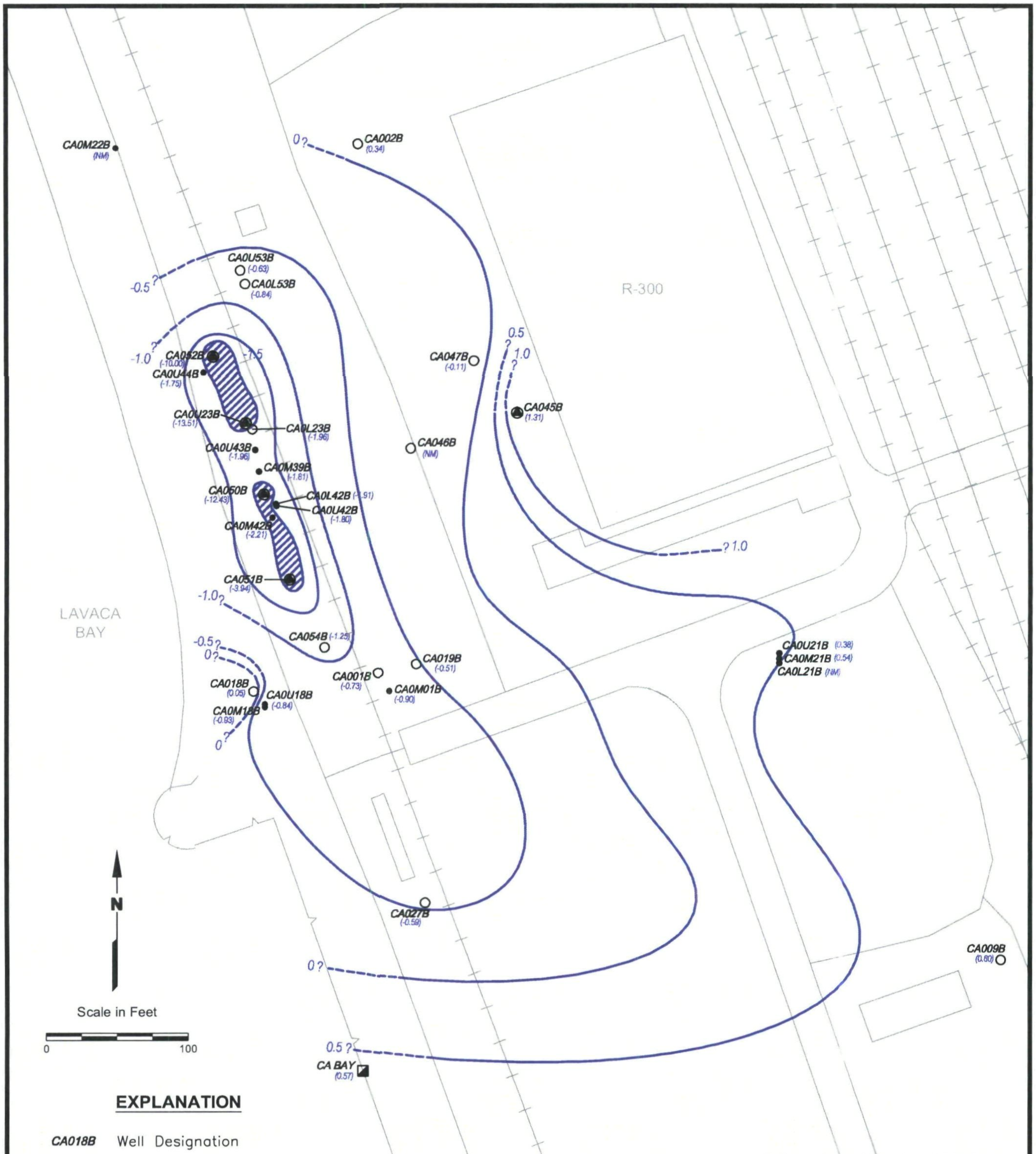
ALCOA

FIGURE 3.1-3

POTENTIOMETRIC SURFACE OF ZONE B GROUNDWATER (9/20/2010)

PROJECT: 3220	DATE: MARCH, 2011	
REV:	BY: KBD	CHECKED: MKW

ALCOA
Point Comfort Operations



EXPLANATION

CA018B	Well Designation
O	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)

Notes:
1. Groundwater elevations measured in pumping wells are probably influenced by well inefficiencies.
2. Groundwater elevations are corrected for salinity effects.
3. NM = Not measured.
4. Only wells measured for water levels are shown on this figure.
5. Surface water elevation used for contouring is from tidal gauge located south of CAPA (CA Bay).

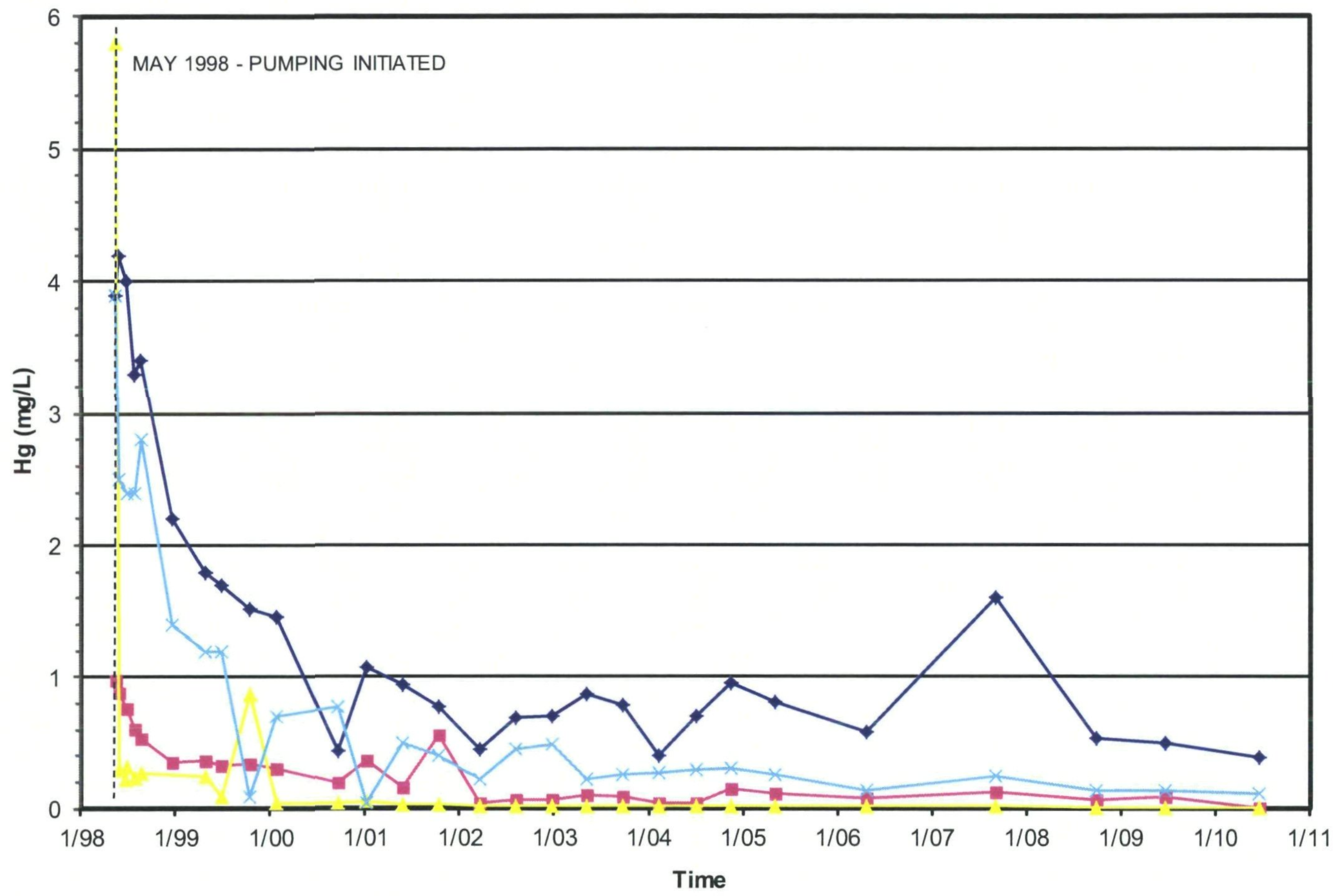
ALCOA

FIGURE 3.1-4

POTENTIOMETRIC SURFACE OF ZONE B GROUNDWATER (12/26/2010)

PROJECT: 3220	DATE: MAR., 2011	
REV:	BY: KBD	CHECKED: MKW

ALCOA
Point Comfort Operations

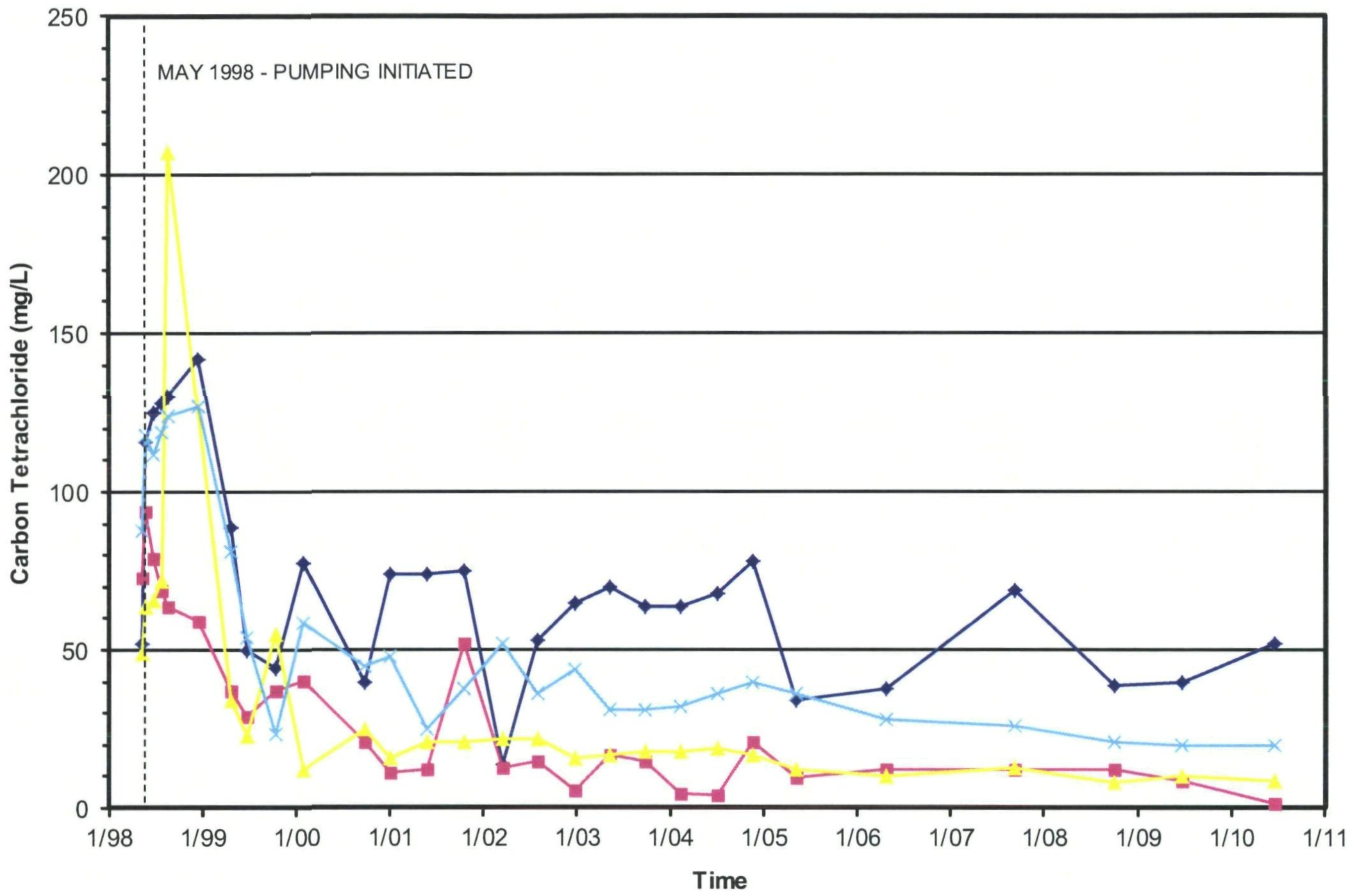


ALCOA

FIGURE 3.1-5
RECOVERY WELLS,
MERCURY CONCENTRATIONS vs. TIME

PROJECT: 3220	DATE: MARCH, 2011	
REV:	BY: AJD	CHECKED: MKW

ALCOA
Point Comfort Operations

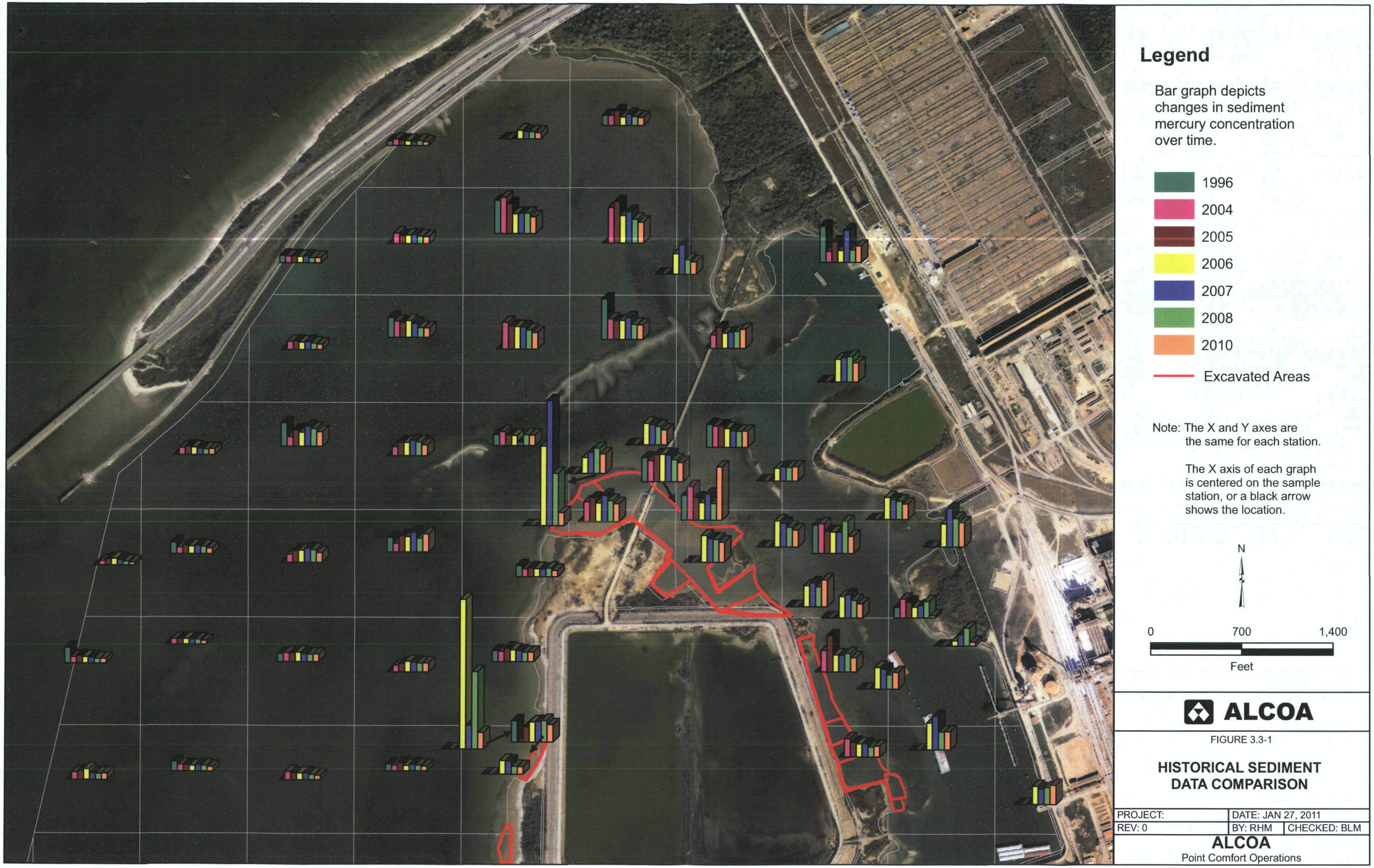


ALCOA

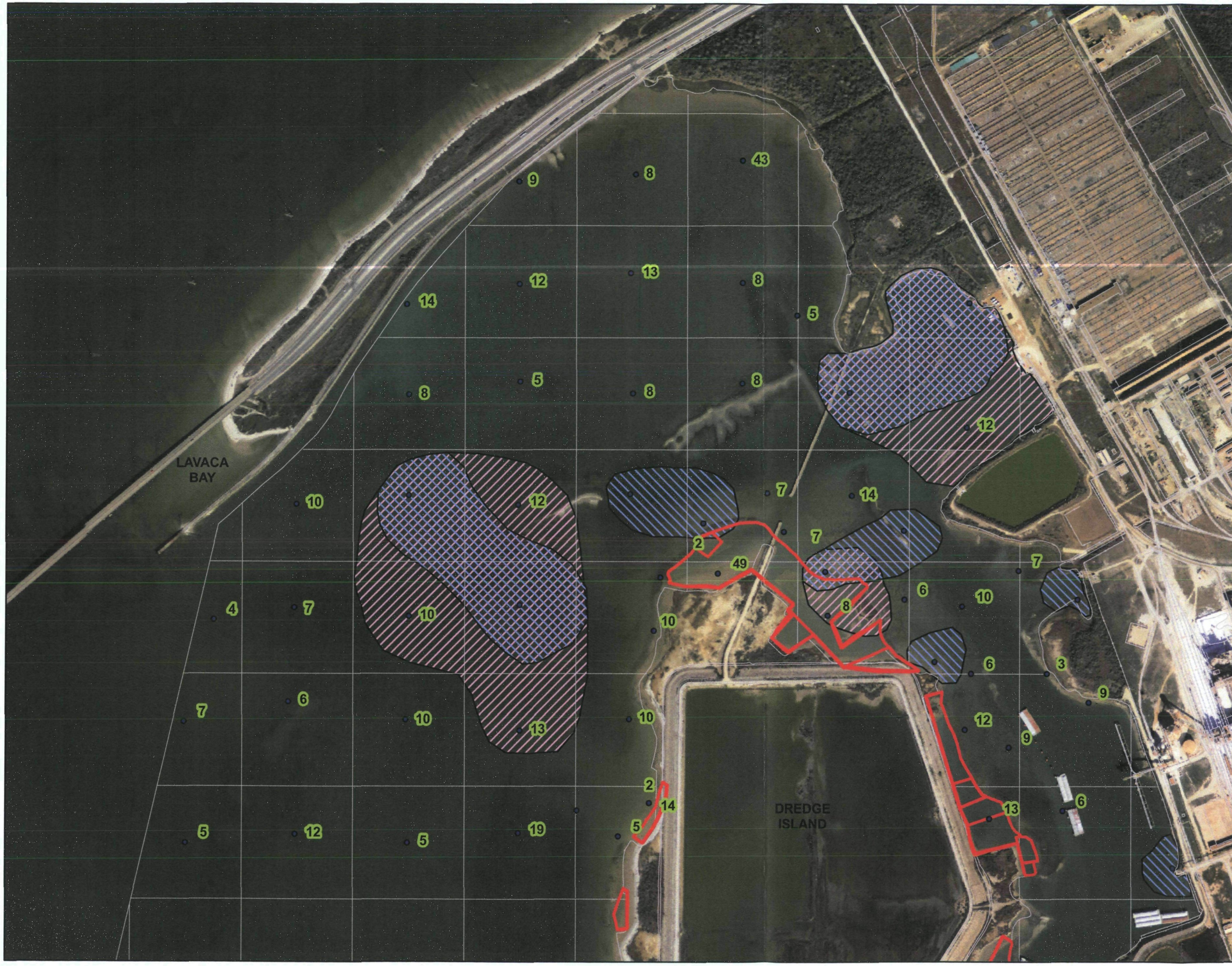
FIGURE 3.1-6
RECOVERY WELLS,
CARBON TETRACHLORIDE
CONCENTRATIONS vs. TIME

PROJECT: 3220	DATE: MARCH, 2011	
REV:	BY: AJD	CHECKED: MKW

ALCOA
Point Comfort Operations



Legend
Bar graph depicts changes in sediment mercury concentration over time.
1996
2004
2005
2006
2007
2008
2010
Excavated Areas
Note: The X and Y axes are the same for each station.
The X axis of each graph is centered on the sample station, or a black arrow shows the location.
N
0
700
1,400
Feet
ALCOA
FIGURE 3.3-1
HISTORICAL SEDIMENT DATA COMPARISON
PROJECT:
DATE: JAN 27, 2011
REV: 0
BY: RHM
CHECKED: BLM
ALCOA
Point Comfort Operations



Legend

- Sediment Sample Location
- Inferred Areas Where Surficial Sediment Hg Concentrations Increased Slightly Between 2006 and 2010
- 14 Empirical Sediment Recovery Half-life (Years, 2006-2010)
- Area Excavated During Dredge Island Stabilization Project

$t_{1/2}$ Statistics in Years

8.5	Median
10.3	Mean
49	Max

$$t_{1/2} = \frac{[4yr \times (Hg_{Year\ 1} \times 0.5)]}{(Hg_{Year\ 1} - Hg_{Year\ 2})}$$

N

0 700 1,400
Feet

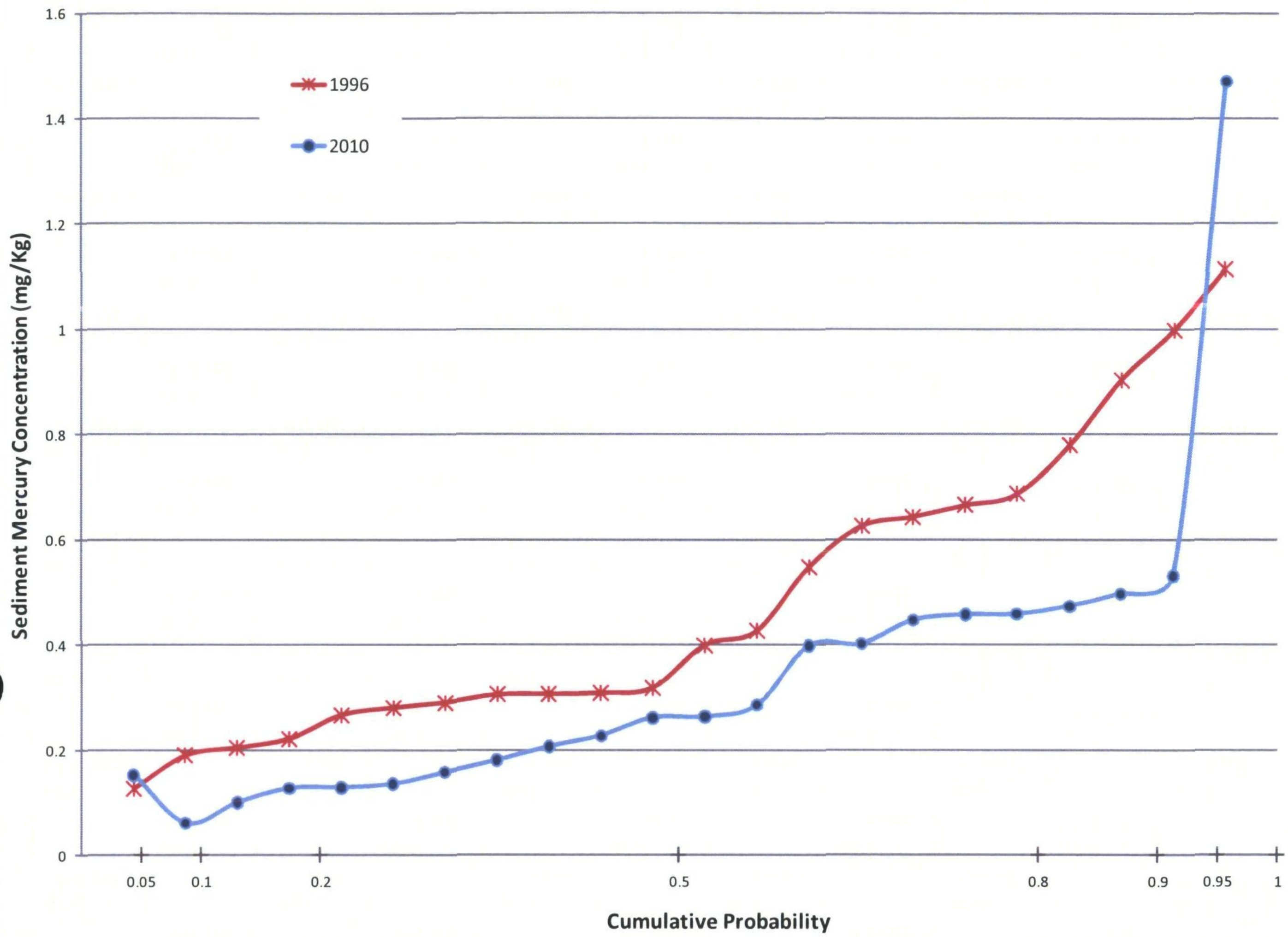
ALCOA

FIGURE 3.3-2

OPEN WATER SEDIMENT CONCENTRATION RECOVERY TRENDS

PROJECT: 021125	DATE: JAN 27, 2011	
REV: 0	BY: RHM	CHECKED: BLM

ALCOA
Point Comfort Operations



ALCOA

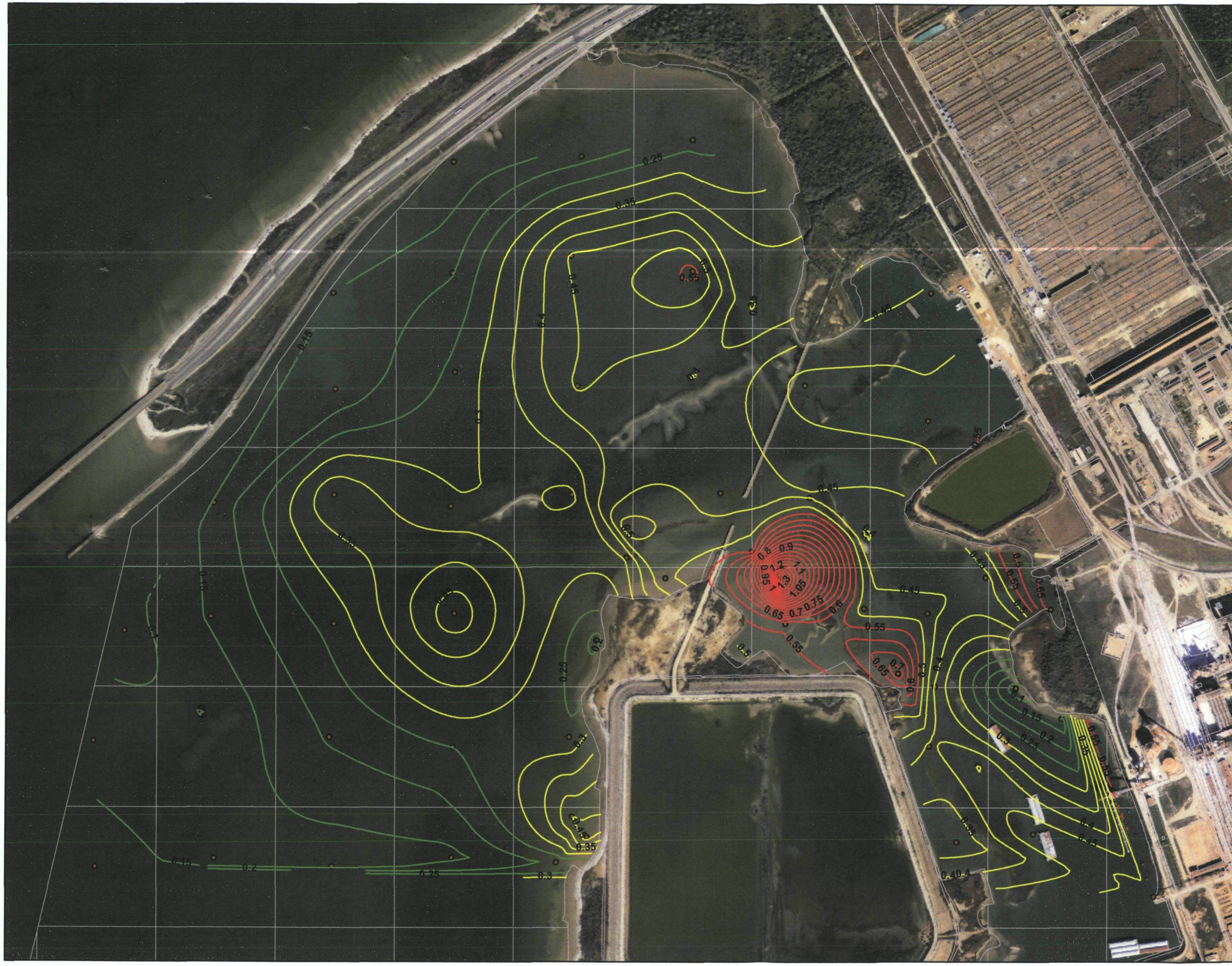
FIGURE 3.3-3

CUMULATIVE PROBABILITY GRAPH OF 1996 AND 2010 SEDIMENT CONCENTRATIONS

PROJECT: 021125	DATE: JAN 27, 2011	
REV: 0	BY: RHM	CHECKED: BLM

ALCOA

Point Comfort Operations



Legend

Sediment contour
(0.05 mg/Kg interval)

Mercury Concentration (in mg/Kg)

- 0.10 - 0.25
- 0.26 - 0.50
- 0.51 - 1.40

N

0 700 1,400
Feet

ALCOA

FIGURE 3.3-4

2010 SEDIMENT CONCENTRATION MAP

PROJECT:	DATE: JAN 27, 2011
REV: 0	BY: RHM — CHECKED: BLM

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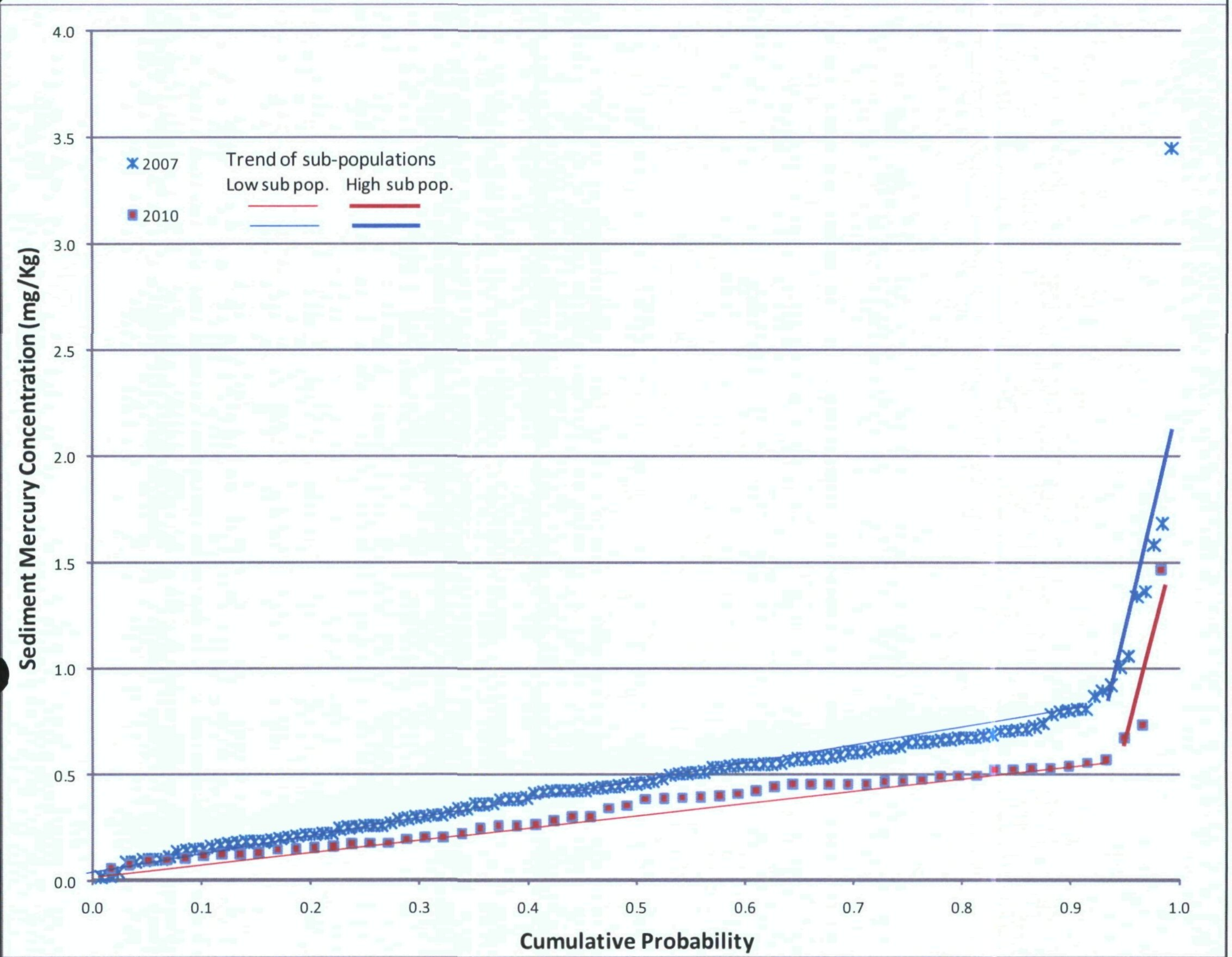
Point Comfort Operations



ALCOA

FIGURE 3.3-5

CUMULATIVE PROBABILITY GRAPH OF 2007 AND 2010 SEDIMENT CONCENTRATIONS

PROJECT: 021125	DATE: JAN 27, 2011	
REV: 0	BY: RHM	CHECKED: BLM

ALCOA

Point Comfort Operations

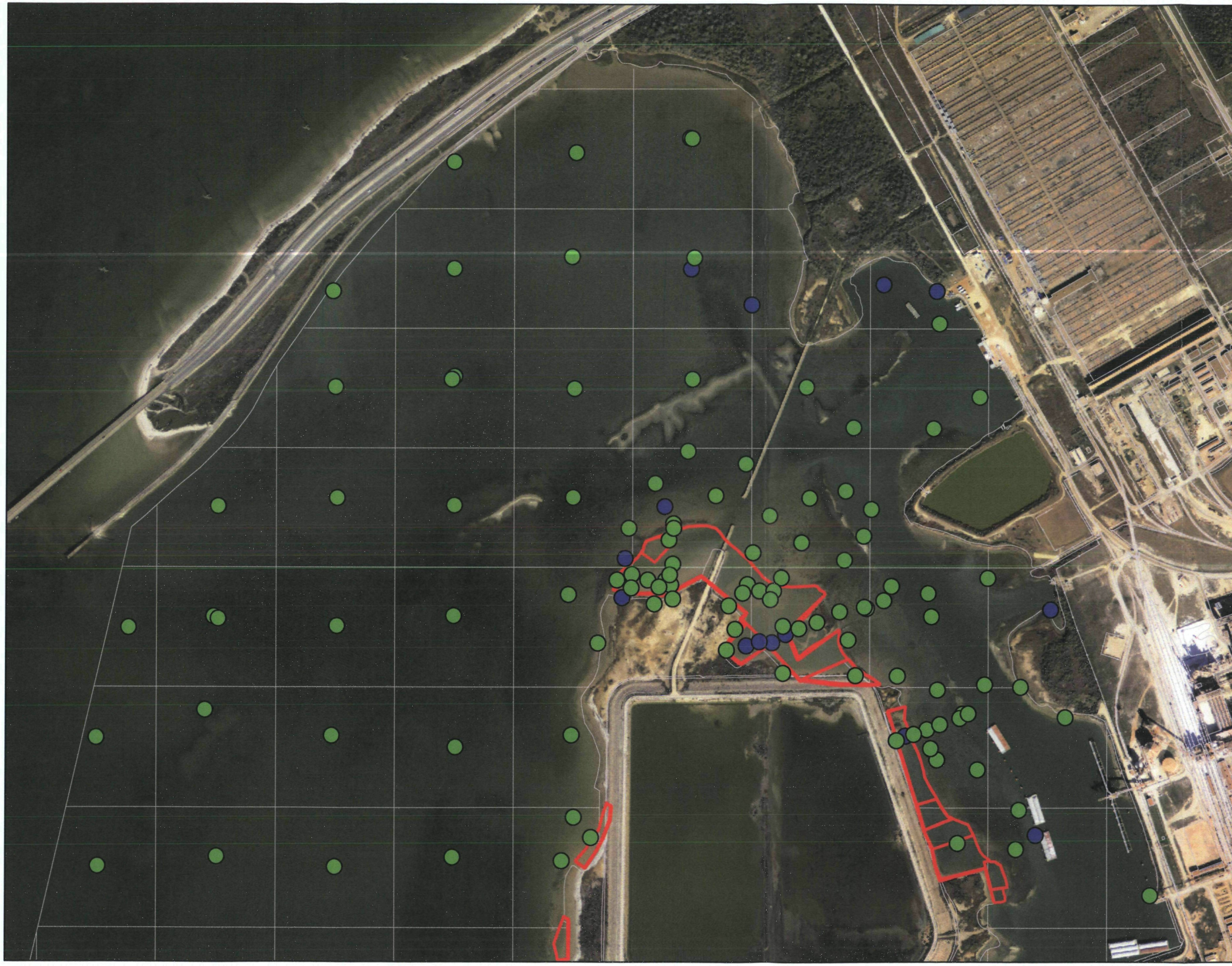


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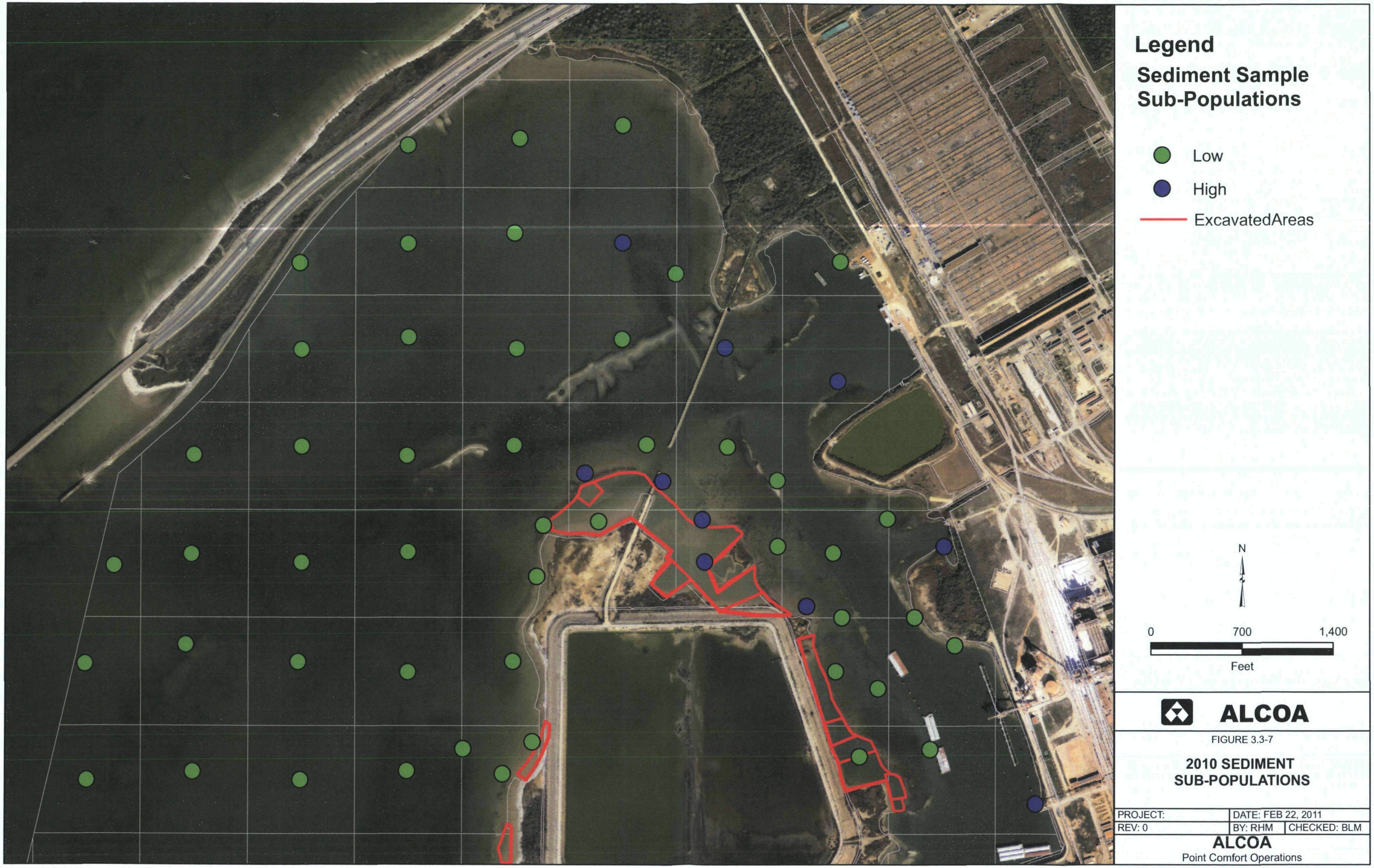
FIGURE 3.3-6

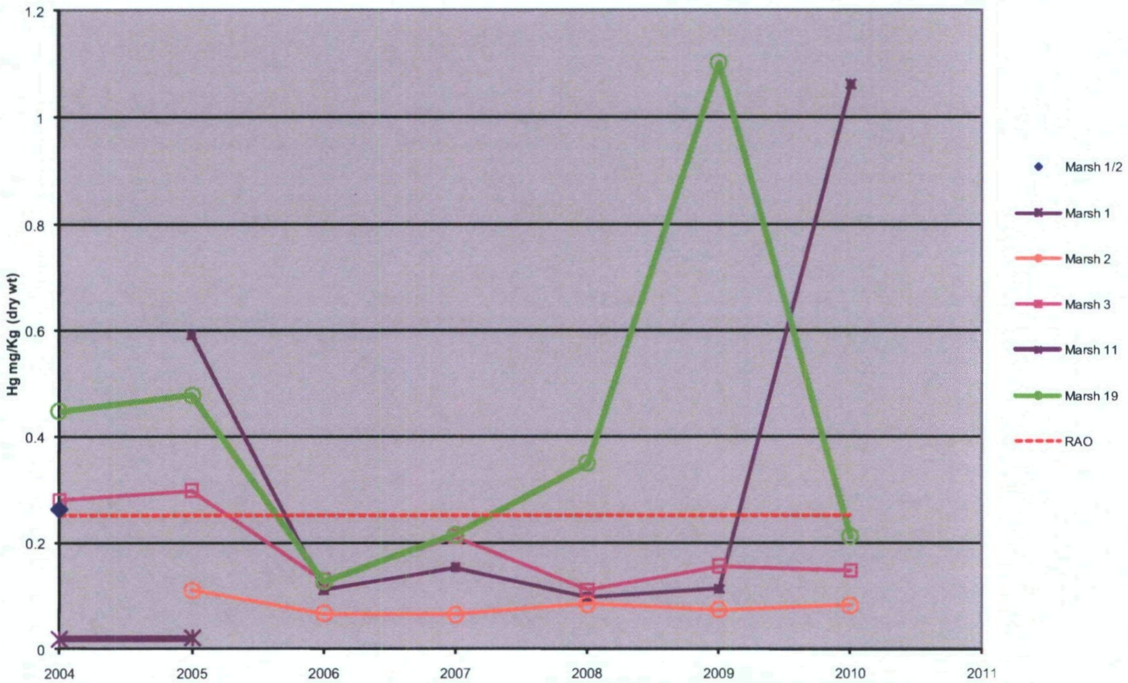
2007 SEDIMENT SUB-POPULATIONS

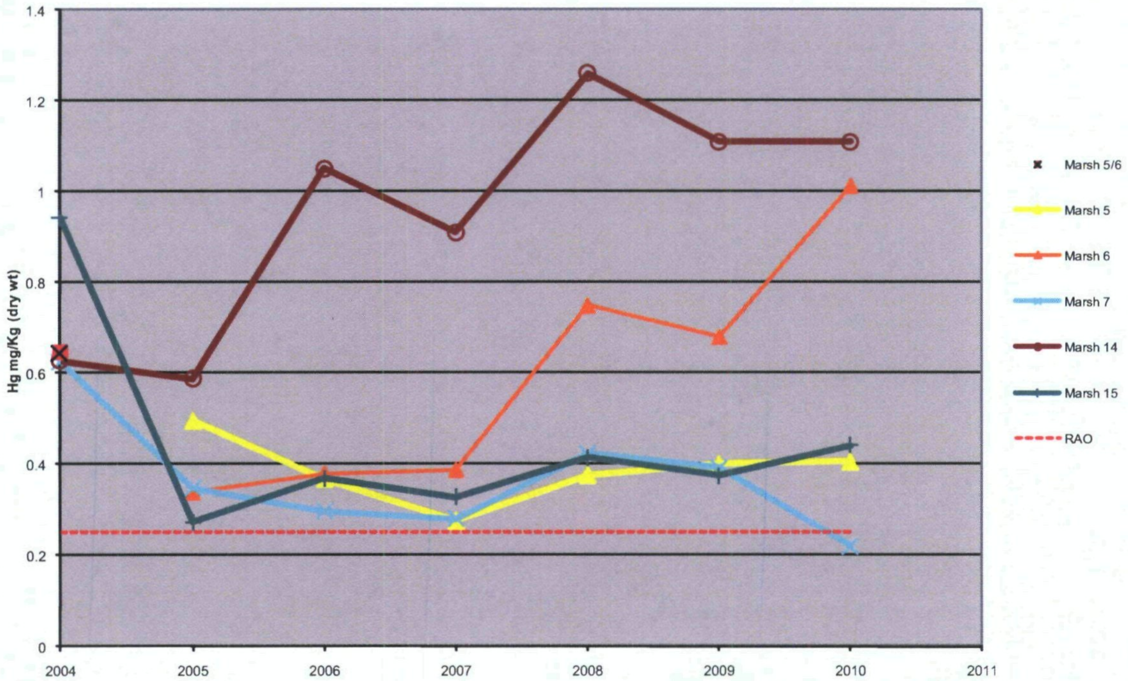
PROJECT:	DATE: FEB 22, 2011	
REV: 0	BY: RHM	CHECKED: BLM

ALCOA
Point Comfort Operations


Legend
Sediment Sample Sub-Populations
Low
High
ExcavatedAreas
N
0
700
1,400
Feet
ALCOA
FIGURE 3.3-7
2010 SEDIMENT SUB-POPULATIONS
PROJECT:
DATE: FEB 22, 2011
REV: 0
BY: RHM
CHECKED: BLM
ALCOA
Point Comfort Operations

Trends in Marsh Sediment Concentrations





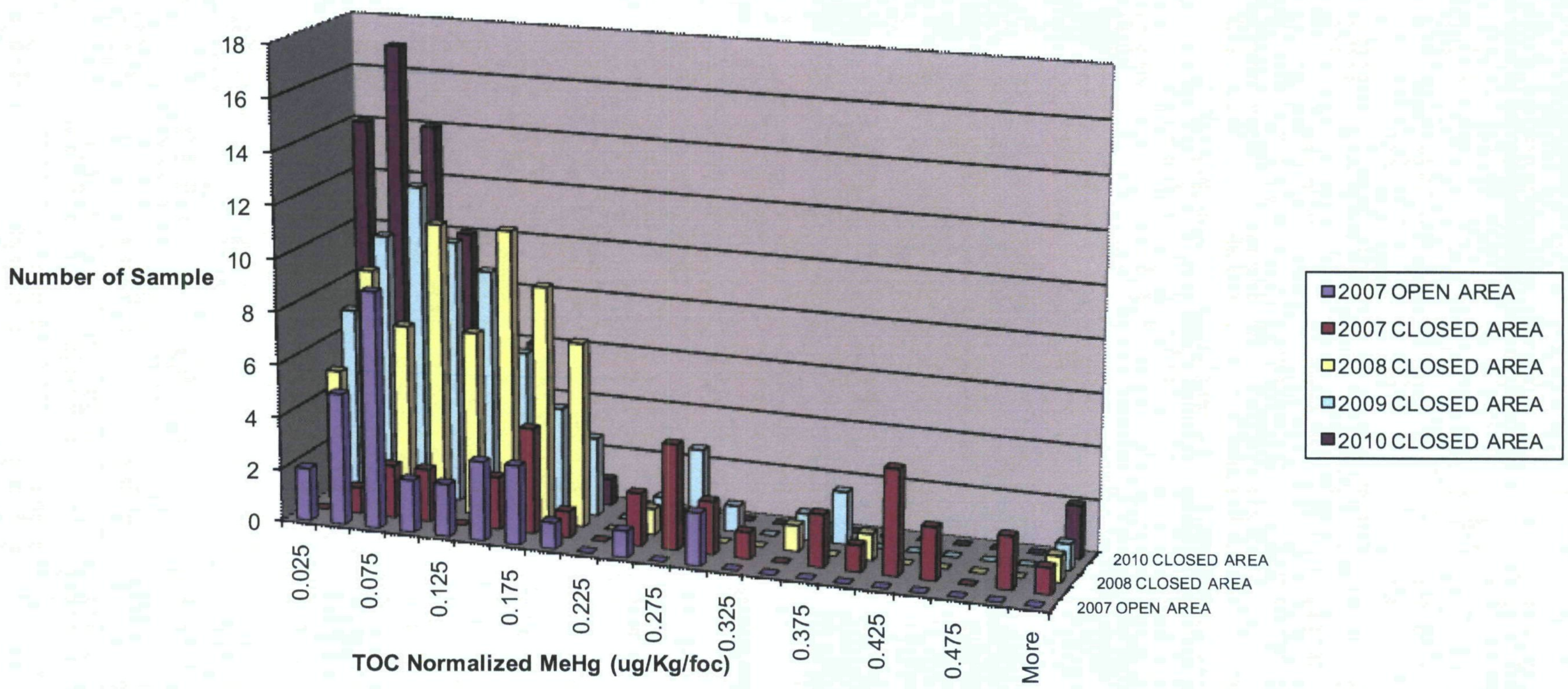
ALCOA

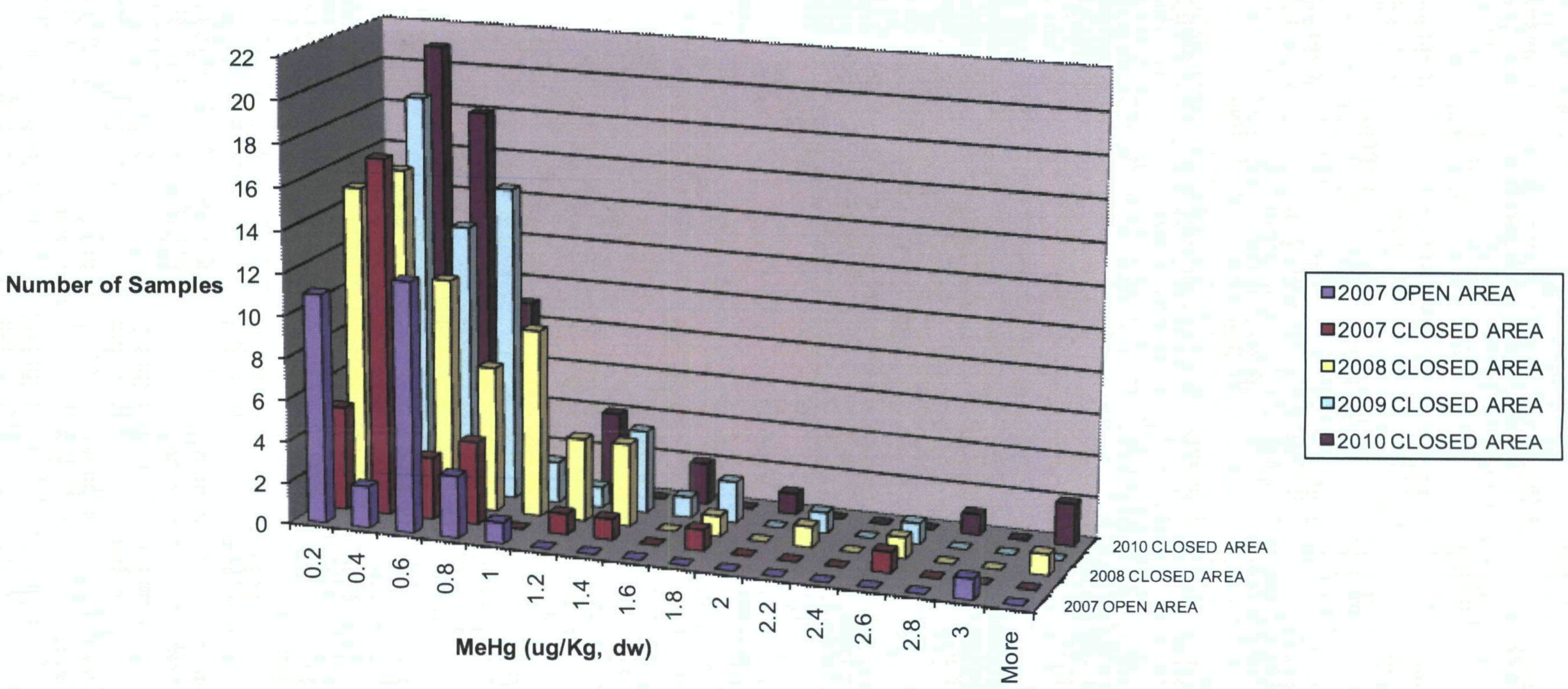
FIGURE 3.3-8

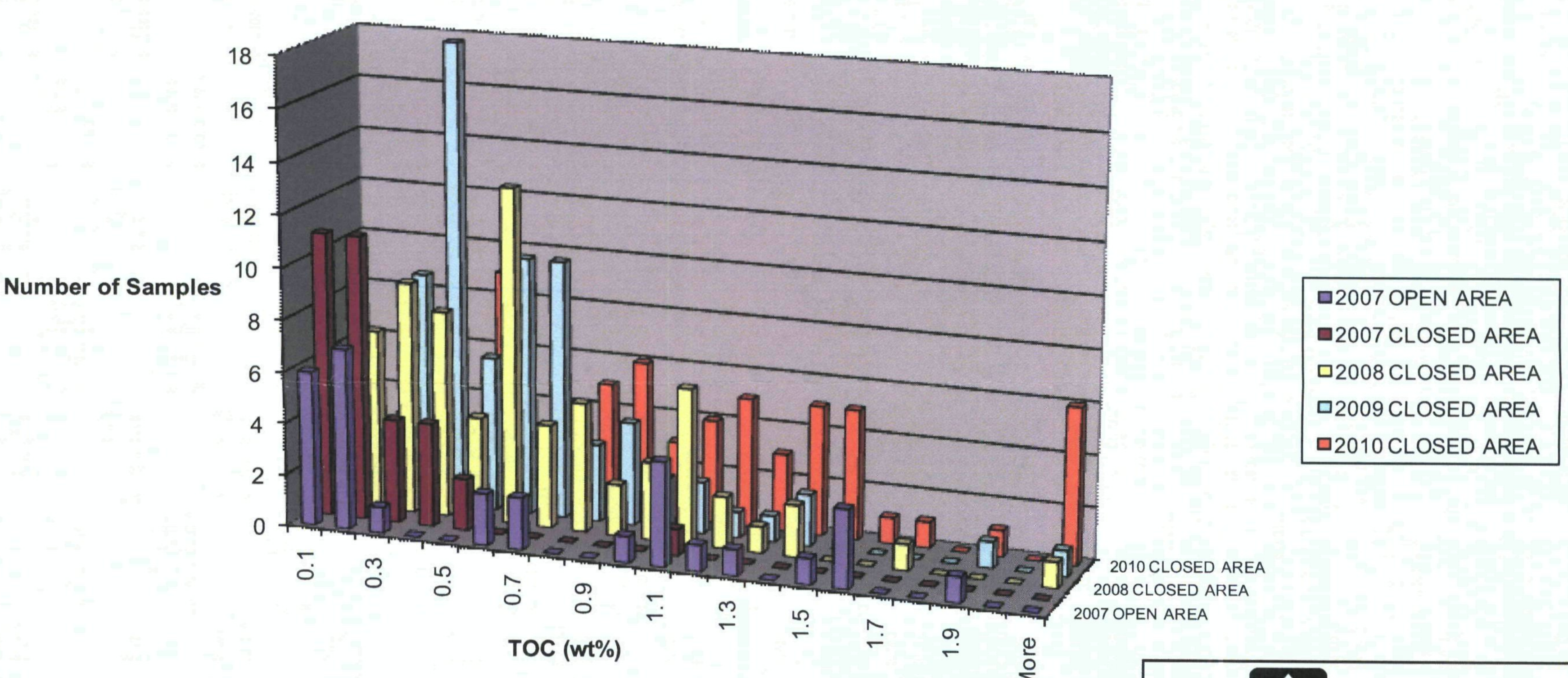
TRENDS IN MARSH SEDIMENT CONCENTRATIONS

PROJECT:	DATE: JAN 27, 2011	
REV: 0	BY: RHM	CHECKED: BLM

ALCOA
Point Comfort Operations







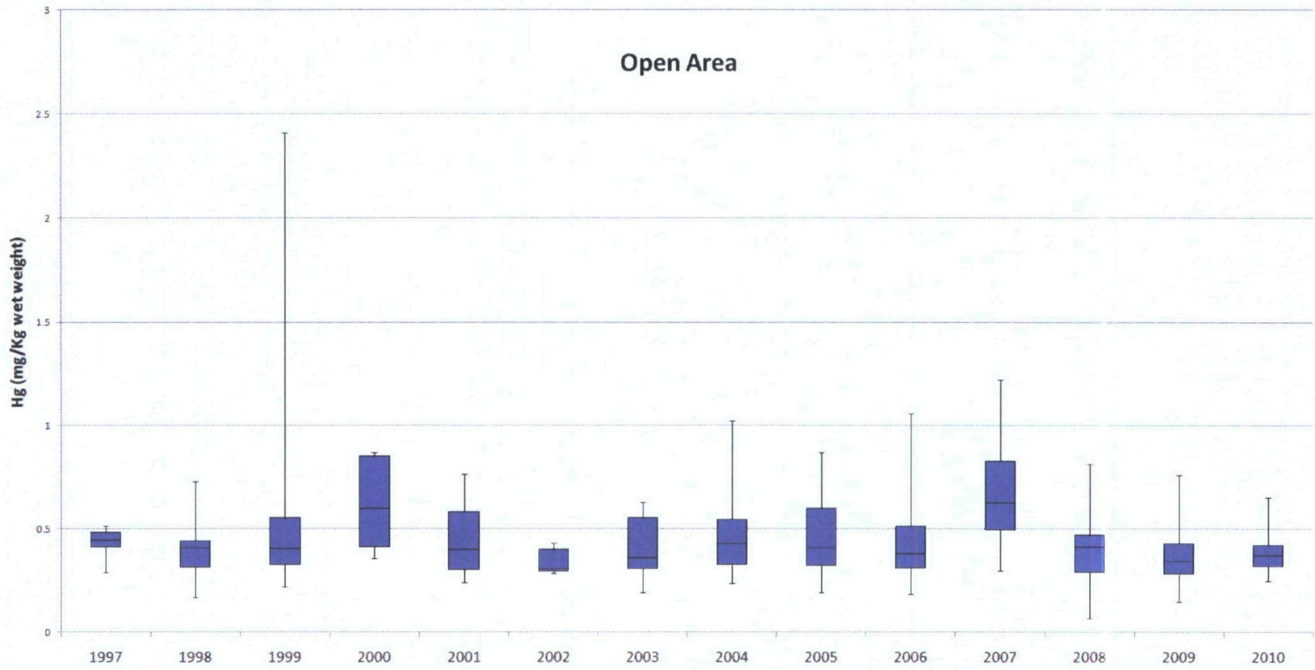
ALCOA

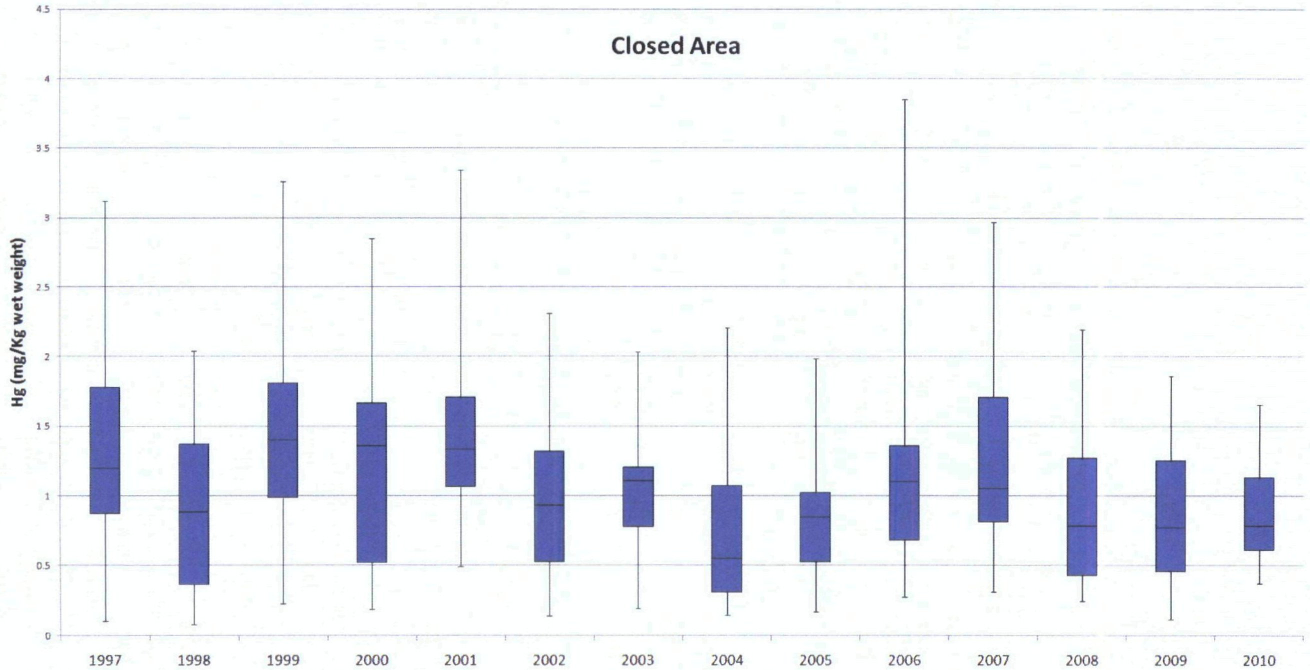
FIGURE 3.3-9

CLOSED AREA MARSH SEDIMENT METHYL MERCURY CONCENTRATIONS

PROJECT:	DATE: JAN 27, 2011	
REV: 0	BY: RHM	CHECKED: BLM

ALCOA
Point Comfort Operations





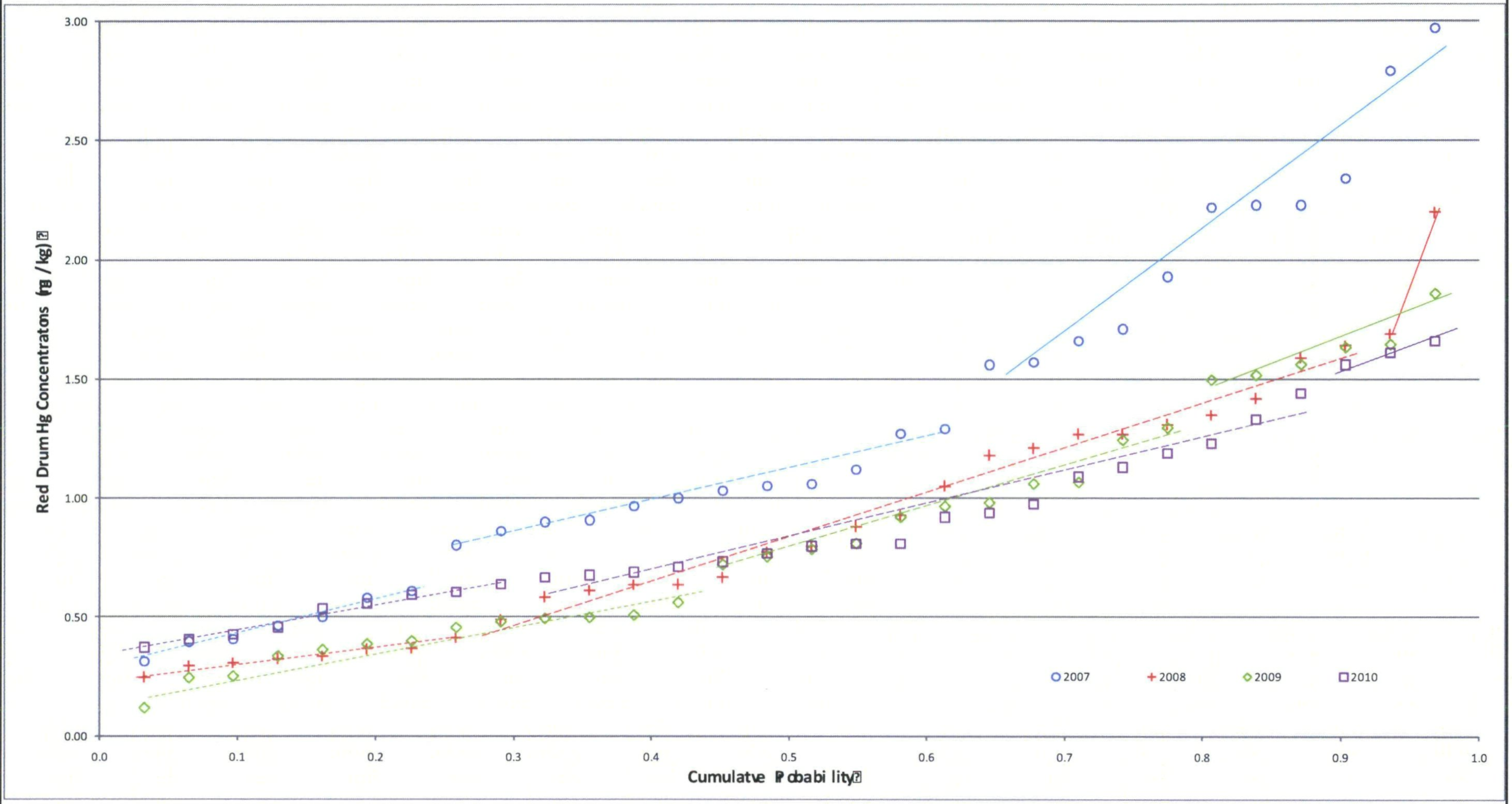
ALCOA

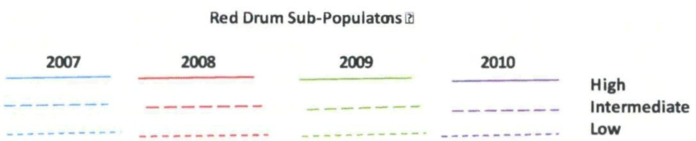
FIGURE 3.4-1

TRENDS IN RED DRUM MERCURY CONCENTRATIONS

PROJECT:	DATE: JAN 27, 2011	
REV: 0	BY: RHM	CHECKED: BLM

ALCOA
Point Comfort Operations





ALCOA

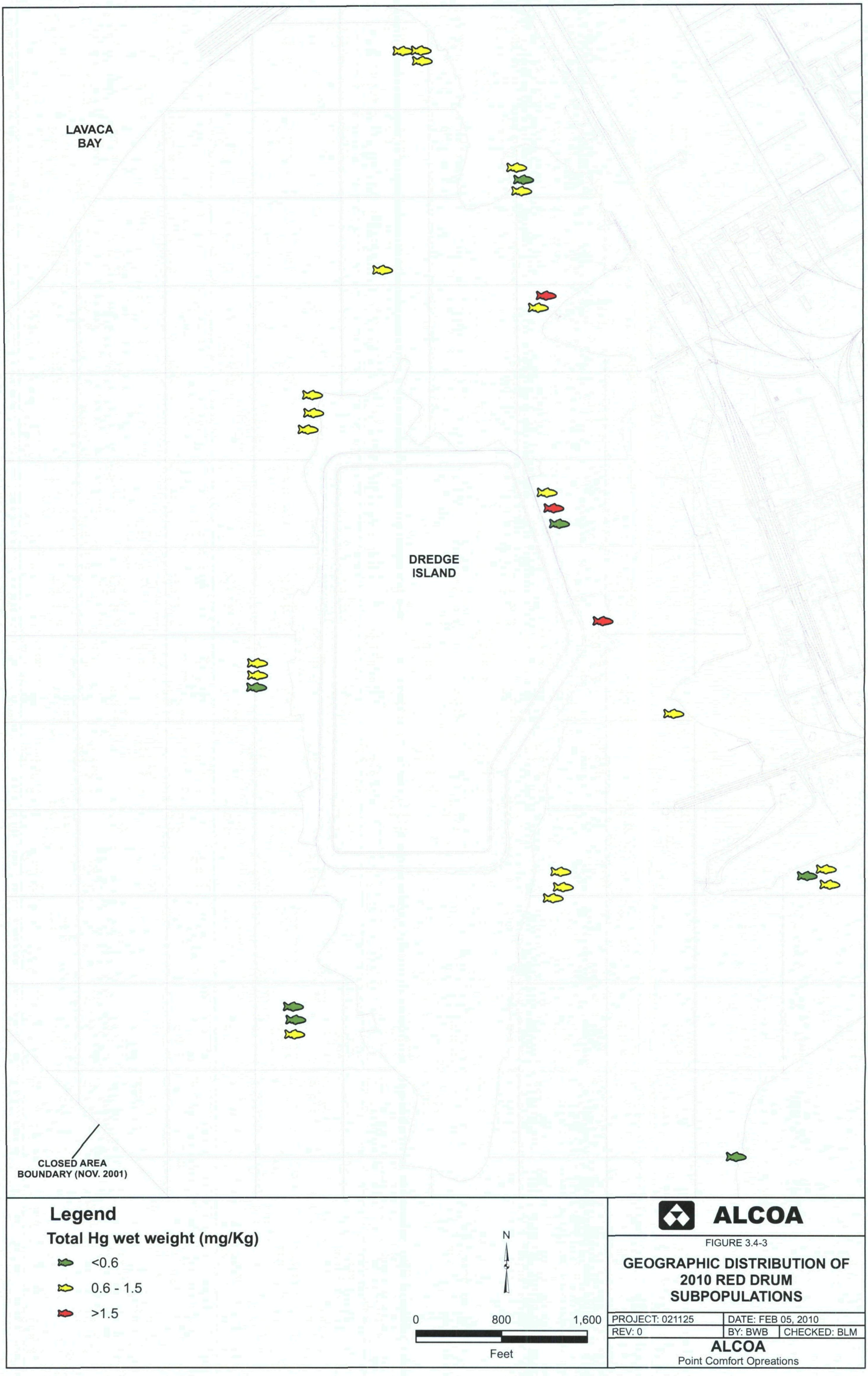
FIGURE 3.4-2

CUMULATIVE PROBABILITY GRAPH OF 2007-2010 RED DRUM MERCURY CONCENTRATIONS

PROJECT:	DATE: JAN 27, 2011	
REV: 0	BY: RHM	CHECKED: BLM

ALCOA

Point Comfort Operations



ALCOA

FIGURE 3.4-3

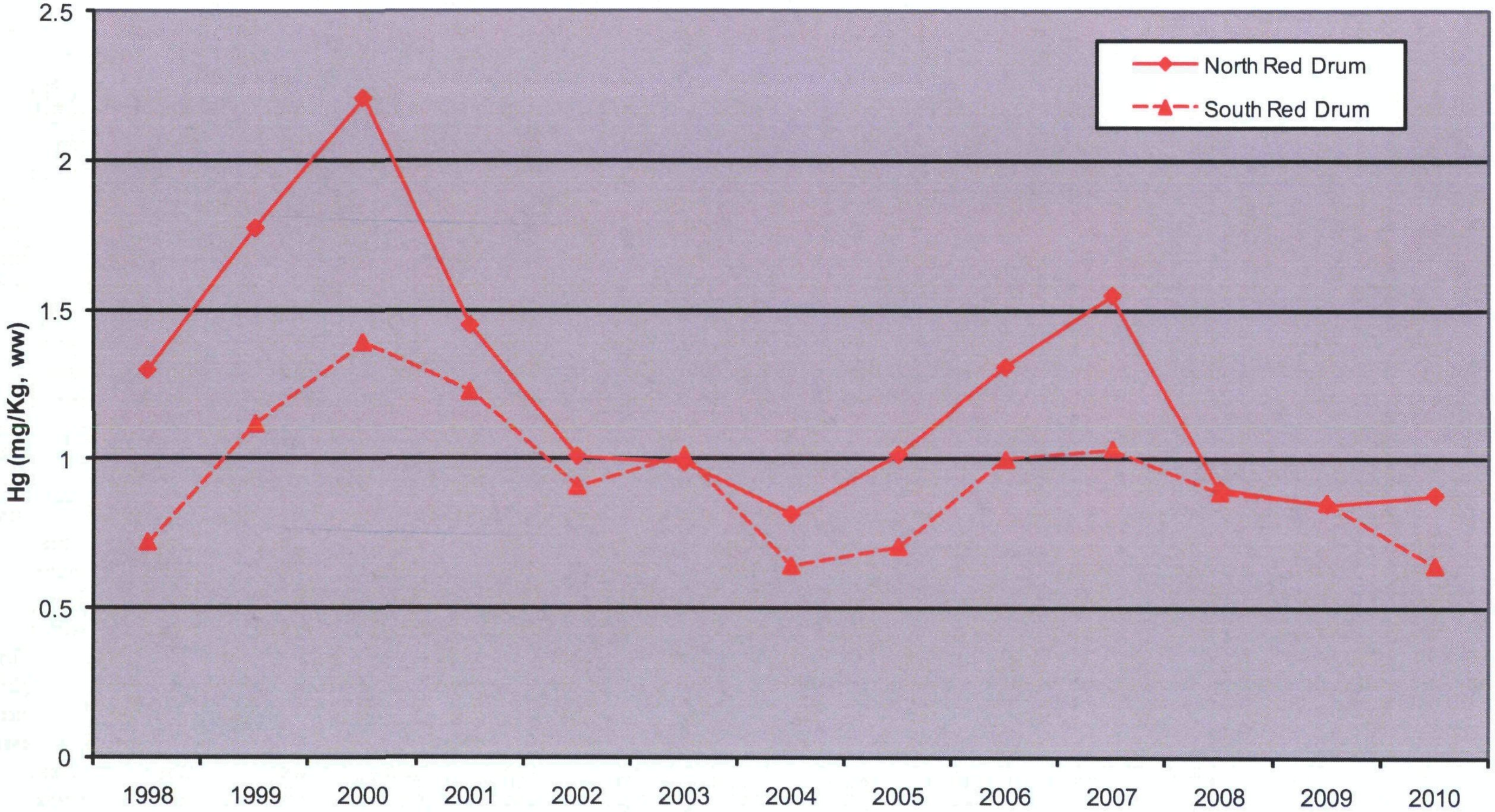
GEOGRAPHIC DISTRIBUTION OF 2010 RED DRUM SUBPOPULATIONS

PROJECT: 021125	DATE: FEB 05, 2010	
REV: 0	BY: BWB	CHECKED: BLM

ALCOA

Point Comfort Opreations

Fig. 3.4-4 Trends in Northern and Southern Closed Area Red Drum Mercury Concentrations



ALCOA

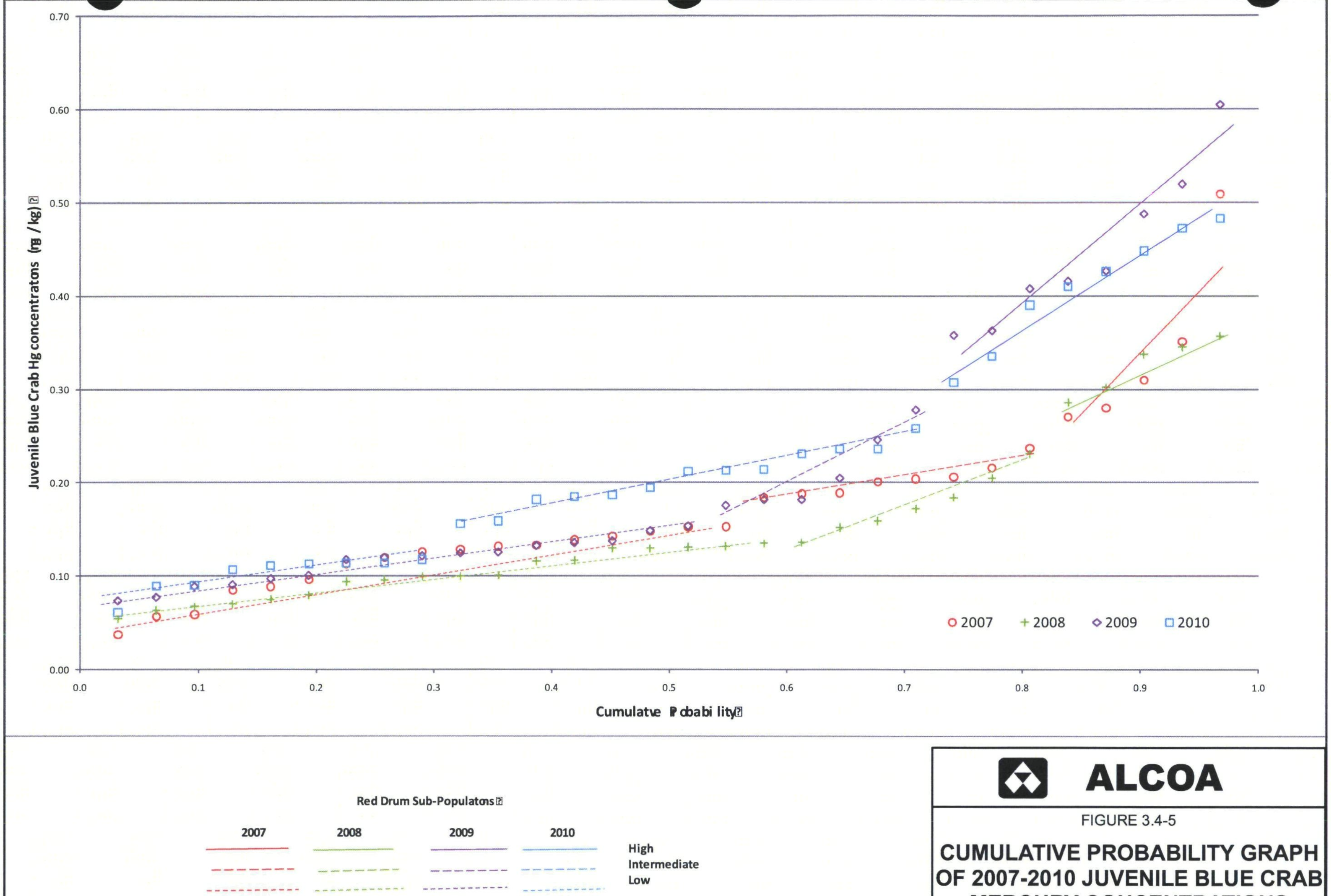
FIGURE 3.4-4

TRENDS IN NORTHERN AND SOUTHERN CLOSED AREA RED DRUM MERCURY CONCENTRATIONS

PROJECT:	DATE: JAN 27, 2011	
REV: 0	BY: RHM	CHECKED: BLM

ALCOA

Point Comfort Operations



ALCOA

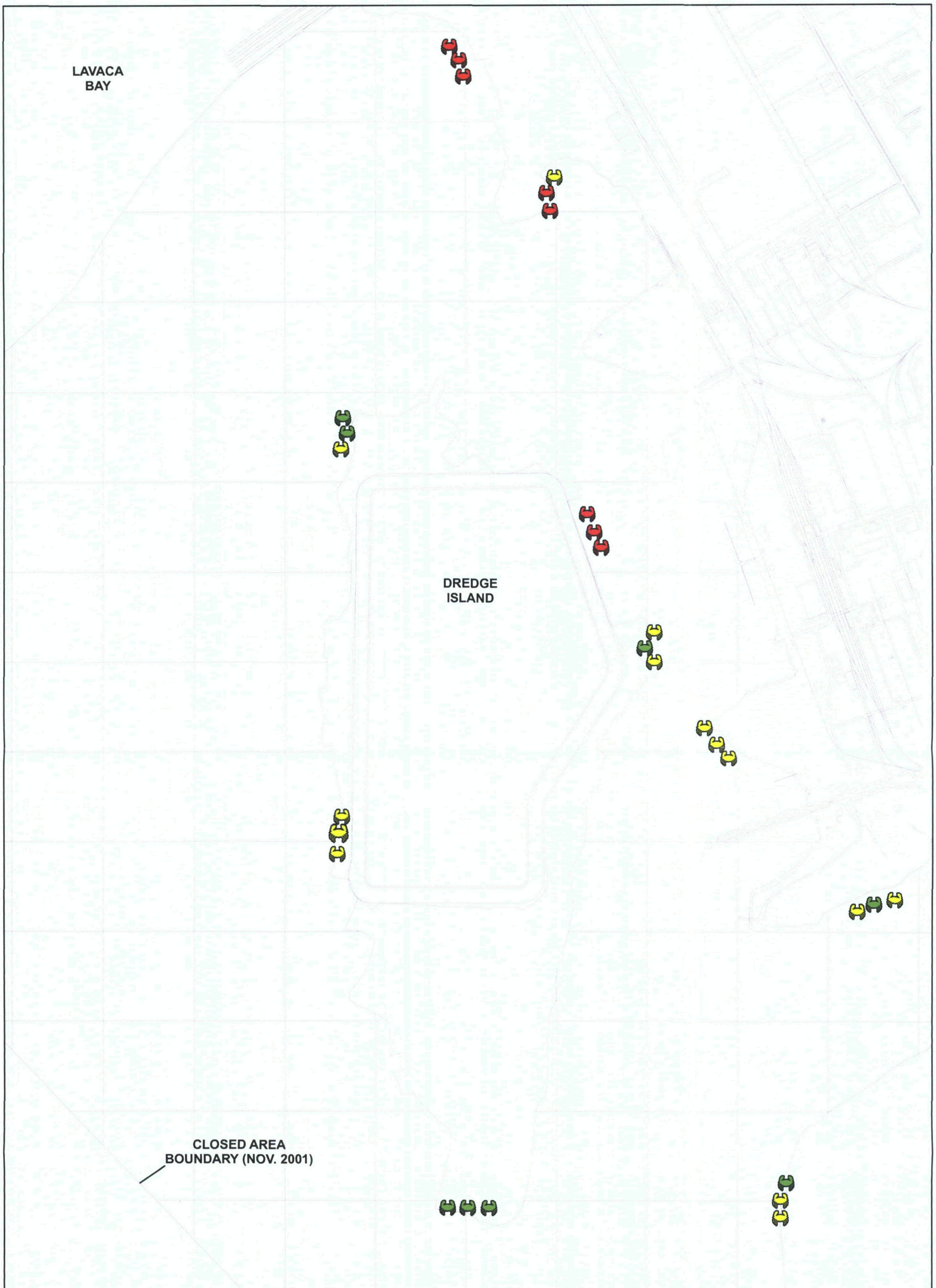
FIGURE 3.4-5

CUMULATIVE PROBABILITY GRAPH OF 2007-2010 JUVENILE BLUE CRAB MERCURY CONCENTRATIONS

PROJECT:	DATE: JAN 27, 2011	
REV: 0	BY: RHM	CHECKED: BLM

ALCOA

Point Comfort Operations



Legend

Total Hg Wet Weight (mg/Kg)

- <0.15
- 0.15 - 0.30
- >0.30

N

0 800 1,600

Feet

ALCOA

FIGURE 3.4-6

GEOGRAPHIC DISTRIBUTION OF 2010 JUVENILE BLUE CRAB SUBPOPULATIONS

PROJECT: 021125	DATE: MAR 29, 2010	
REV: 0	BY: BWB	CHECKED: BLM

ALCOA

Point Comfort Opreations

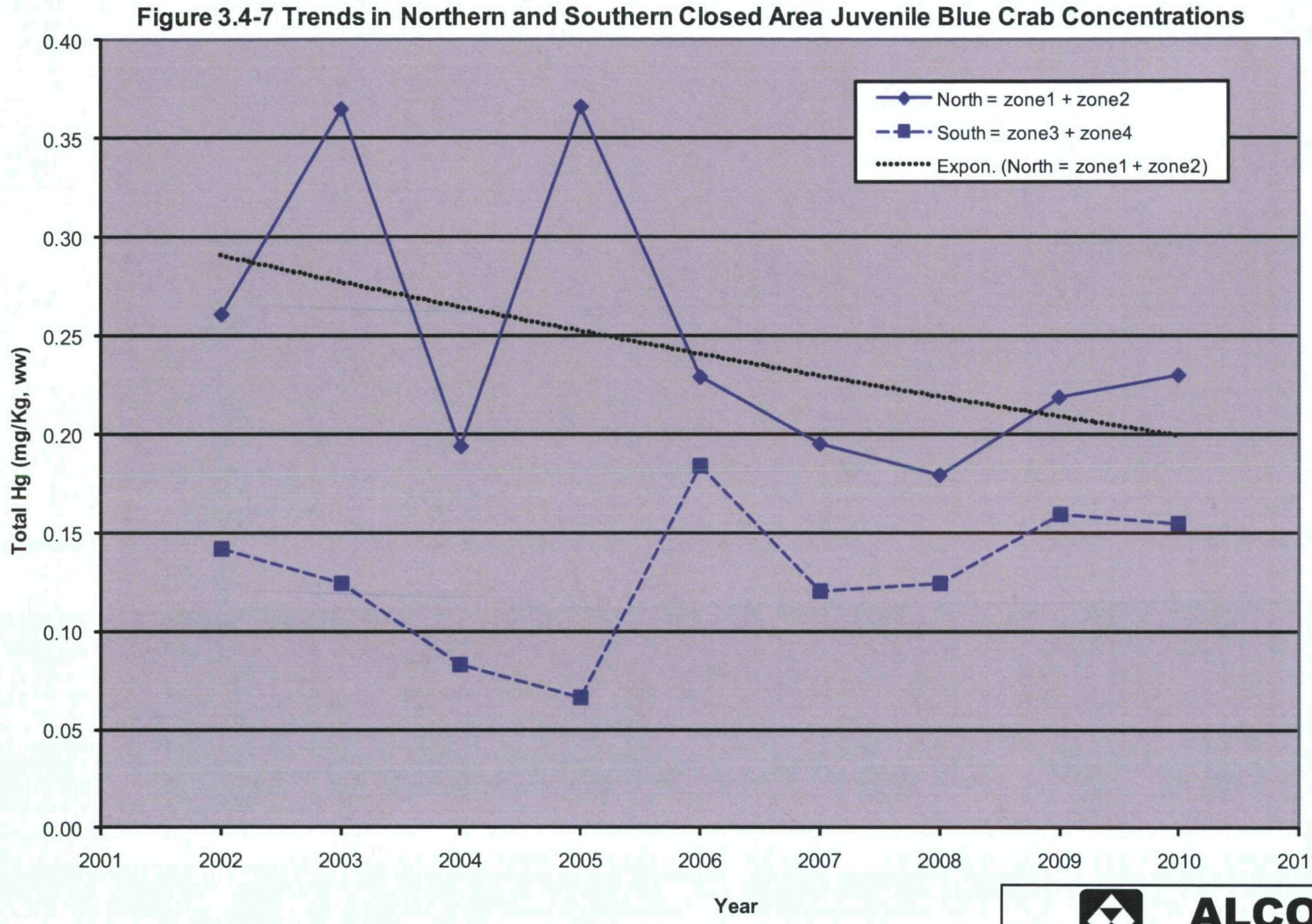


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FIGURE 3.4-7

TRENDS IN NORTHERN AND SOUTHERN CLOSED AREA JUVENILE BLUE CRAB MERCURY CONCENTRATIONS

PROJECT:	DATE: JAN 27, 2011	
REV: 0	BY: RHM	CHECKED: BLM

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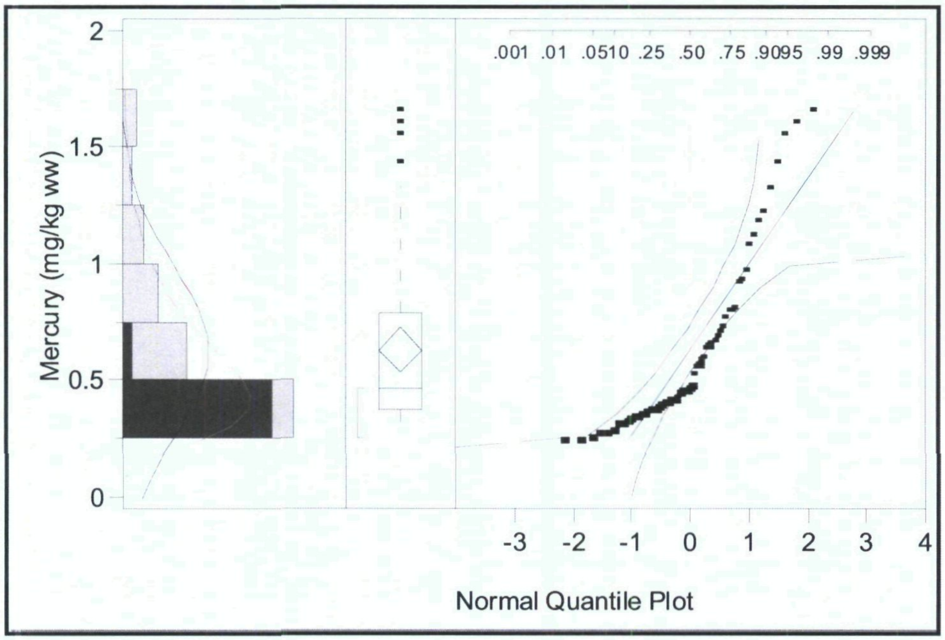
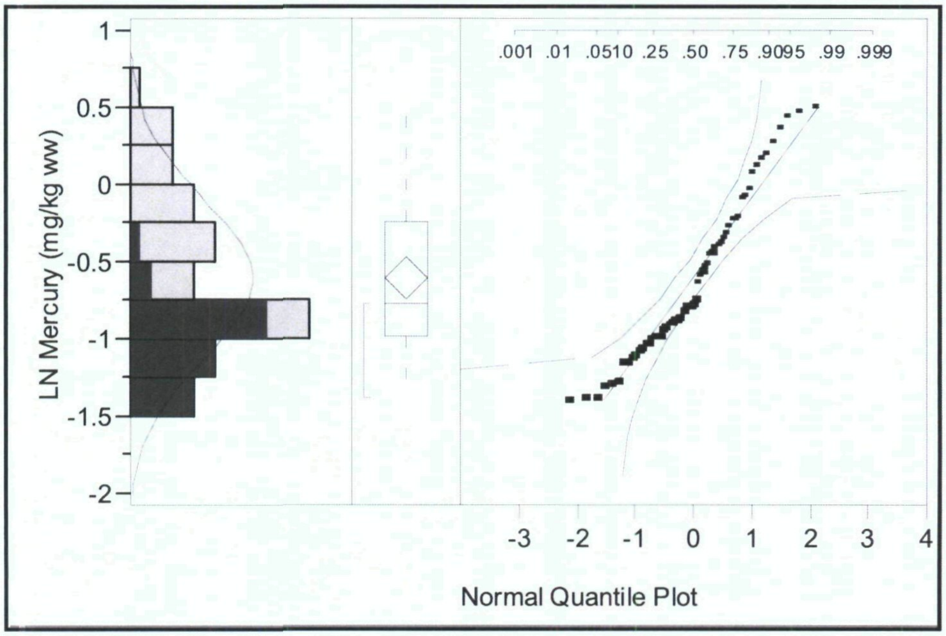


Distributions of Red Drum Tissue Mercury Data -- Untransformed



Distributions of Red Drum Tissue Mercury Data -- LN Transformed

ALCOA

FIGURE 3.4-8

STATISTICAL DISTRIBUTION OF RED DRUM TISSUE MERCURY DATA

PROJECT: 021125	DATE: MARCH 30, 2011	
REV: 0	BY: SMM	CHECKED: BLM

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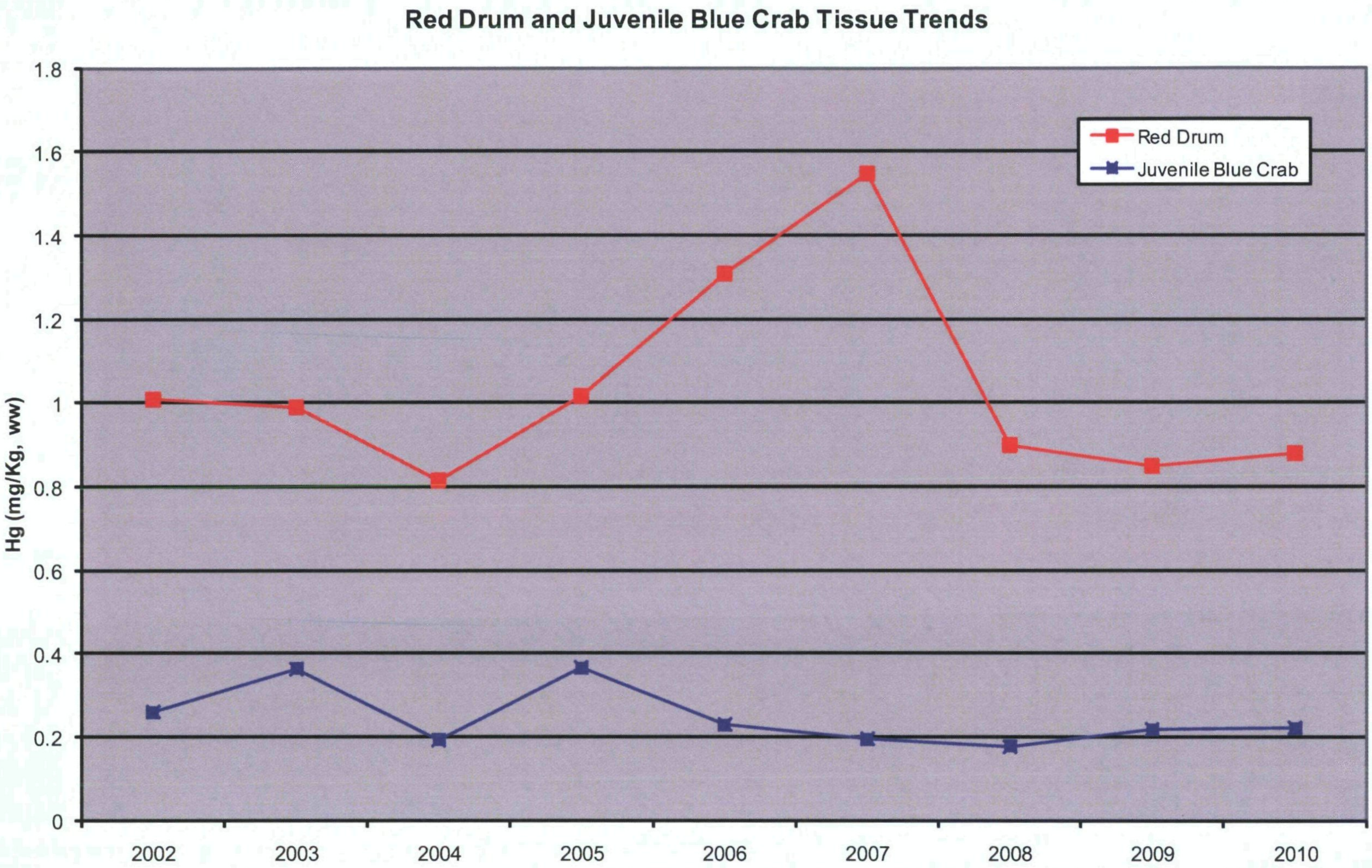
Point Comfort Operations



ALCOA

FIGURE 3.4-9

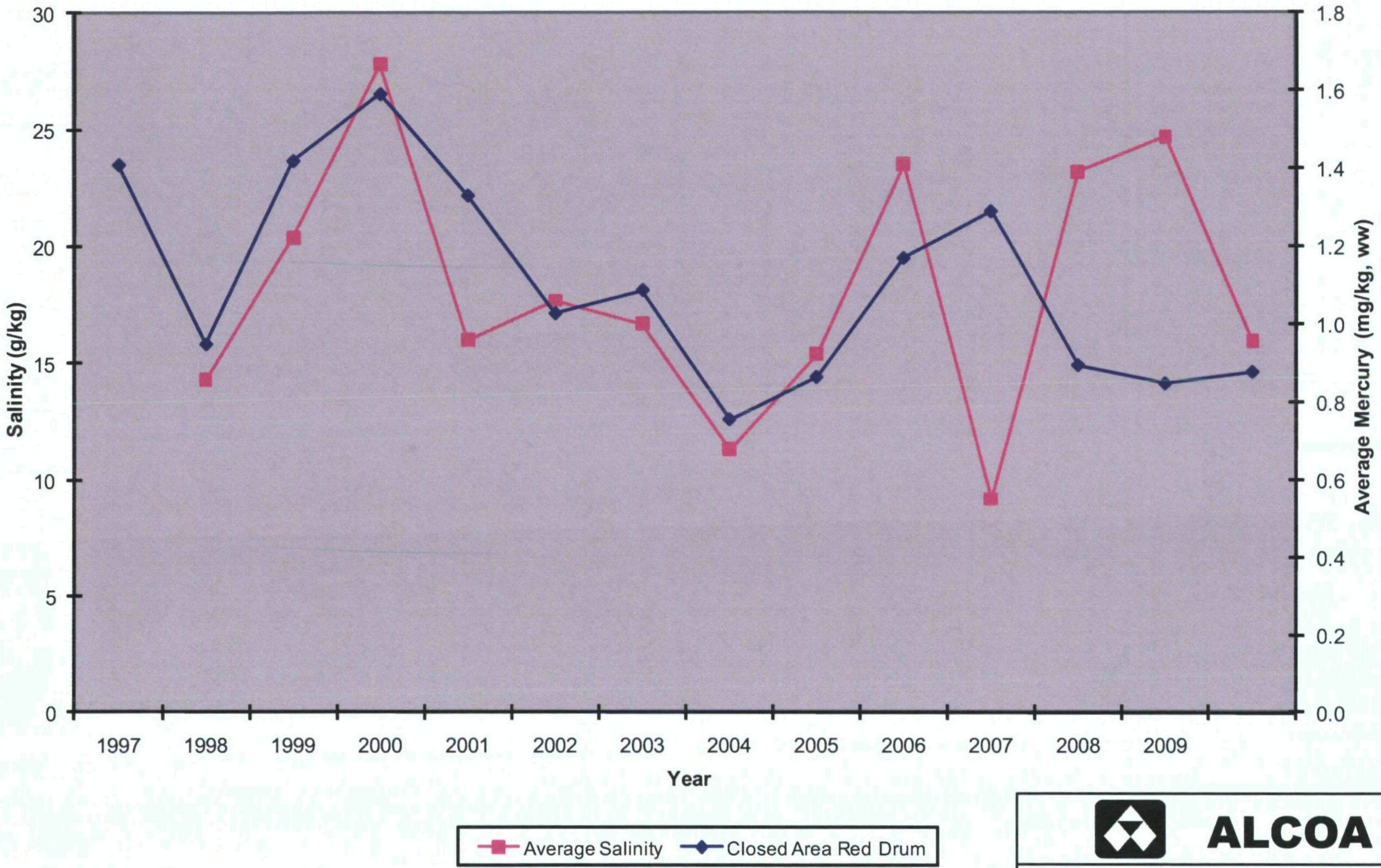
RED DRUM AND JUVENILE BLUE CRAB TISSUE TRENDS IN THE NORTHERN PART OF THE CLOSED AREA

PROJECT:	DATE: JAN 27, 2011	
REV: 0	BY: RHM	CHECKED: BLM

ALCOA

Point Comfort Operations

Figure 3.4-10 Relationship of Lavaca Bay Salinity and Red Drum Mercury Levels



ALCOA	
FIGURE 3.4-10	
RELATIONSHIP OF LAVACA BAY SALINITY AND RED DRUM MERCURY LEVELS	
PROJECT:	DATE: JAN 27, 2011
REV: 0	BY: RHM — CHECKED: BLM
ALCOA Point Comfort Operations	

APPENDIX A

LAVACA BAY ANNUAL SEDIMENT MONITORING REPORT 2010

LAVACA BAY ANNUAL SEDIMENT MONITORING REPORT 2010

Alcoa Point Comfort Operations
Lavaca Bay Superfund Site

February 2011

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1.0 INTRODUCTION

The approved remedial action plan for the Alcoa/Lavaca Bay Superfund Site focuses on eliminating ongoing sources of mercury to the bay, reducing surface sediment concentrations of mercury and poly aromatic hydrocarbons, and ultimately reducing mercury concentrations in fish tissue. A key factor in the Lavaca Bay remedy is the reduction in sediment mercury concentrations through targeted sediment removal efforts, capping, enhanced natural recovery, and/or natural recovery. In accordance with the provisions of the Lavaca Bay Sediment Remediation and Long-Term Monitoring Plan Operations, Maintenance, and Monitoring Plan (OMMP, Appendix – to the Consent Decree, March 2005), surface sediment within open water and marshes of the Closed Area adjacent to the Point Comfort Facility will be sampled and analyzed annually for total mercury to document the effectiveness of the remedial action plan.

The Consent Decree requires that the marsh sediment monitoring program be performed until all designated marshes have met the remedial action objective (RAO) for marsh sediment. An average total mercury concentration is calculated for each marsh and compared to the marsh sediment RAO. Sediment monitoring will be monitored in each marsh until the mean mercury concentration in the marsh is less than the RAO.

The RAO for marsh sediments has been met in Marshes 1, 2, 3, 11, and 19. Pursuant to the Consent Decree, annual monitoring of sediments in Marsh 11 was discontinued in 2007. Alcoa has elected to continue annual monitoring of sediment at stations 1, 2, 3, and 19 on a voluntary basis as part of their on-going effort to better understand trends in tissue concentrations in the Closed Area of Lavaca Bay.

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 in two consecutive years. As documented in the 2005 RAAER (Alcoa 2007), this occurred in 2004 and 2005 when the average concentrations of 0.293 ppm and 0.276 ppm, respectively, were measured in open water surface sediment samples from the Closed Area. Thus the performance objective of the open water sediment monitoring program established in the Consent Decree has been met. However, Alcoa has elected to continue annual monitoring of the northern half of the open water sediment sampling grid on a voluntary basis as part of their on-going effort to better understand trends in tissue concentrations in the Closed Area of Lavaca Bay.

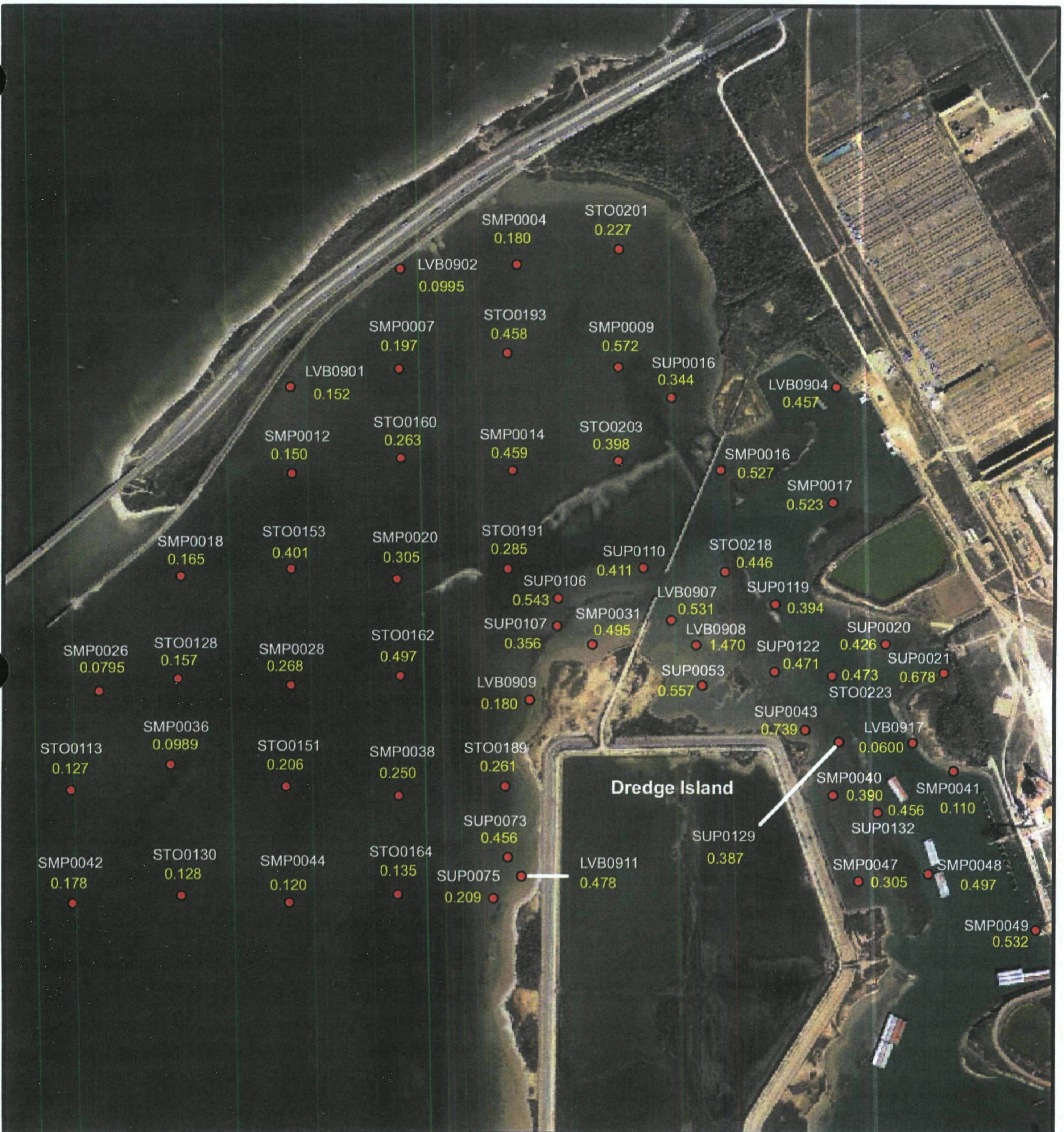
1.1 PURPOSE AND SCOPE

In accordance with the sediment monitoring OMMP, 70 stations located in the 9 remaining marshes were sampled during the 2010 monitoring event. The OMMP requires that marsh sediment samples be analyzed for Total Mercury, at a minimum. In 2010, marsh sediment samples were analyzed for Total Mercury (Hg), Methyl Mercury (MeHg), and Total Organic Carbon (TOC). The voluntary open water sediment monitoring program in 2010 consisted of surface sediment sampling at the 60 stations shown in Figure 1. Open water samples were analyzed for Total Mercury.

This document presents a summary of sampling and analytical methods and the results of the 2010 annual sediment monitoring study. A detailed description of the methods and procedures for this study are presented in the OMMP.

1.2 SITE DESCRIPTION

Alcoa Point Comfort Operations is located in Calhoun County, Texas, adjacent to Lavaca Bay. The area in the bay adjacent to the Alcoa Plant is associated with elevated mercury concentrations in fish tissue and is closed to the taking of finfish and shellfish for consumption by order of the Texas Department of Health. This area is referred to as the Closed Area. The Remedial Investigation identified the Closed Area as an area where open water and marsh sediment contains elevated mercury concentrations. The study area and sampling strategy for the open water sediment samples and marsh sediment samples within the closed area are documented in the OMMP.



N

0 800 1,600 Feet

Legend

- Open Water Sample Station Locations
- ### Open Water Sample Station IDs
- ### Open Water Total Hg Results (mg/kg- dry weight)

Notes

2009 DOQQ
NAD 1983 UTM
Zone 14 North Meters

Annual Sediment Monitoring Study Fall 2010

Open Water Sample Stations and Results

Alcoa Point Comfort Operations

Project: 98003-057
Date: 01/27/11

Figure 1

M:\\98003\057\arc\ow_tothg_results.mxd

2.0 METHODS

Sediment samples for the 2010 annual sediment monitoring study were collected and processed by Benchmark Ecological Services, Inc. (Benchmark). Samples collected for total mercury and total organic carbon were analyzed by ALS Laboratory Group (ALS) in Houston, Texas. Samples collected for methyl-mercury were analyzed by Battelle Marine Sciences Laboratory (Battelle) in Sequim, Washington. Open water samples were analyzed for Total Mercury by ALS. Marsh samples were split, and half of each sample was analyzed for Total Mercury and TOC by ALS, and half was analyzed for Methyl Mercury by Battelle. Marsh samples were collected on 3 and 10 of November 2010, and Open Water Samples were collected on 4 and 5 of January 2011. Validation and evaluation of the analytical results was conducted by Environmental Chemistry Services, Inc. in Houston, Texas.

2.1 SAMPLE STATIONS

Sample stations were located using coordinates provided by Alcoa. The coordinates were entered into a sub-meter Global Positioning System (GPS), and the GPS was used to position personnel over the sample station. Actual coordinates for the final sample station locations were recorded using the sub-meter GPS and are listed in Table 1 (open water stations) and Table 2 (marsh stations). Open water sediment sample station locations are shown in Figure 1, and marsh sediment stations are shown in Figures 2a, 2b, and 2c.

2.2 SAMPLE COLLECTION

Open water sediment samples were collected using an Ekman grab sampler. On board the sample vessel, a sub-sample (0-5 cm depth) was collected from an undisturbed portion of the Ekman sample using a modified 60 cc syringe. The lower end of the syringe barrel (needle lock) was cut off to transform the syringe barrel into an open cylinder. The open end of the syringe barrel was placed on the surface of the sediment, and while holding the syringe piston stationary, the barrel was pushed 5 cm into the sample. The syringe was pulled from the sediment and the sub-sample contained within the syringe barrel was extruded into a pre-cleaned sample jar provided by the analytical laboratory. To provide a sufficient sample volume, the process was repeated at least twice. Sediment in the sample jar was mixed using a clean plastic spoon. New clean syringes and spoons were used for each sample.

Marsh sediment samples were collected directly from the sediment surface using syringes (prepared as described above) at most sample stations. At sample stations where shell or rock was found on the sediment surface, samples were collected directly from the surface of the sediment using a pre-cleaned stainless steel spoon. A ruler was used to measure sample depths for samples collected with a spoon. Marsh sediment collected using the syringe or spoon was placed in a pre-cleaned 16 ounce glass jar provided by ALS. A disposable plastic spoon was used to homogenize the sediment. The plastic spoon was then used to split the homogenized sediment in the 16 ounce jar into two sub-samples. One sub-sample was placed in a pre-cleaned 8 ounce jar provided by ALS Laboratory and was designated for Total Mercury and TOC analysis. The second sub-sample placed in a pre-cleaned 8 ounce jar provided by Battelle and was designated for Methyl Mercury analysis.

Sample containers were labeled with the sample ID, station ID, collection date, time, and intended analysis and were put in re-sealable plastic bags, bubble wrapped, and immediately placed in an insulated chest for storage and transport. Samples designated for Total Mercury and TOC analysis were placed on wet ice in an insulated ice chest. Samples designated for Methyl Mercury analysis were placed on dry ice in a separate insulated chest. Sediment samples designated for Total Mercury and TOC analyses were hand delivered to the ALS Laboratory in Houston for analysis. Samples designated for Methyl Mercury analysis were delivered via over-night shipping to the Battelle Marine Sciences Laboratory.

Sample station coordinates, sample IDs, sample collection dates, and sediment descriptions for the open water stations are listed in Table 1. Sample station IDs, sample IDs, and sample collection dates for the marsh stations are listed in Table 2. A Chain of Custody form was completed for all samples collected.

Table 1 - Open Water Sediment Stations, Sample IDs, Field Data, and Results

Station ID	Easting[1]	Northing[1]	Sample ID	Date	Time	Water Depth (ft)[2]	Total Hg (mg/kg)[3]	% Moisture	SQL[4] (mg/kg)	Flag	Sediment Descriptions and Comments
SMP0042	2742852.228	13428809.084	SMP-SE-16150	1/4/2011	10:07	8.3	0.178	50.6	0.00710		0-2 cm Light brown sandy silt 2-5 cm Dark gray sandy silt
STO0130	2743668.841	13428868.470	SMP-SE-16151	1/4/2011	10:15	5.5	0.128	46.9	0.00654		0-2 cm Light brown sandy silt 2-5 cm Dark gray sandy silt
SMP0044	2744482.222	13428813.066	SMP-SE-16152	1/4/2011	10:25	4.9	0.120	42.9	0.00594		0-3 cm Light brown sandy silt 3-5 cm Dark gray sandy silt
STO0164	2745305.390	13428875.735	SMP-SE-16153	1/4/2011	10:32	4.3	0.135	41.5	0.00577		0-2 cm Light brown sandy silt 2-5 cm Dark gray sandy clay
SUP0075	2746026.929	13428843.250	SMP-SE-16154	1/4/2011	10:38	2.3	0.209	25.9	0.00457		0-1 cm Light brown sandy silt w/ shell 1-5 cm Dark gray sandy silt
LVB0911	2746240.033	13429013.884	SMP-SE-16155	1/4/2011	10:46	1.3	0.478	48.2	0.00666		0-2 cm Light brown sandy silt 2-5 cm Dark gray sandy clay
SUP0073	2746135.023	13429154.863	SMP-SE-16156	1/4/2011	10:57	1.3	0.456	40.8	0.00595		0-1 cm Light brown sandy silt 1-5 cm Dark gray sandy silt
STO0189	2746115.112	13429695.998	SMP-SE-16157	1/4/2011	11:02	2.2	0.261	24.0	0.00458		0-3 cm Light brown sandy silt, green moss on surface 3-5 cm Dark gray sandy silt
SMP0038	2745311.626	13429626.779	SMP-SE-16158	1/4/2011	11:07	4.0	0.250	50.7	0.00710		0-2 cm Light brown sandy silt 2-5 cm Dark gray sandy silt
STO0151	2744458.884	13429695.285	SMP-SE-16159	1/4/2011	11:16	4.6	0.206	48.3	0.00685		0-1 cm Light brown sandy silt 1-5 cm Dark gray sandy silt
SMP0036	2743589.701	13429862.175	SMP-SE-16160	1/4/2011	11:21	5.0	0.0989	32.8	0.00535		0-2 cm Light brown sandy silt 2-5 cm Brownish gray sandy silt, shell hash throughout
STO0113	2742835.460	13429668.351	SMP-SE-16161	1/4/2011	11:35	5.3	0.127	47.3	0.00669		0-1 cm Light brown sandy silt 1-5 cm Dark gray silty clay
SMP0026	2743048.316	13430422.767	SMP-SE-16162	1/4/2011	11:45	4.6	0.0795	32.7	0.00533		0-3 cm Light brown sandy silt 3-5 cm Dark gray silty clay
STO0128	2743641.895	13430518.131	SMP-SE-16163	1/4/2011	11:48	4.6	0.157	59.4	0.00871		0-2 cm Light brown sandy silt 2-4 cm Light gray sandy silt 4-5 cm Dark gray silty clay
SMP0028	2744491.349	13430469.300	SMP-SE-16164	1/4/2011	11:53	4.9	0.268	61.4	0.00892		0-2 cm Light brown sandy silt 2-4 cm Light gray sandy silt 4-5 cm Dark gray silty clay, H_2S odor throughout
STO0162	2745320.920	13430540.194	SMP-SE-16165	1/4/2011	11:58	5.3	0.497	51.3	0.00707		0-2 cm Light brown sandy silt 2-5 cm Light gray sandy silt
LVB0909	2746301.767	13430358.568	SMP-SE-16166	1/4/2011	12:05	1.0	0.180	23.4	0.00462		0-2 cm Light brown sandy silt 2-5 cm Dark gray sand, small amount of shell

Table 1 - Open Water Sediment Stations, Sample IDs, Field Data, and Results

Station ID	Easting[1]	Northing[1]	Sample ID	Date	Time	Water Depth (ft)[2]	Total Hg (mg/kg)[3]	% Moisture	SQL[4] (mg/kg)	Flag	Sediment Descriptions and Comments
SMP0020	2745294.520	13431276.439	SMP-SE-16167	1/4/2011	12:12	4.1	0.305	43.1	0.00616		0-1 cm Light brown sandy silt 1-5 cm Light gray sandy silt
STO0153	2744490.971	13431354.808	SMP-SE-16168	1/4/2011	12:20	4.5	0.401	49.9	0.00680		0-1 cm Light brown sandy silt 1-5 cm Light gray sandy silt
SMP0018	2743661.240	13431298.700	SMP-SE-16169	1/4/2011	12:25	4.7	0.165	32.3	0.00515		0-2 cm Light brown sandy silt with shell hash 2-5 cm Dark gray sandy silt
STO0203	2746963.476	13432179.055	SMP-SE-16170	1/4/2011	12:53	2.5	0.398	67.9	0.0106		0-2 cm Light brown silty sand 2-5 cm Dark gray sandy silt
SMP0014	2746166.555	13432103.284	SMP-SE-16171	1/4/2011	13:14	3.6	0.459	61.8	0.00909		0-2 cm Light brown silty sand 2-5 cm Dark gray sandy silt
STO0160	2745320.364	13432198.033	SMP-SE-16172	1/4/2011	13:21	4.0	0.263	38.8	0.00555		0-2 cm Light brown silty sand 2-5 cm Dark gray sandy silt
SMP0012	2744493.941	13432079.614	SMP-SE-16173	1/4/2011	13:25	4.0	0.150	28.4	0.00488		0-1 cm Light brown silty sand 1-5 cm Dark gray silty sand
LVB0901	2744480.543	13432738.819	SMP-SE-16174	1/4/2011	13:30	3.6	0.152	28.3	0.00489		0-2 cm Light brown silty sand 2-5 cm Dark gray silty sand
SMP0007	2745303.677	13432876.914	SMP-SE-16175	1/4/2011	13:35	3.7	0.197	31.4	0.00507		0-3 cm Light brown silty sand 3-5 cm Dark gray silty sand
STO0193	2746120.260	13432995.328	SMP-SE-16176	1/4/2011	13:40	2.8	0.458	50.7	0.00707		0-2 cm Light brown sandy silt 2-5 cm Dark gray silty sand
SMP0009	2746959.894	13432890.737	SMP-SE-16177	1/4/2011	13:45	3.1	0.572	49.5	0.00660		0-4 cm Light brown sandy silt 4-5 cm Light gray sandy silt
SUP0016	2747363.389	13432658.054	SMP-SE-16178	1/4/2011	13:50	2.6	0.344	47.5	0.00675		0-2 cm Light brown sandy silt 2-5 cm Medium gray sandy silt with shell hash
STO0201	2746959.512	13433789.358	SMP-SE-16179	1/4/2011	13:55	2.2	0.227	35.1	0.00524		0-5 cm Light brown silty sand
SMP0004	2746192.124	13433674.246	SMP-SE-16180	1/4/2011	14:00	2.9	0.180	29.4	0.00487		0-2 cm Light brown silty sand 2-5 cm Light gray silty sand
LVB0902	2745309.914	13433637.796	SMP-SE-16181	1/4/2011	14:05	2.4	0.0995	20.3	0.00443		0-2 cm Light brown silty sand 2-5 cm Light gray sand
STO0191	2746130.798	13431355.508	SMP-SE-16182	1/4/2011	14:10	4.0	0.285	49.9	0.00691		0-1 cm Light brown silty sand with shell hash 1-5 cm Light gray silty sand
SUP0106	2746514.612	13431132.656	SMP-SE-16183	1/4/2011	14:17	1.9	0.543	32.2	0.00494		0-1 cm Light brown sandy silt with shell hash 1-5 cm Light gray sand with shell hash
SUP0110	2747157.323	13431365.787	SMP-SE-16184	1/4/2011	14:20	2.4	0.411	49.8	0.00670		0-2 cm Light brown sandy silt 2-5 cm Dark gray sandy silt
LVB0907	2747370.671	13430965.761	SMP-SE-16185	1/4/2011	14:26	1.6	0.531	62.8	0.00953		0-3 cm Light brown sandy silt 3-5 cm Light gray sandy silt

Table 1 - Open Water Sediment Stations, Sample IDs, Field Data, and Results

Station ID	Easting[1]	Northing[1]	Sample ID	Date	Time	Water Depth (ft)[2]	Total Hg (mg/kg)[3]	% Moisture	SQL[4] (mg/kg)	Flag	Sediment Descriptions and Comments
LVB0908	2747560.972	13430775.624	SMP-SE-16186	1/4/2011	14:33	0.5	1.470	30.7	0.0241		0-2 cm Light brown silty sand 2-5 cm Dark gray sand
STO0218	2747777.188	13431336.535	SMP-SE-16187	1/4/2011	14:40	1.5	0.446	47.2	0.00640		0-2 cm Light brown silty sand 2-5 cm Medium gray silty sand, shell throughout
SMP0016	2747740.782	13432107.235	SMP-SE-16188	1/4/2011	14:48	4.2	0.527	68.3	0.0110		0-3 cm Light brown sandy silt 3-5 cm Dark gray sandy silt
SMP0017	2748593.591	13431864.907	SMP-SE-16189	1/4/2011	15:00	7.1	0.523	65.2	0.0100		0-1 cm Light brown sandy silt 1-5 cm Light gray sandy silt
LVB0904	2748612.895	13432740.577	SMP-SE-16190	1/4/2011	15:05	7.1	0.457	70.2	0.0117		0-2 cm Light brown sandy silt 2-5 cm Light gray sandy silt
SUP0119	2748161.013	13431087.447	SMP-SE-16191	1/4/2011	15:11	5.8	0.394	64.7	0.0100		0-2 cm Light brown sandy silt 2-5 cm Light gray silt
SUP0020	2748994.168	13430789.358	SMP-SE-16192	1/4/2011	15:45	3.1	0.426	45.1	0.00642		0-2 cm Light brown sandy silt 2-5 cm Light gray sandy silt
SUP0021	2749443.573	13430569.816	SMP-SE-16193	1/4/2011	15:55	2.8	0.678	52.2	0.00699		0-4 cm Light brown sandy silt 4-5 cm Light gray sandy silt
STO0223	2748594.159	13430543.214	SMP-SE-16194	1/4/2011	16:06	9.0	0.473	55.5	0.00784		0-1 cm Light brown sandy silt 1-5 cm Medium gray sandy silt with shell hash
SUP0122	2748154.673	13430575.821	SMP-SE-16195	1/4/2011	16:18	2.0	0.471	40.1	0.00587		0-2 cm Light brown sandy silt 2-5 cm Light gray sandy silt
SUP0043	2748390.999	13430129.892	SMP-SE-16196	1/4/2011	16:25	1.7	0.739	37.5	0.00563		0-2 cm Light brown sandy silt 2-5 cm Light gray sandy silt
SUP0129	2748646.849	13430041.452	SMP-SE-16197	1/4/2011	16:45	3.8	0.387	65.1	0.0101		0-2 cm Light brown sandy silt 2-5cm Light gray sandy clay
LVB0917	2749204.392	13430031.853	SMP-SE-16198	1/4/2011	16:54	1.4	0.0600	40.2	0.00567		0-1 cm Light brown sandy silt with shell hash on surface 1-5 cm Light gray sandy clay
SMP0041	2749519.327	13429822.093	SMP-SE-16199	1/4/2011	17:02	1.3	0.110	24.2	0.00445		0-5 cm Light gray clay with shell hash throughout
SMP0049	2750156.100	13428612.184	SMP-SE-16200	1/4/2011	17:10	4.5	0.532	29.3	0.00483		0-1 cm Light brown sandy silt 1-5 cm Dark gray clay
SMP0031	2746777.134	13430781.847	SMP-SE-16201	1/5/2011	8:15	1.5	0.495	52.6	0.00710		0-1 cm Light brown silty sand 1-5 cm Dark gray sandy clay
SUP0107	2746508.143	13430922.756	SMP-SE-16202	1/5/2011	8:24	2.0	0.356	27.4	0.00459		0-1 cm Light brown sandy silt 1-5 cm Medium gray sandy silt with shell hash throughout
SUP0053	2747607.018	13430470.637	SMP-SE-16203	1/5/2011	8:35	1.9	0.557	65.5	0.00996		0-2 cm Light brown sandy silt 2-5 cm Light gray sandy silt

Table 1 - Open Water Sediment Stations, Sample IDs, Field Data, and Results

Station ID	Easting[1]	Northing[1]	Sample ID	Date	Time	Water Depth (ft)[2]	Total Hg (mg/kg)[3]	% Moisture	SQL[4] (mg/kg)	Flag	Sediment Descriptions and Comments
SMP0040	2748604.390	13429634.758	SMP-SE-16204	1/5/2011	8:47	2.0	0.390	31.3	0.00499		0-3 cm Light brown sandy silt 3-5 cm Dark gray sandy clay
SUP0132	2748942.250	13429500.439	SMP-SE-16205	1/5/2011	8:56	3.0	0.456	51.9	0.00708		0-2 cm Light brown sandy silt 2-5 cm Light gray sand
SMP0048	2749326.168	13429038.177	SMP-SE-16206	1/5/2011	9:05	6.0	0.497	56.8	0.00800		0-1 cm Light brown sandy silt 1-5 cm Light gray sandy clay
SMP0047	2748794.891	13428982.192	SMP-SE-16207	1/5/2011	9:15	3.0	0.305	54.2	0.00759		0-2 cm Light brown sandy silt 2-5 cm Dark gray sandy silt

[1]Coordinates Reported in NAD 1983 StatePlane Texas South Central, Feet
[2] Water Depths are not calibrated to tidal level
[3]Results reported as dry weight
[4]SQL - Sample Quantitation Limit

Table 2 - Marsh Sediment Stations, Sample IDs, and Results

Habitat	Station ID	Sample ID	Date	Total Hg				Methyl Hg				TOC			
				% M	(mg/kg)[1] dry wt	SQL (mg/kg)	Total Hg Flags	% M	(ng/g)[1] dry wt	SQL (ng/g)	MeHg Flags	% M	TOC (wt%)[1]	SQL (wt%)	TOC Flags
Marsh 1	Marsh-1-1R	SMP-SE-16113	11/3/2010	25.3%	0.0824	0.00454		25.7%	0.213	0.0355		25.3%	0.452	0.0600	
	Marsh-1-2R	SMP-SE-16112	11/3/2010	24.3%	0.0827	0.00456		25.4%	0.139	0.0355		24.3%	0.177	0.0600	
	Marsh-1-3R	SMP-SE-16111	11/3/2010	23.1%	0.0977	0.00439		25.1%	0.157	0.0355		23.1%	0.186	0.0600	
	Marsh-1-4R	SMP-SE-16110	11/3/2010	27.4%	0.106	0.00484		25.3%	0.120	0.0355		27.4%	0.542	0.0600	
	Marsh-1-5R	SMP-SE-16109	11/3/2010	21.6%	0.0761	0.00440		26.0%	0.200	0.0355		21.6%	0.168	0.0600	
	Marsh-1-6R	SMP-SE-16108	11/3/2010	22.6%	0.0749	0.00464		26.1%	0.264	0.0355		22.6%	0.204	0.0600	
	Marsh-1-7R	SMP-SE-16107	11/3/2010	28.0%	0.290	0.00488		32.1%	0.468	0.0355		28.0%	0.302	0.0600	
	Marsh-1-8R	SMP-SE-16106	11/3/2010	27.8%	0.0771	0.00493		28.7%	0.382	0.0355		27.8%	0.236	0.0600	
	Marsh-1-9R	SMP-SE-16105	11/3/2010	28.7%	0.0947	0.00489		26.4%	0.612	0.0355		28.7%	0.467	0.0600	
	Marsh-1-10R	SMP-SE-16104	11/3/2010	31.2%	0.135	0.00491		29.7%	0.563	0.0355		31.2%	0.481	0.0600	
	Marsh-1-11R	SMP-SE-16103	11/3/2010	23.8%	0.123	0.00474		27.3%	0.456	0.0355		23.8%	0.720	0.0600	
	Marsh-1-12R	SMP-SE-16102	11/3/2010	29.4%	11.50	0.09900		25.9%	6.10	0.0355		29.4%	0.871	0.0600	
					1.0616				**0.806**				**0.401**		
Marsh 2	Marsh-2-1R	SMP-SE-16101	11/3/2010	29.9%	0.0328	0.00503		26.0%	0.248	0.0355		29.9%	0.494	0.0600	
	Marsh-2-2R	SMP-SE-16100	11/3/2010	31.4%	0.0580	0.00522		30.9%	0.463	0.0355		31.4%	0.624	0.0600	
	Marsh-2-3R	SMP-SE-16099	11/3/2010	30.5%	0.130	0.00509		28.4%	0.464	0.0355		30.5%	0.590	0.0600	
	Marsh-2-4R	SMP-SE-16098	11/3/2010	28.3%	0.0789	0.00475		26.3%	0.277	0.0355		28.3%	0.469	0.0600	
	Marsh-2-5R	SMP-SE-16097	11/3/2010	28.0%	0.0944	0.00471		24.6%	0.147	0.0355		28.0%	0.446	0.0600	
	Marsh-2-6R	SMP-SE-16096	11/3/2010	26.8%	0.0913	0.00472		40.7%	0.593	0.0355		26.8%	0.783	0.0600	
					0.0809				**0.365**				**0.568**		
Marsh 3	Marsh-3-1R	SMP-SE-16095	11/3/2010	20.2%	0.0603	0.00435		20.1%	0.433	0.0355		20.2%	1.53	0.0600	
	Marsh-3-2R	SMP-SE-16094	11/3/2010	28.0%	0.0792	0.00471		26.6%	0.361	0.0355		28.0%	0.918	0.0600	
	Marsh-3-3R	SMP-SE-16093	11/3/2010	31.8%	0.0816	0.00496		33.8%	0.463	0.0355		31.8%	1.31	0.0600	
	Marsh-3-4R	SMP-SE-16092	11/3/2010	26.4%	0.0577	0.00478		27.0%	0.216	0.0355		26.4%	1.64	0.0600	
	Marsh-3-5R	SMP-SE-16091	11/3/2010	29.9%	0.436	0.00493		32.5%	0.653	0.0355		29.9%	2.99	0.0600	
	Marsh-3-6R	SMP-SE-16090	11/3/2010	26.5%	0.172	0.00473		24.5%	0.488	0.0355		26.5%	2.45	0.0600	
					0.1478				**0.436**				**1.806**		

Table 2 - Marsh Sediment Stations, Sample IDs, and Results

Habitat	Station ID	Sample ID	Date	Total Hg				Methyl Hg				TOC			
				% M	(mg/kg)[1] dry wt	SQL (mg/kg)	Total Hg Flags	% M	(ng/g)[1] dry wt	SQL (ng/g)	MeHg Flags	% M	TOC (wt%)[1]	SQL (wt%)	TOC Flags
Marsh 5	Marsh-5-1R	SMP-SE-16126	11/10/2010	32.0%	0.365	0.00499		32.9%	1.19	0.0355		32.0%	1.50	0.0600	
	Marsh-5-2R	SMP-SE-16127	11/10/2010	28.9%	0.827	0.00953		30.3%	0.606	0.0355		28.9%	1.32	0.0600	
	Marsh-5-3R	SMP-SE-16128	11/10/2010	41.6%	0.396	0.00588		36.0%	0.502	0.0355		41.6%	0.889	0.0600	
	Marsh-5-4R	SMP-SE-16129	11/10/2010	37.9%	0.348	0.00541		41.7%	0.481	0.0355		37.9%	1.17	0.0600	
	Marsh-5-5R	SMP-SE-16130	11/10/2010	53.3%	0.405	0.00714		47.9%	0.655	0.0355		53.3%	1.13	0.0600	
	Marsh-5-6R	SMP-SE-16131	11/10/2010	26.3%	0.0873	0.00484		26.5%	0.626	0.0355		26.3%	0.652	0.0600	
					0.4047				**0.677**				**1.110**		
Marsh 6	Marsh-6-1R	SMP-SE-16120	11/10/2010	33.5%	0.164	0.00526		37.7%	0.775	0.0355		33.5%	1.28	0.0600	
	Marsh-6-2R	SMP-SE-16121	11/10/2010	33.7%	0.499	0.00511		34.2%	0.762	0.0355		33.7%	1.12	0.0600	
	Marsh-6-3R	SMP-SE-16122	11/10/2010	56.6%	0.674	0.00780		54.9%	1.14	0.0355		56.6%	1.31	0.0600	
	Marsh-6-4R	SMP-SE-16123	11/10/2010	49.6%	0.386	0.00718		54.5%	1.03	0.0355		49.6%	1.26	0.0600	
	Marsh-6-5R	SMP-SE-16124	11/10/2010	35.8%	0.981	0.00564		37.9%	1.41	0.0355		35.8%	1.05	0.0600	
	Marsh-6-6R	SMP-SE-16125	11/10/2010	31.6%	0.166	0.00498		30.3%	0.271	0.0355		31.6%	0.804	0.0600	
	Marsh-6-7R	SMP-SE-16086	11/3/2010	36.5%	0.268	0.00537		37.7%	1.10	0.0355		36.5%	0.850	0.0600	
	Marsh-6-8R	SMP-SE-16087	11/3/2010	28.8%	0.217	0.00494		28.0%	0.572	0.0355		28.8%	0.688	0.0600	
	Marsh-6-9R	SMP-SE-16088	11/3/2010	37.5%	6.67	0.0535		32.4%	3.51	0.0355		37.5%	2.88	0.0600	
	Marsh-6-10R	SMP-SE-16089	11/3/2010	26.5%	0.0985	0.00455		28.6%	0.254	0.0355		26.5%	1.18	0.0600	
					1.0124				**1.082**				**1.242**		
Marsh 7	Marsh-7-1R	SMP-SE-16080	11/3/2010	28.7%	0.0646	0.00478		27.7%	0.209	0.0355		28.7%	1.39	0.0600	
	Marsh-7-2R	SMP-SE-16081	11/3/2010	23.3%	0.346	0.00471		24.0%	0.636	0.0355		23.3%	2.44	0.0600	
	Marsh-7-3R	SMP-SE-16082	11/3/2010	17.9%	0.245	0.00421		8.4%	0.207	0.0355		17.9%	4.98	0.0600	
	Marsh-7-4R	SMP-SE-16083	11/3/2010	22.6%	0.263	0.00442		28.2%	0.587	0.0355		22.6%	1.81	0.0600	
	Marsh-7-5R	SMP-SE-16084	11/3/2010	28.4%	0.258	0.00477		30.6%	0.575	0.0355		28.4%	0.950	0.0600	
	Marsh-7-6R	SMP-SE-16085	11/3/2010	14.8%	0.140	0.00398		15.9%	0.163	0.0355		14.8%	4.52	0.0600	
					0.2194				**0.396**				**2.682**		

Table 2 - Marsh Sediment Stations, Sample IDs, and Results

Habitat	Station ID	Sample ID	Date	Total Hg				Methyl Hg				TOC			
				% M	(mg/kg)[1] dry wt	SQL (mg/kg)	Total Hg Flags	% M	(ng/g)[1] dry wt	SQL (ng/g)	MeHg Flags	% M	TOC (wt%)[1]	SQL (wt%)	TOC Flags
Marsh 14	Marsh-14-1R	SMP-SE-16114	11/10/2010	31.3%	3.980	0.0249		32.9%	2.74	0.0355		31.3%	1.44	0.0600	
	Marsh-14-2R	SMP-SE-16115	11/10/2010	28.1%	0.398	0.00469		27.2%	0.437	0.0355		28.1%	0.738	0.0600	
	Marsh-14-3R	SMP-SE-16116	11/10/2010	35.2%	0.707	0.00516		38.5%	1.50	0.0355		35.2%	1.46	0.0600	
	Marsh-14-4R	SMP-SE-16117	11/10/2010	26.4%	0.931	0.00480		31.8%	1.89	0.0355		26.4%	0.0300[3]	0.0600	
	Marsh-14-5R	SMP-SE-16118	11/10/2010	24.7%	0.356	0.00455		25.8%	0.595	0.0355		24.7%	0.438	0.0600	
	Marsh-14-6R	SMP-SE-16119	11/10/2010	29.4%	0.285	0.00479		26.8%	0.413	0.0355		29.4%	1.33	0.0600	
					1.1095				**1.263**				**0.906**		
Marsh 15	Marsh-15-1R	SMP-SE-16141	11/10/2010	31.6%	0.451	0.00503		29.3%	0.334	0.0355		31.6%	1.04	0.0600	
	Marsh-15-2R	SMP-SE-16140	11/10/2010	41.2%	0.646	0.00583		34.1%	0.328	0.0355		41.2%	1.01	0.0600	
	Marsh-15-3R	SMP-SE-16139	11/10/2010	30.4%	0.667	0.00488		28.8%	0.388	0.0355		30.4%	0.740	0.0600	
	Marsh-15-4R	SMP-SE-16138	11/10/2010	26.8%	0.291	0.00476		30.3%	0.209	0.0355		26.8%	1.26	0.0600	
	Marsh-15-5R	SMP-SE-16137	11/10/2010	29.4%	0.242	0.00471		30.7%	0.366	0.0355		29.4%	0.875	0.0600	
	Marsh-15-6R	SMP-SE-16136	11/10/2010	28.5%	0.416	0.00504		27.7%	0.629	0.0355		28.5%	0.496	0.0600	
	Marsh-15-7R	SMP-SE-16135	11/10/2010	33.2%	1.00	0.00514		31.2%	0.463	0.0355		33.2%	0.719	0.0600	
	Marsh-15-8R	SMP-SE-16134	11/10/2010	25.7%	0.469	0.00465		24.0%	0.322	0.0355		25.7%	0.370	0.0600	
	Marsh-15-9R	SMP-SE-16133	11/10/2010	24.5%	0.101	0.00475		25.7%	0.220	0.0355		24.5%	0.360	0.0600	
	Marsh-15-10R	SMP-SE-16132	11/10/2010	26.8%	0.113	0.00467		24.7%	0.283	0.0355		26.8%	1.04	0.0600	
					0.4396				**0.354**				**0.791**		

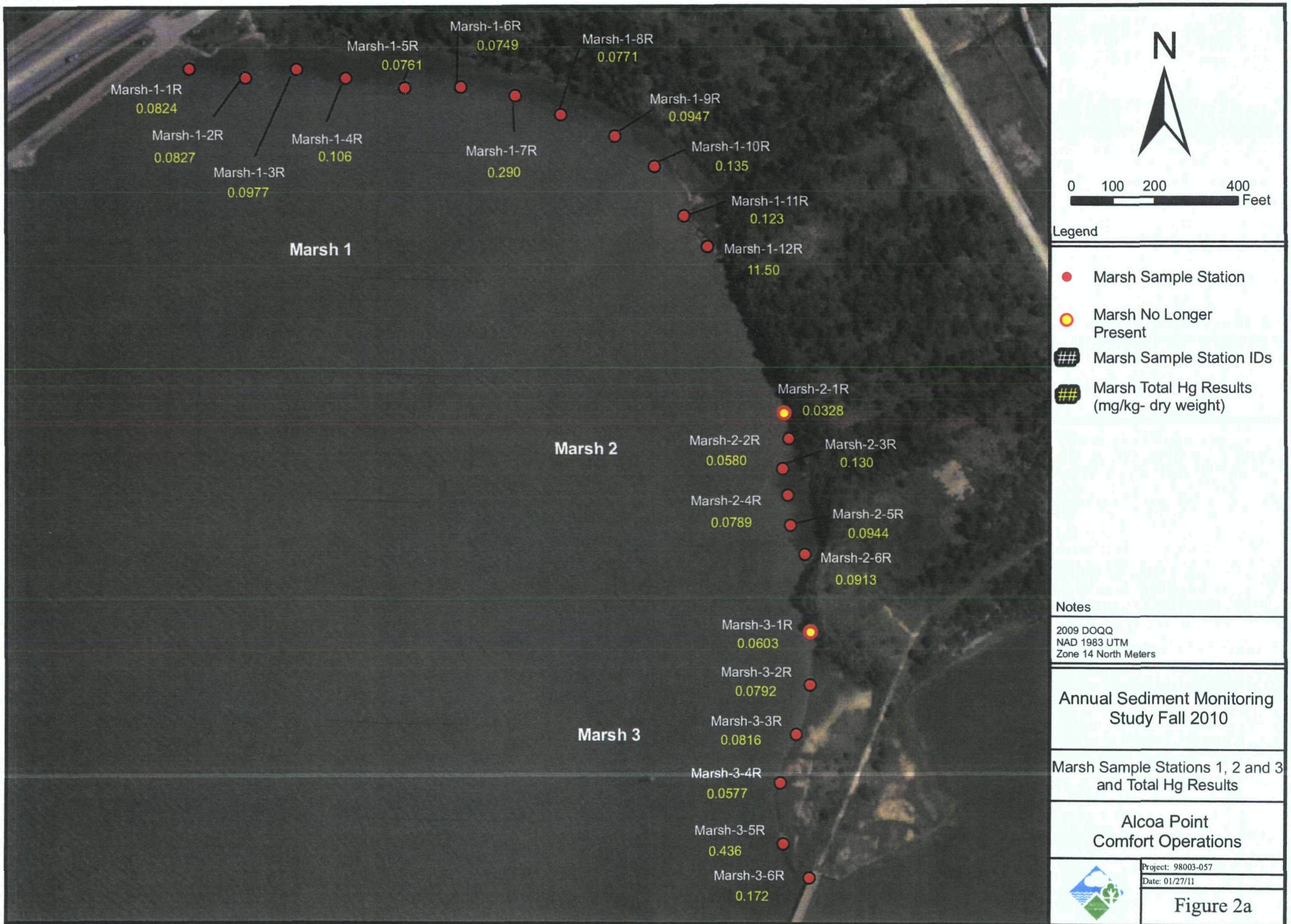
Table 2 - Marsh Sediment Stations, Sample IDs, and Results

Habitat	Station ID	Sample ID	Date	Total Hg				Methyl Hg				TOC			
				% M	(mg/kg)[1] dry wt	SQL (mg/kg)	Total Hg Flags	% M	(ng/g)[1] dry wt	SQL (ng/g)	MeHg Flags	% M	TOC (wt%)[1]	SQL (wt%)	TOC Flags
Marsh 19	Marsh-19-1R	SMP-SE-16142	11/10/2010	26.6%	0.0883	0.00467		28.1%	0.140	0.0355		26.6%	1.45	0.0600	
	Marsh-19-2R	SMP-SE-16143	11/10/2010	28.6%	0.00353	0.00503	J[2]	28.6%	0.0602	0.0355		28.6%	0.891	0.0600	
	Marsh-19-3R	SMP-SE-16144	11/10/2010	24.0%	0.0571	0.00444		24.2%	0.121	0.0355		24.0%	1.47	0.0600	
	Marsh-19-4R	SMP-SE-16145	11/10/2010	20.3%	0.0863	0.00437		28.1%	0.201	0.0355		20.3%	0.912	0.0600	
	Marsh-19-5R	SMP-SE-16146	11/10/2010	24.7%	0.0993	0.00467		25.4%	0.161	0.0355		24.7%	1.11	0.0600	
	Marsh-19-6R	SMP-SE-16147	11/10/2010	24.3%	0.194	0.00462		23.7%	0.180	0.0355		24.3%	0.440	0.0600	
	Marsh-19-7R	SMP-SE-16148	11/10/2010	28.1%	0.788	0.00476		28.4%	0.318	0.0355		28.1%	0.696	0.0600	
	Marsh-19-8R	SMP-SE-16149	11/10/2010	30.1%	0.366	0.00519		24.1%	0.154	0.0355		30.1%	0.218	0.0600	
					0.2103				**0.167**				**0.898**		

[1] Analytical results presented in dry weight

[2] Analyte detected below quantitation limits

[3] TOC was not detected in this sample, the result is shown as ½ the report limit and used to calculate the average TOC



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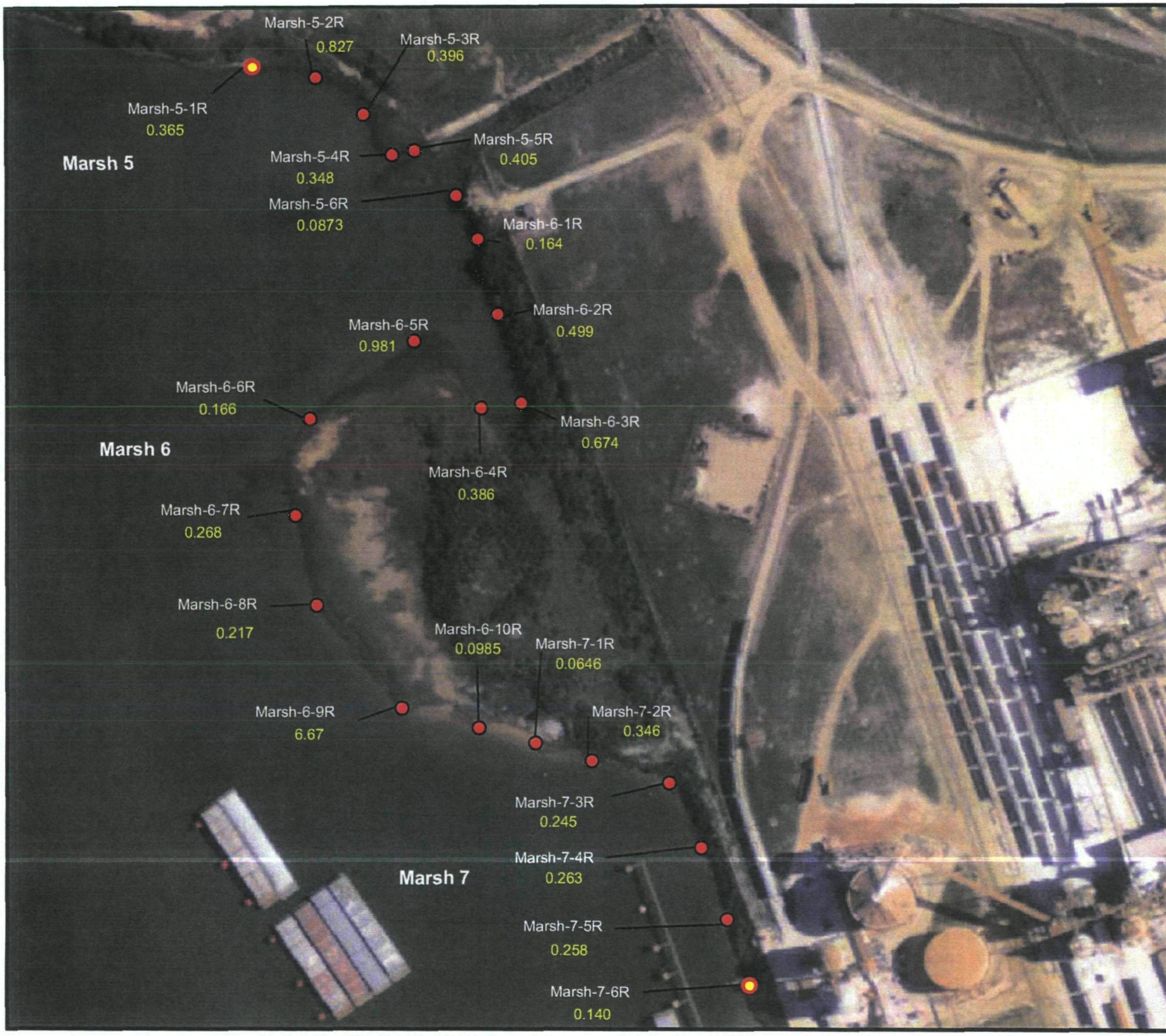

Legend

- Marsh Sample Station
- Marsh No Longer Present
- ## Marsh Sample Station IDs
- ## Marsh Total Hg Results (mg/kg- dry weight)

Notes

2009 DOQQ
NAD 1983 UTM
Zone 14 North Meters

Annual Sediment Monitoring Study Fall 2010

Marsh Sample Stations 5, 6 and 7 and Total Hg Results

Alcoa Point Comfort Operations

Project: 98003-057
Date: 01/27/11

Figure 2b

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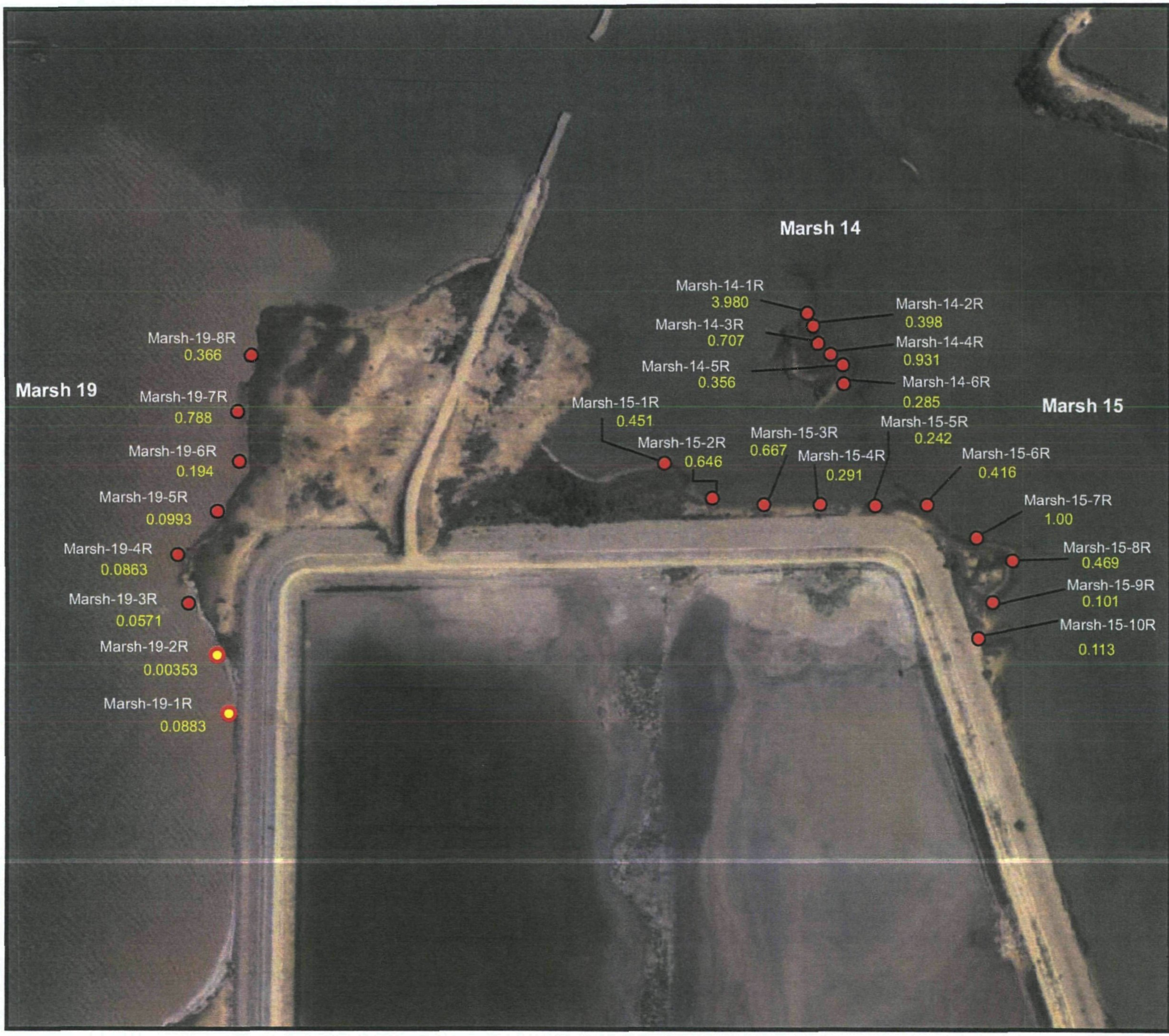


N

0 125 250 500 Feet

Legend

- Marsh Sample Station
- Marsh No Longer Present
- ## Marsh Sample Station IDs
- ## Marsh Total Hg Results (mg/kg- dry weight)

Notes

2009 DOQQ
NAD 1983 UTM
Zone 14 North Meters

Annual Sediment Monitoring Study Fall 2010

Marsh Sample Stations 14, 15 and 19 and Total Hg Results

Alcoa Point Comfort Operations

Project: 98003-057
Date: 01/27/11

Figure 2c

M:\98003\055\arc\Hg\marsh_10_stations141519_Hg_fin.mxd

3.0 ANALYTICAL RESULTS

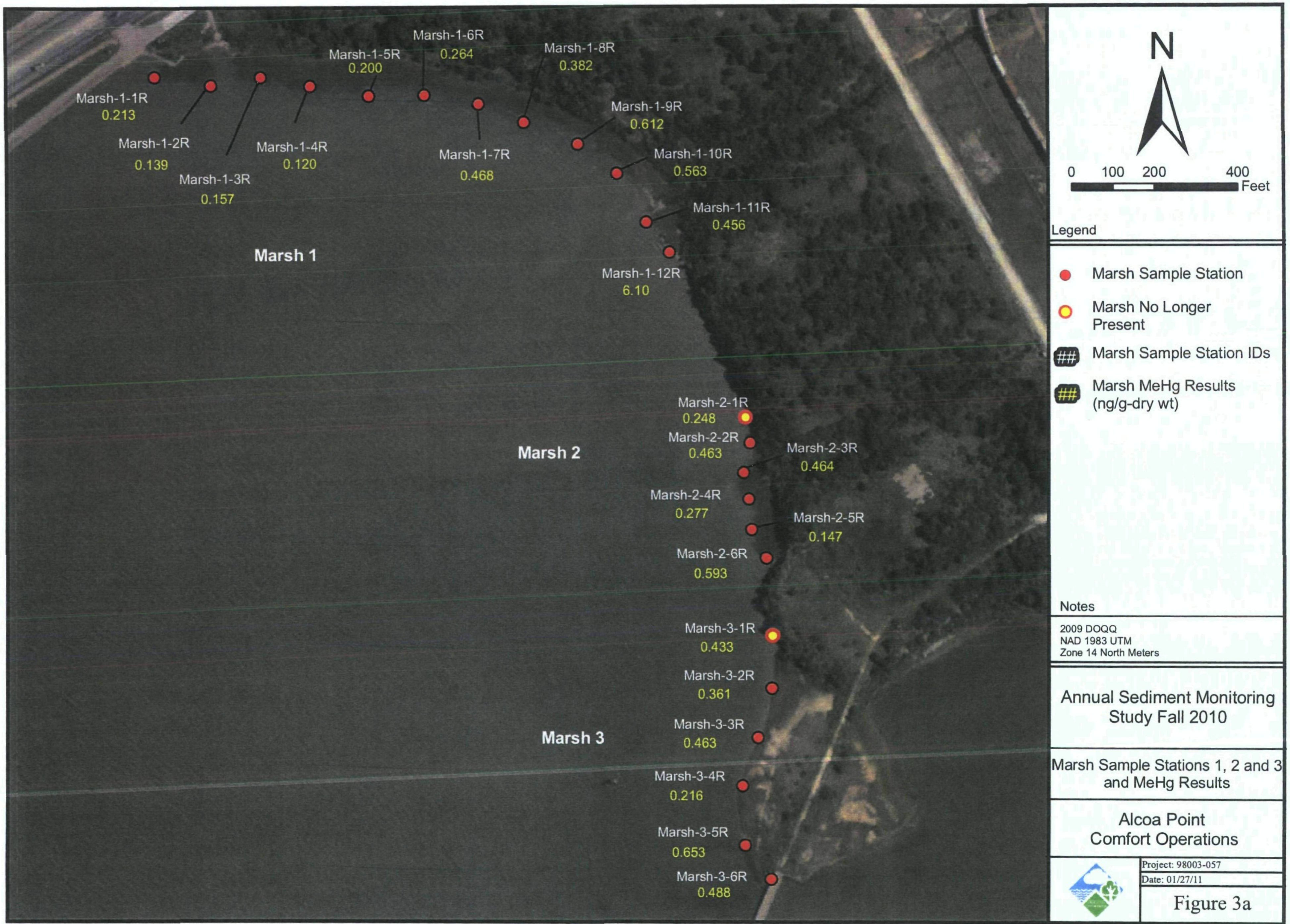
Marsh and open water sediment samples were analyzed for Total Mercury (Method 7471A) and percent moisture by ALS in Houston, Texas. Total mercury results were reported in µg/kg as dry weight and were converted to mg/kg as dry weight. Marsh Sediment samples were also analyzed for Total Organic Carbon (SW 9060) by ALS in Houston, Texas, and Methyl Mercury (EPA 1630 (draft) using preparation outlined in Bloom et. al. 1997[1]) by Battelle Marine Sciences Laboratory. Total Organic Carbon results were reported in percent sample weight. Benchmark received all final data packets from ALS Laboratory on 26 January 2011. Data validation and evaluation was completed by Environmental Chemistry Services on 28 January 2011. Methyl mercury results were reported in ng/kg as dry weight. Benchmark received the final data packet from Battelle Marine Sciences Laboratory on 4 January 2011. Data validation and evaluation was completed by Environmental Chemistry Services on 5 January 2011.

Open water sediment station numbers, sample IDs, analytical results and percent moisture are listed for each sample in Table 1. Marsh sediment station numbers, sample identification numbers, and analytical results are listed in Table 2. The analytical results for the individual samples from each marsh were mathematically averaged in this report to produce the average mercury concentration for each marsh as required by the OMMP. Marsh sediment analytical results are shown in the Figures as listed in Table 3. Open water analytical results are shown in Figure 1.

Analytical results for sediment samples were validated according to the Standard Operating Procedure Data Validation (Appendix E) in the Quality Assurance Project Plan Alcoa (Point Comfort)/Lavaca Bay Superfund Site (22 August 2005). All analytical results were validated and may be included in the data used to evaluate the effectiveness of the approved remedy and to meet monitoring requirements specified in the Consent Decree.

Table 3 – Figures Showing Marsh Sediment Results

Marsh ID	Analyte	Figure ID
Marshes 1, 2, and 3	Total Hg	Figure 2a
Marshes 5, 6, and 7	Total Hg	Figure 2b
Marshes 14, 15, and 19	Total Hg	Figure 2c
Marshes 1, 2, and 3	Methyl Hg	Figure 3a
Marshes 5, 6, and 7	Methyl Hg	Figure 3b
Marshes 14, 15, and 19	Methyl Hg	Figure 3c
Marshes 1, 2, and 3	TOC	Figure 4a
Marshes 5, 6, and 7	TOC	Figure 4b
Marshes 14, 15, and 19	TOC	Figure 4c



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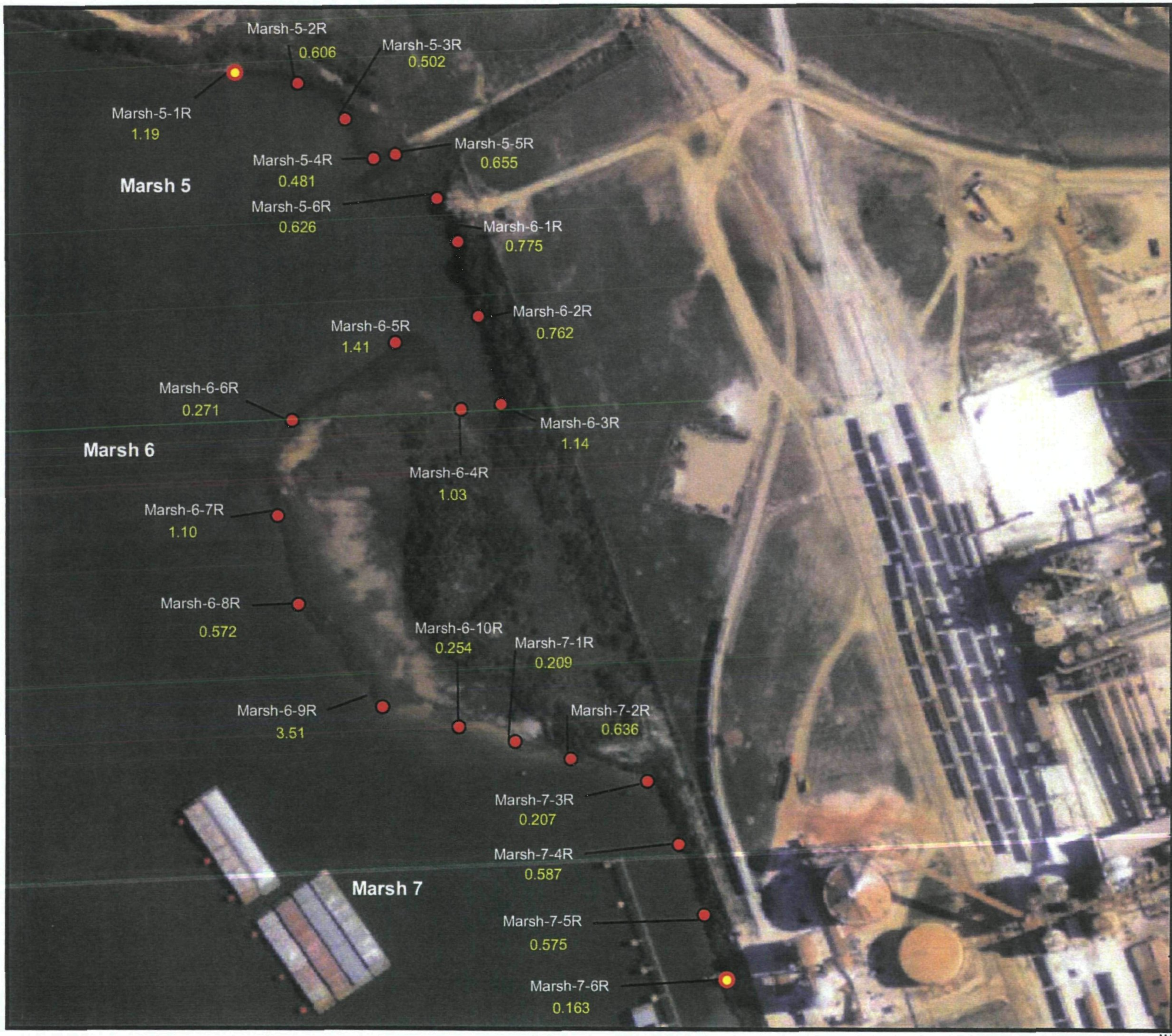

N

0 75 150 300 Feet

Legend

- Marsh Sample Station
- Marsh No Longer Present
- ## Marsh Sample Station IDs
- ## Marsh MeHg Results (ng/g-dry wt.)

Notes

2009 DOQQ
NAD 1983 UTM
Zone 14 North Meters

Annual Sediment Monitoring Study Fall 2010

Marsh Sample Stations 5, 6 and 7 and MeHg Results

Alcoa Point Comfort Operations

Project: 98003-057
Date: 01/27/11

Figure 3b

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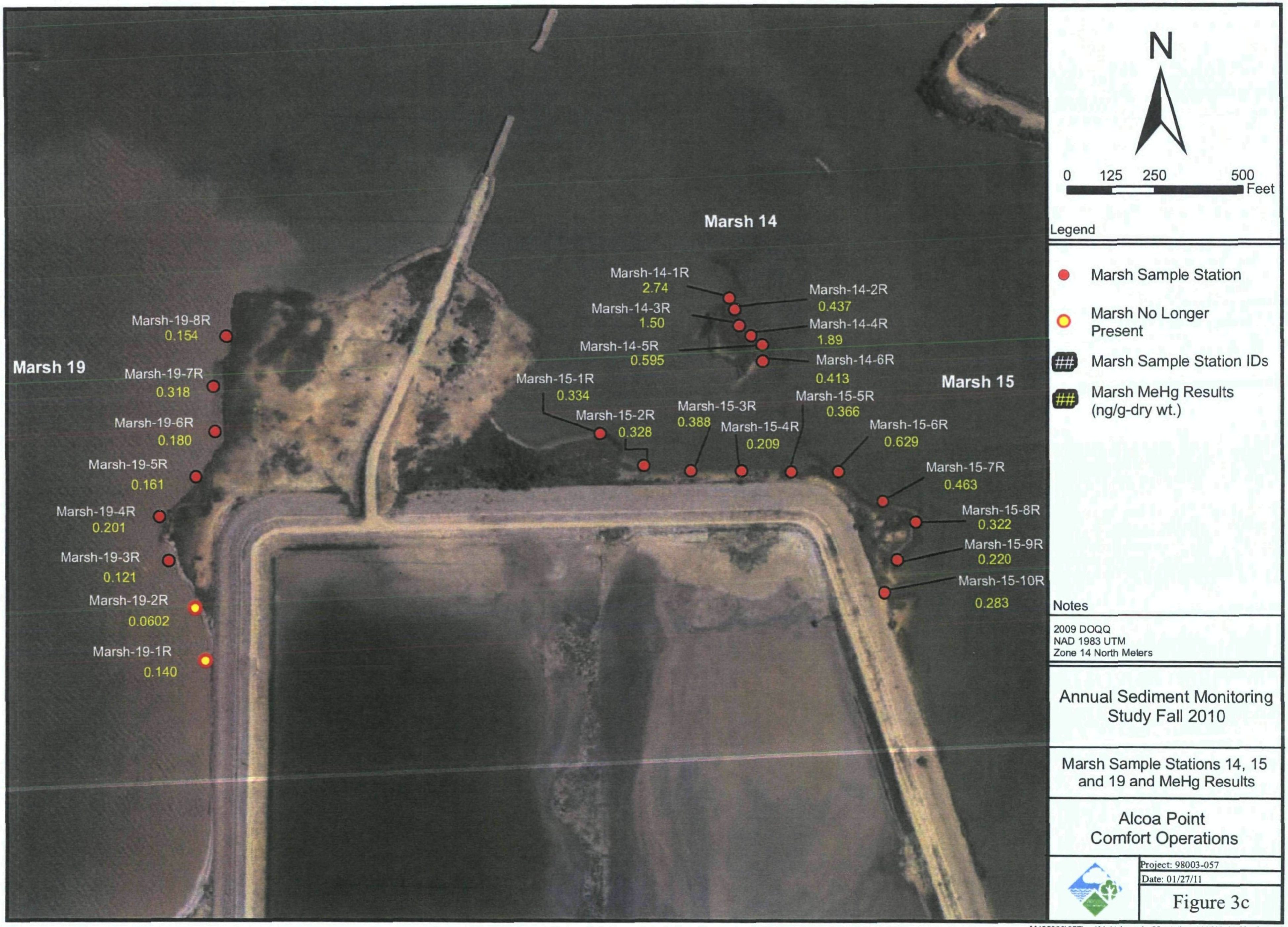

Notes

2009 DOQQ
NAD 1983 UTM
Zone 14 North Meters

Annual Sediment Monitoring Study Fall 2010

Marsh Sample Stations 14, 15 and 19 and MeHg Results

Alcoa Point Comfort Operations

Project: 98003-057
Date: 01/27/11

Figure 3c

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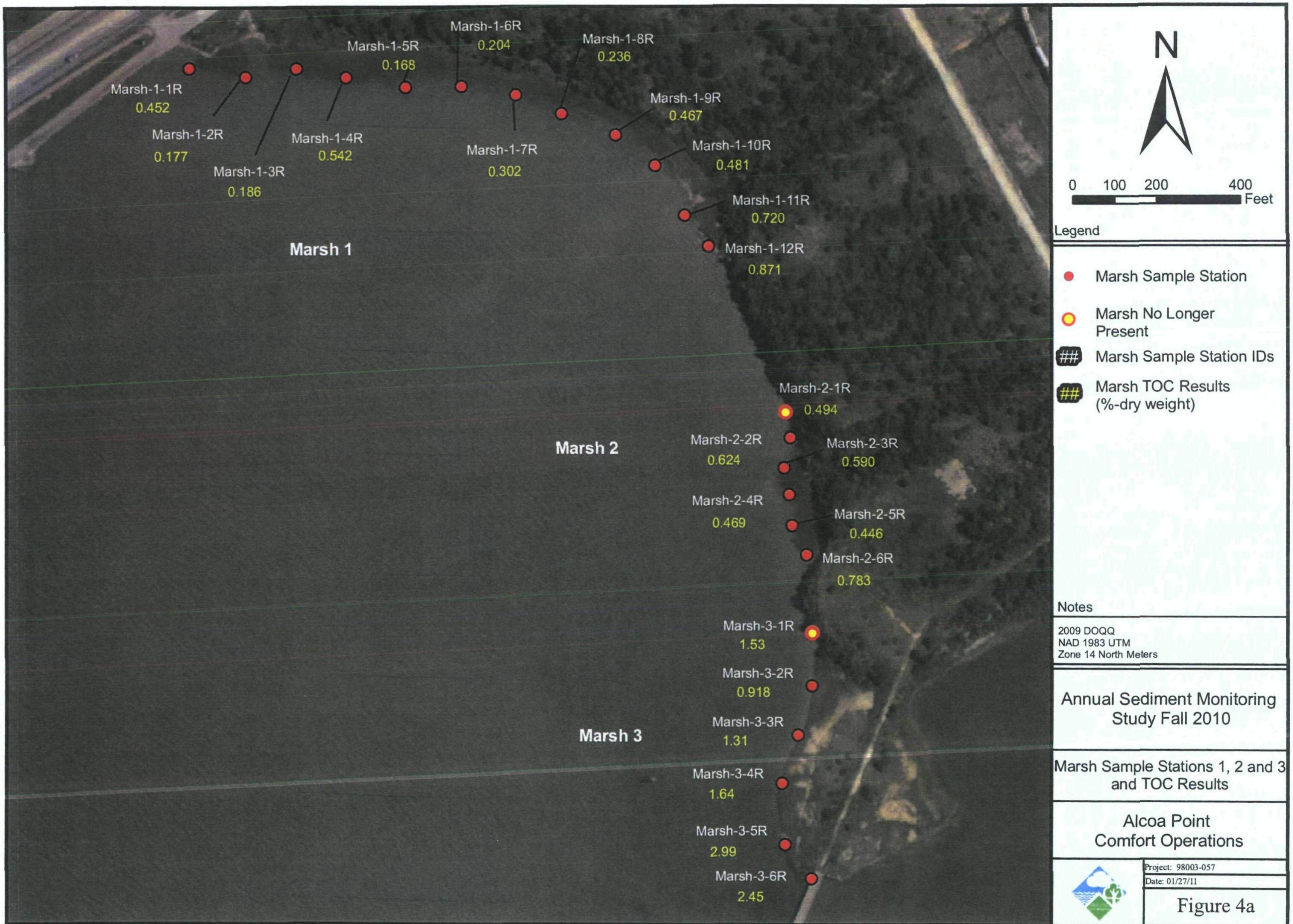

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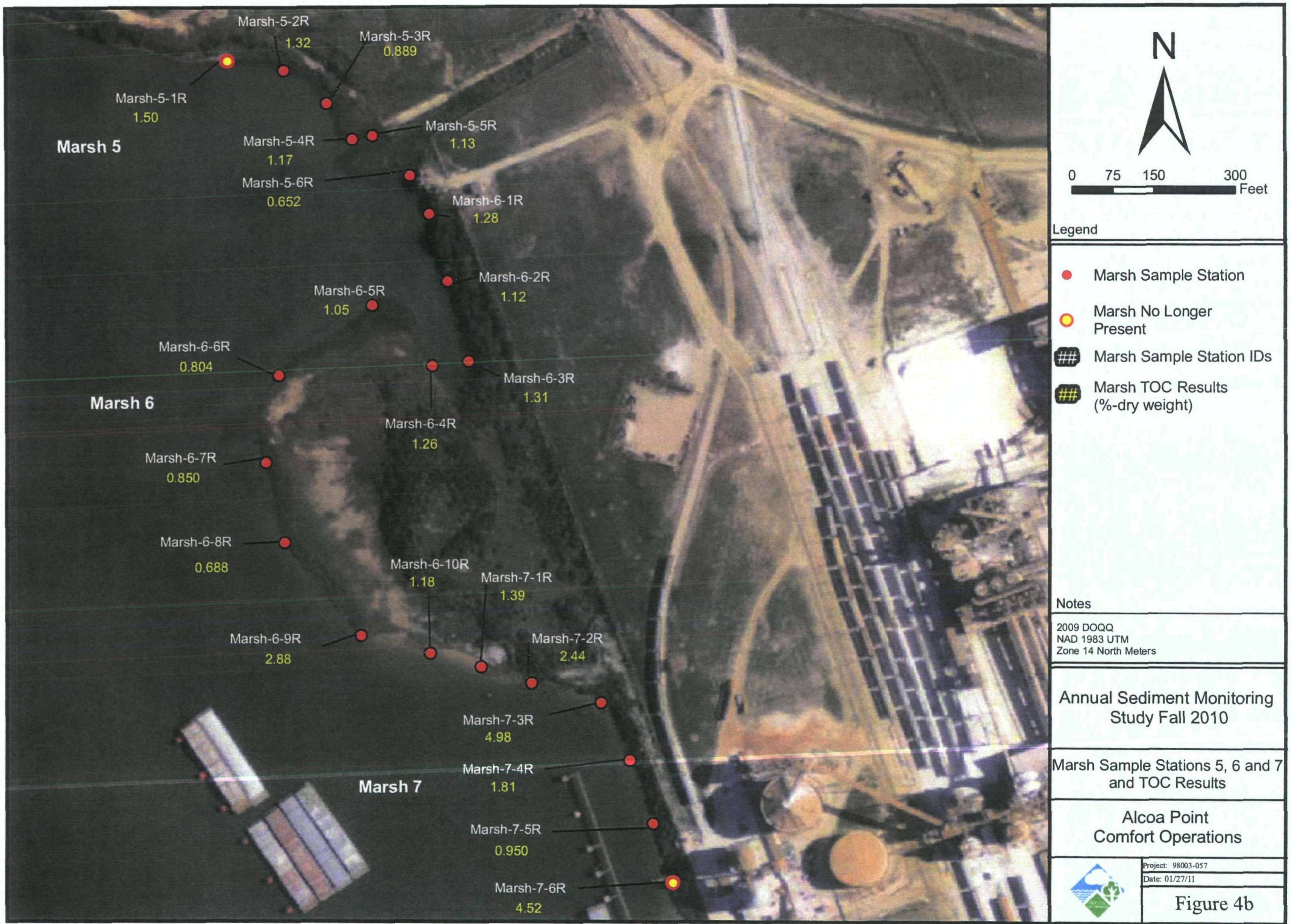

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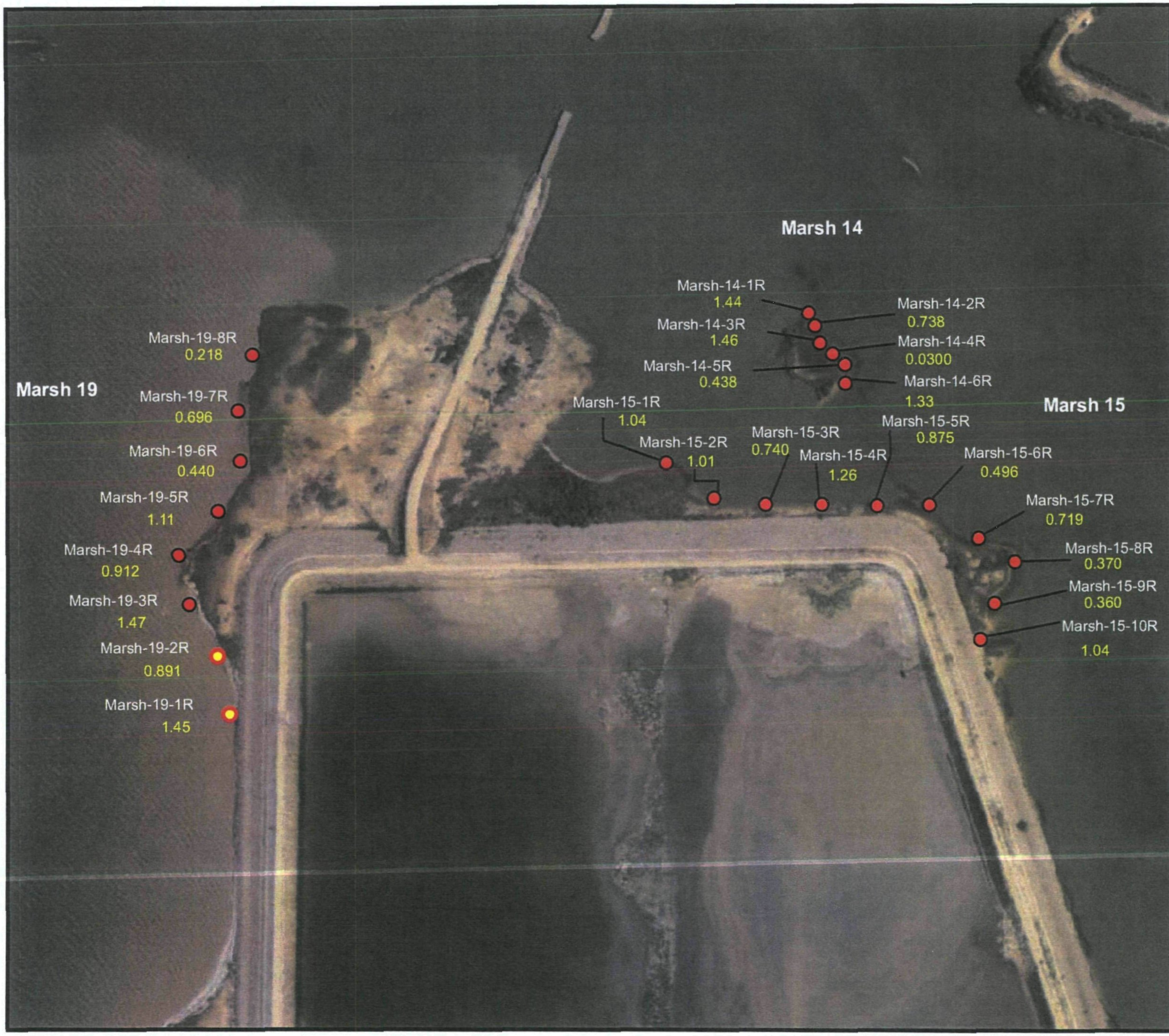

N

0 125 250 500 Feet

Legend

- Marsh Sample Station
- Marsh No Longer Present
- Marsh Sample Station IDs
- Marsh TOC Results (%-dry weight)

Notes

2009 DOQQ
NAD 1983 UTM
Zone 14 North Meters

Annual Sediment Monitoring Study Fall 2010

Marsh Sample Stations 14, 15 and 19 and TOC Results

Alcoa Point Comfort Operations

Project: 98003-057
Date: 01/27/11

Figure 4c

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APPENDIX B

LAVACA BAY FINFISH AND SHELLFISH MONITORING REPORT 2010

LAVACA BAY FINFISH AND SHELLFISH MONITORING REPORT 2010

Alcoa Point Comfort
Lavaca Bay Superfund Site

February 2011

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1.0 INTRODUCTION

A key factor in the success of the Lavaca Bay Remedy is the reduction in tissue mercury concentrations through targeted source control efforts, sediment removal efforts, capping, enhanced natural recovery, and/or natural recovery. The Consent Decree (March 2005) for the Lavaca Bay Superfund Site requires annual monitoring of finfish and shellfish for total mercury.

1.1 PURPOSE AND SCOPE

The objective of the program is to monitor the recovery of mercury levels in finfish and shellfish. The monitoring data collected under this program are used to assess the effectiveness of remedial actions implemented at the Site. This document presents a summary of sampling and analytical methods and the results of the 2010 monitoring study. A detailed description of the methods and procedures for this study are presented in the Lavaca Bay Finfish and Shellfish Operations, Maintenance, and Monitoring Plan (OMMP, Appendix I of the Consent Decree March 2005).

1.2 SITE DESCRIPTION

The Alcoa Point Comfort Operations Plant is located in Calhoun County, Texas, adjacent to Lavaca Bay. An area in the bay adjacent to the Alcoa Plant is associated with elevated mercury concentrations in fish tissue and is closed to the taking of finfish and blue crabs for consumption by order of the Texas Department of Health. This area is referred to as the "Closed Area" and is delineated in the figures contained in this report. The monitoring area specified in the OMMP includes both the Closed Area and designated areas outside the Closed Area (termed the "Adjacent Area" or the "Open Area").

2.0 METHODS

Red drum and juvenile blue crab tissue samples for the 2010 Finfish and Blue Crab Monitoring Study were collected and processed by Benchmark Ecological Services, Inc., and analyzed by Battelle Marine Sciences Laboratory (Battelle) in Sequim, Washington. Samples were collected between 23 September 2010 and 8 November 2010. Validation and evaluation of the analytical results were conducted by Environmental Chemistry Services, Inc. in Houston, Texas.

2.1 SAMPLE STATIONS

A total of 30 red drum samples were collected from 13 stations inside the Closed Area (Figure 1), and 30 samples were collected from 10 stations outside the Closed Area (Adjacent Area) (Figure 2). A total of 30 juvenile blue crab composite samples were collected from 10 stations inside the Closed Area (Figure 3), and 30 composite samples were collected from 10 stations outside the Closed Area (Adjacent Area) (Figure 4).

As described in the OMMP (p. 3-3), the objectives for selecting sample stations are to achieve equal geographic representation of the four quadrants (or zones) within the Closed Area. As also stated in the OMMP (p. 3-3), netting success will be variable and stations from which samples are collected and the number of samples per station will vary. The actual numbers of stations sampled for red drum and juvenile blue crab during the 2010 monitoring event are shown for each of the four Closed Area zones in Figures 1 and 3, respectively. Table 1 shows the number of red drum and juvenile blue crab samples collected per zone.

Table 1 – Number of Red Drum and Juvenile Blue Crabs Analyzed per Zone

Zone	Red Drum Samples	Juvenile Blue Crab Samples
Zone 1	7	3
Zone 2	13	15
Zone 3	3	3
Zone 4	7	9

The distribution of red drum samples ranged from 3 samples in Zone 3 to 13 samples in Zone 2. The number of juvenile blue crab samples ranged from 3 samples in Zones 1 and 3 (3 samples per zone), to 15 samples in Zone 2. The uneven distribution of samples among the zones was due to the uneven distribution of suitable habitat within the Zones. Most of the habitat that is attractive to red drum and juvenile blue crabs was located in Zones 2 and 4.

The primary objective for the location of both Adjacent Area and Closed Area sample stations was the same. The objective was to establish stations that would provide a geographically uniform distribution of samples (OMMP, p. 3-3). The general goal for Adjacent Area sampling was to collect approximately the same number of samples from 10 to 15 stations, distributed evenly over the Adjacent Area. Whenever possible, red drum and juvenile blue crab samples were collected from the same stations. Adjacent Area red drum samples were collected from 10 stations and Adjacent Area juvenile blue crabs were collected from 10 stations, shown in Figures 2 and 4 respectively.

Fall 2010 Annual Finfish and Shellfish Monitoring Study

Closed Area Red Drum Sample Stations and Analytical Results

ALCOA PCO

Project: cls_rd_10_result.mxd

Date:12/13/10

Figure 1

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N

0 5,000 10,000 Feet

Legend

- Adjacent Area Red Drum Stations
- ### Total Hg (ug/g)

Fall 2010 Annual Finfish and Shellfish Monitoring Study

Adjacent Area Red Drum Sample Stations and Analytical Results

ALCOA PCO

Project: adj_rd_10_results.mxd

Date: 01/11/10

Figure 2

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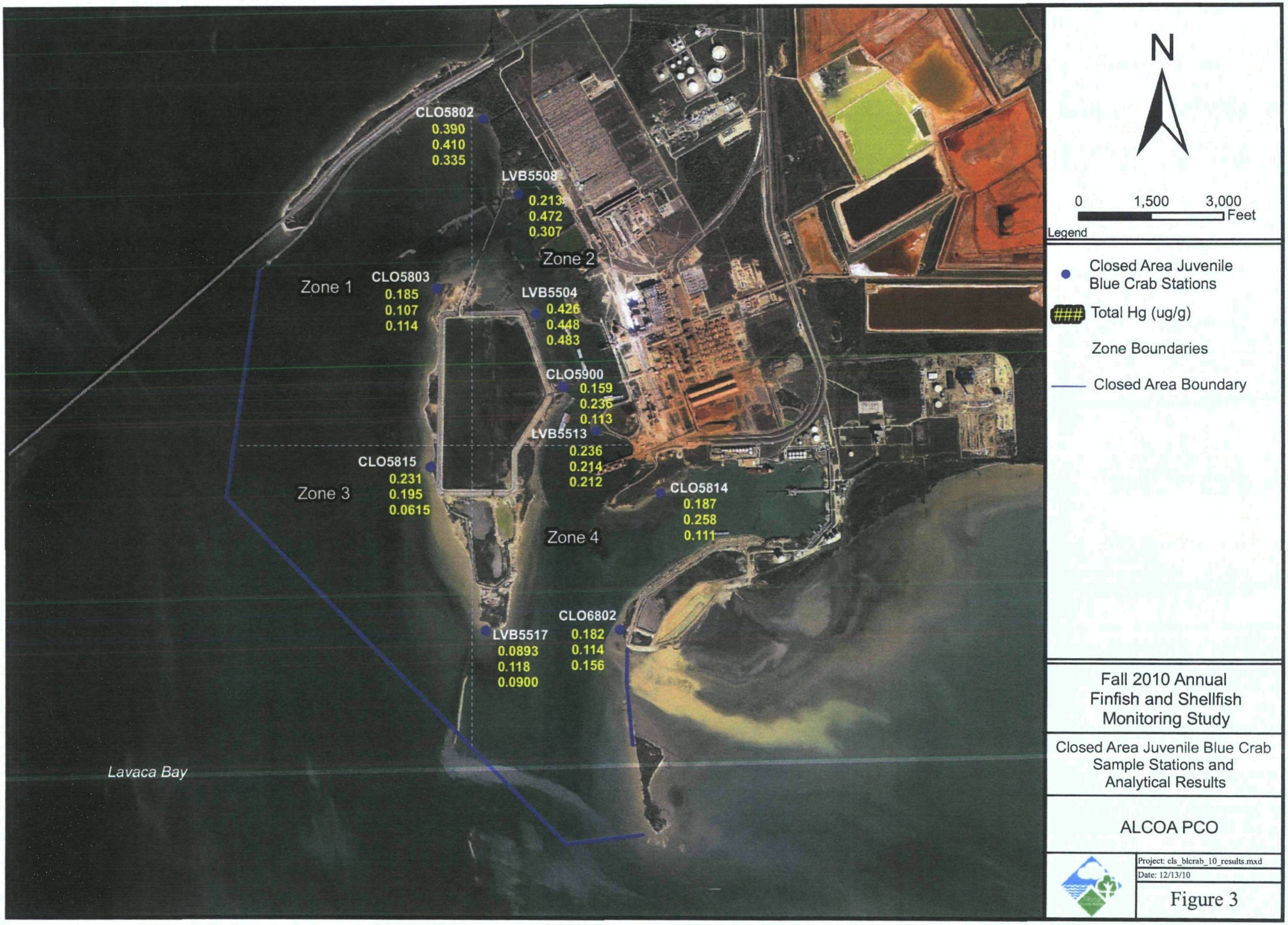

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M:\\98003\056\arc\10_Crab\adj_blcrab_10_result.mxd

2.2 SAMPLE COLLECTION

2.2.1 Red Drum

Red drum were collected from the Closed Area and Adjacent Areas between 29 September 2010 and 8 November 2010. In the Closed Area, 30 red drum tissue samples were collected from the 13 sample stations shown on Figure 1. In the Adjacent Areas, 30 red drum tissue samples were collected from the 10 sample stations shown on Figure 2. Sampling was conducted from a 20-foot aluminum boat. A Global Positioning System (GPS) was used to determine the positions of all sample stations.

Red drum specimens were collected using gill nets (6 x 150 ft) with 5-inch stretch mesh. Multiple nets (1-3) were set at each sample station in the evening, and the nets were allowed to fish over night. The nets were retrieved the following morning, and the fish were removed. Gill nets were set at stations shown in Figure 1, and at one additional station (CLO5815), where no usable red drum were collected. Red drum with total lengths between 508 and 711.2 mm (20 to 28 inches) were removed from the gill nets, placed in plastic bags, and labeled with station identification (ID), date, and time. Labeled bags were immediately placed in an insulated box with ice for storage. Undersized and oversized red drum and specimens of other species were returned to the water.

The following information (at a minimum) was recorded on data sheets:

Station ID	Initials of Field personnel	End date
Gear type	Set date	End time
Water depth	Set time	List of photo log entries

2.2.2 Juvenile Blue Crab

Juvenile blue crabs were collected from the Closed Area and Adjacent Area between 23 September 2010 and 1 November 2010. In the Closed Area, 30 blue crab tissue samples were collected from 10 sample stations (Figure 3). In the Adjacent Area, 30 blue crab tissue samples were collected from 10 sample stations (Figure 4). Sampling was conducted from a 20-foot aluminum boat. A Global Positioning System was used to determine the positions of all sample stations.

Juvenile blue crabs were collected using barrel type minnow traps baited with commercial crab bait (Gulf menhaden, Mullet, and, Sardines). Traps were checked every 24 to 72 hours. Crabs were removed from the traps, inspected, and sorted by size in a clean sorting tray. Injured, dead, undersized, and oversized crabs were returned to the water. Crabs that were between 25-75 mm in width were retained. Width is the distance between the tips of the primary lateral spines. Crabs collected in the field were placed in Ziploc bags labeled with station ID, date, and collection time. Labeled bags were immediately placed in an insulated chest with ice. Data sheets were used to record the same sample site information listed above for finfish samples.

2.3 SAMPLE PROCESSING

2.3.1 Red Drum

Red drum samples were processed within 24 hours of collection in the Alcoa Clean Lab (located at the Alcoa Point Comfort Facility) and remained on ice until processing was complete. Fish were weighed, measured, scaled, and rinsed with deionized (DI) water. Data were recorded on tissue processing data sheets and are listed in Table 2 (Closed Area specimens) and Table 3 (Adjacent Area specimens). After scaling, fish were placed in clean plastic bags and returned to cold storage until all fish were scaled.

In the clean lab, the fish were again rinsed with DI water and placed on pre-cleaned Teflon cutting boards. The right filet (with skin) was removed with pre-cleaned hexane rinsed stainless steel fillet knives. The filets were cut into small cubes, mixed, and weighed (in grams). A 50-100g sub-sample was removed, weighed, and placed in a pre-cleaned sample container supplied by the analytical laboratory. Filet weights and sample weights were recorded on sample processing data sheets and are listed in Tables 2 and 3 for Closed Area and Adjacent Area specimens, respectively. Sample jars were labeled with sample station ID, sample number, species, collection date, time, and initials of processing personnel.

The sample and container were placed in two sealed Ziploc bags and stored at 4 ±2 degrees Celsius. A Chain of Custody form was completed for all samples collected.

2.3.2 Juvenile Blue Crab

Blue crabs were processed within 24 hours of collection in the Alcoa Clean Lab (located at the Alcoa Point Comfort Facility) and remained on ice or in a refrigerator until processing was complete. In the laboratory, crabs were rinsed with DI water and sorted by size on pre-cleaned Teflon cutting boards. Individual blue crabs were measured, weighed, and placed in sample containers. Each sample was a composite of 5 crabs measuring 25 to 75 mm in width. Individual crab weights and total sample weights were recorded on sample processing data sheets and are listed in Tables 4 and 5 for Closed Area and Adjacent Area specimens, respectively. Sample containers were labeled with the station ID, sample ID, collection date, and time; and were placed in two re-sealable plastic bags and placed in a secure refrigerator in the Clean Lab. Samples were shipped overnight to Battelle for analysis.

3.0 ANALYTICAL RESULTS

Red drum and juvenile blue crab samples were analyzed for total mercury and percent moisture by Battelle. Total mercury results were reported in µg/g as wet weight. Benchmark received the final data packet from the analytical laboratory 17 December 2010, and Analytical QA/QC was completed by Environmental Chemistry Services on 5 January 2011. Analytical results for red drum collected from the Closed Area are presented in Table 2, and the results for red drum from the Adjacent Area are presented in Table 3. Analytical results for juvenile blue crabs collected from the Closed Area are presented in Table 4, and the results for juvenile blue crabs from the Adjacent Area are presented in Table 5.

Analytical results for both red drum and juvenile blue crab samples were validated according to the Standard Operating Procedure Data Validation (Appendix E) in the Quality Assurance Project Plan Alcoa (Point Comfort)/Lavaca Bay Superfund Site (August 22, 2005). All analytical results were validated and may be included in the data used to evaluate the effectiveness of the approved remedy and to meet monitoring requirements specified in the Consent Decree.

Table 2 - Closed Area Red Drum Sample Stations, Sample IDs, Processing Data, and Analytical Results

Station ID	Sample ID	Date	Time	Flag	Total Length (mm)	Standard Length (mm)	Total Weight (g)	Tissue Weight (g)	Sample Weight (g)	Percent Moisture	Total Hg wet weight (µg/g)
CLO5802	B12b-TF-15060	9/29/2010	8:50		603	500	2320	309.1	87.8	81.0%	0.676
CLO5802	B12b-TF-15061	9/29/2010	8:50		634	530	2920	241.3	77.3	81.1%	0.639
CLO5802	B12b-TF-15062	9/29/2010	8:50		545	450	1160	162.9	78.5	81.1%	1.19
LVB5504	B12b-TF-15066	10/6/2010	9:25		681	575	3010	323.3	84.7	80.9%	1.56
CLO5518	B12b-TF-15067	10/6/2010	8:34		665	555	3090	298.1	89.7	79.7%	0.798
CLO5814	B12b-TF-15068	10/7/2010	10:30		510	425	1270	96.8	79.5	79.7%	0.605
CLO5814	B12b-TF-15069	10/7/2010	10:30		605	595	2030	226.7	89.4	81.1%	0.593
CLO5814	B12b-TF-15070	10/7/2010	10:30		515	420	1330	111.8	82.1	80.9%	0.665
LVB5508	B12b-TF-15071	10/7/2010	9:05		570	470	1720	214.3	98.7	81.4%	0.407
CLO5518	B12b-TF-15072	10/6/2010	15:00		585	475	2230	225.3	84.0	79.8%	0.535
LVB5504	B12b-TF-15073	10/7/2010	9:40		710	615	4170	341.1	82.4	79.2%	0.372
CLO5818	B12b-TF-15074	10/8/2010	9:50		550	455	1630	128.5	81.4	80.9%	1.13
CLO5818	B12b-TF-15075	10/8/2010	9:50		521	420	1440	124.9	72.1	81.0%	0.688
CLO1414	B12b-TF-15076	10/8/2010	8:50		604	505	2470	260.8	88.1	80.6%	0.733
LVB5504	B12b-TF-15085	10/13/2010	9:34		527	455	1460	156.0	85.2	80.8%	1.33
CLO5803	B12b-TF-15089	10/15/2010	8:21		525	445	1380	151.9	75.8	79.2%	0.807
CLO5803	B12b-TF-15090	10/15/2010	8:21		546	468	1590	145.5	81.3	80.5%	1.23
CLO5803	B12b-TF-15091	10/15/2010	8:21		630	545	2750	355.1	88.8	79.8%	0.809
CLO5806	B12b-TF-15105	10/22/2010	8:50		557	478	1630	198.0	88.6	76.2%	1.61
LVB5508	B12b-TF-15106	10/26/2010	16:21		645	550	2650	317.9	85.8	79.4%	1.44
LVB5508	B12b-TF-15107	10/27/2010	9:15		516	435	1360	183.1	88.7	81.1%	1.09
LVB5518	B12b-TF-15108	10/26/2010	17:23		572	485	2040	299.6	94.4	79.6%	0.426
CLO1414	B12b-TF-15109	10/28/2010	11:05		711	618	3940	409.7	85.5	80.0%	0.556
CLO6802	B12b-TF-15110	10/28/2010	9:25		660	557	2850	333.1	87.6	79.4%	0.457
LVB5513	B12b-TF-15111	11/2/2010	9:51		643	546	2430	290.4	88.9	81.7%	0.920
CLO5804	B12b-TF-15112	11/2/2010	9:01		710	615	4170	526.7	85.9	78.9%	0.939
CLO5806	B12b-TF-15113	11/2/2010	9:17		580	495	1890	239.4	86.8	79.6%	0.975
CLO5900	B12b-TF-15114	11/2/2010	16:05		545	458	1400	137.8	77.3	81.4%	1.66
CLO5818	B12b-TF-15118	11/3/2010	10:00		672	584	2950	409.8	93.5	79.9%	0.768
CLO1414	B12b-TF-15119	11/8/2010	14:36		515	437	1290	155.1	84.2	79.6%	0.710
Average Values					**595**	**505**	**2219**	**245.8**	**85.1**	**80.2%**	**0.877**

Table 3 - Adjacent Area Red Drum Sample Stations, Sample IDs, Processing Data, and Analytical Results

Station ID	Sample ID	Date	Time	Flag	Total Length (mm)	Standard Length (mm)	Total Weight (g)	Tissue Weight (g)	Sample Weight (g)	Percent Moisture	Total Hg wet weight (μg/g)
LVB6852	B12b-TF-15063	9/29/2010	8:00		675	565	3040	392.2	86.3	79.7%	0.252
LVB6852	B12b-TF-15064	9/29/2010	8:00		520	435	1470	193.7	80.8	80.3%	0.376
LVB6852	B12b-TF-15065	9/29/2010	8:00		563	460	1910	265.0	76.9	81.0%	0.410
LVB5839	B12b-TF-15077	10/12/2010	18:04		547	450	1730	211.9	81.8	80.8%	0.374
LVB5839	B12b-TF-15078	10/13/2010	8:09		585	505	2270	332.7	86.9	78.1%	0.458
LVB5839	B12b-TF-15079	10/13/2010	8:09		588	516	2270	309.9	81.6	78.0%	0.477
LVB6837	B12b-TF-15080	10/12/2010	17:26		510	425	1210	169.9	87.9	82.7%	0.460
LVB6837	B12b-TF-15081	10/12/2010	17:26		508	423	1120	142.5	78.4	82.4%	0.651
LVB6850	B12b-TF-15082	10/12/2010	17:40		567	495	1940	266.0	85.8	79.6%	0.465
LVB6850	B12b-TF-15083	10/13/2010	8:37		509	430	1400	157.7	81.8	80.6%	0.419
LVB6850	B12b-TF-15084	10/13/2010	8:37		588	510	1930	314.2	84.1	79.8%	0.392
LVB6871	B12b-TF-15086	10/13/2010	16:33		619	530	2490	351.2	83.8	79.7%	0.319
LVB6871	B12b-TF-15087	10/14/2010	9:02		555	470	1920	266.6	86.3	80.4%	0.419
LVB6871	B12b-TF-15088	10/14/2010	9:02		657	558	2710	366.6	95.0	79.9%	0.424
LVB6853	B12b-TF-15092	10/19/2010	9:15		567	486	1840	242.2	91.1	79.5%	0.361
LVB6870	B12b-TF-15093	10/20/2010	9:26		600	527	2360	281.1	86.2	77.3%	0.574
LVB6870	B12b-TF-15094	10/20/2010	9:26		510	433	1180	174.7	78.5	74.8%	0.318
LVB6837	B12b-TF-15095	10/20/2010	10:36		663	580	2760	327.8	85.0	79.5%	0.334
LVB6853	B12b-TF-15096	10/20/2010	8:37		670	575	3280	465.5	99.2	77.5%	0.398
LVB6853	B12b-TF-15097	10/20/2010	8:37		509	425	1110	133.7	70.4	73.5%	0.284
LVB5841	B12b-TF-15098	10/21/2010	8:35		675	590	3380	456.1	93.7	73.2%	0.330
LVB5841	B12b-TF-15099	10/21/2010	8:35		589	505	1900	258.3	81.4	76.2%	0.346
LVB5841	B12b-TF-15100	10/21/2010	8:35		562	485	1820	240.7	84.8	80.2%	0.253
LVB6870	B12b-TF-15101	10/21/2010	10:00		532	460	1500	228.4	86.1	78.5%	0.275
LVB5838	B12b-TF-15102	10/21/2010	9:23		595	495	2090	251.4	84.5	78.4%	0.378
LVB5838	B12b-TF-15103	10/21/2010	9:23		535	460	1600	218.4	96.6	73.8%	0.351
LVB5838	B12b-TF-15104	10/21/2010	9:23		645	566	2950	295.7	91.1	80.3%	0.447
LVB6950	B12b-TF-15115	11/3/2010	10:26		705	605	3970	507.5	89.1	78.6%	0.251
LVB6950	B12b-TF-15116	11/3/2010	10:26		698	610	3630	350.5	86.7	79.0%	0.360
LVB6950	B12b-TF-15117	11/3/2010	10:26		632	540	2610	287.5	85.2	77.6%	0.278
Average Values					**589**	**504**	**2180**	**282.0**	**85.6**	**78.7%**	**0.381**

Table 4 - Closed Area Juvenile Blue Crab Sample Stations, Sample IDs, Processing Data, and Analytical Results

Station ID	Sample ID	Date	Time	Flag	Width (mm)	Crab Weight (g)	Sample Weight (g)	Percent Moisture	Total Hg wet weight (µg/g)
CLO5815	B12b-TS-15580	9/27/2010	1730		62.7	14.7	45.9	69.5%	0.231
					57.8	13.7			
					58.4	9.9			
					45.9	5.5			
					35.4	2.3			
CLO5802	B12b-TS-15579	9/27/2010	1536		69.1	21.5	42.9	68.8%	0.390
					62.8	13.7			
					38.4	3.8			
					33.4	2.8			
					33.4	2.1			
LVB5504	B12b-TS-15590	9/27/2010	1620		66.5	25.4	59.2	65.9%	0.426
					58.8	16.8			
					47.8	9.5			
					40.4	5.2			
					30.6	2.8			
LVB5508	B12b-TS-15591	9/27/2010	1607		36.7	3.6	21.0	69.5%	0.213
					33.5	2.6			
					32.7	2.3			
					56.8	10.5			
					29.9	2.1			
CLO5802	B12b-TS-15588	9/27/2010	1536		27.8	1.5	46.4	66.7%	0.410
					74.7	31.1			
					55.9	9.2			
					35.4	3.5			
					25.1	1.1			
LVB5513	B12b-TS-15585	9/27/2010	1644		54.7	7.5	47.1	62.8%	0.236
					44.5	5.6			
					29.9	2.4			
					75.0	29.4			
					33.2	2.3			
LVB5517	B12b-TS-15584	9/27/2010	1717		56.7	11.3	23.1	71.3%	0.0893
					40.9	4.4			
					30.5	2.0			
					33.0	3.4			
					30.5	2.1			
CLO5900	B12b-TS-15587	9/29/2010	0955		37.8	3.7	12.7	70.8%	0.159
					33.5	3.1			
					35.3	3.6			
					25.3	1.3			
					25.8	1.0			
LVB5504	B12b-TS-15592	9/29/2010	0942		66.3	20.7	64.0	71.1%	0.448
					73.4	26.8			
					50.0	9.6			
					37.5	4.1			
					31.0	3.2			

Table 4 - Closed Area Juvenile Blue Crab Sample Stations, Sample IDs, Processing Data, and Analytical Results

Station ID	Sample ID	Date	Time	Flag	Width (mm)	Crab Weight (g)	Sample Weight (g)	Percent Moisture	Total Hg wet weight (µg/g)
CLO5802	B12b-TS-15593	10/4/2010	1355		60.6	18.6	42.0	68.1%	0.335
					51.3	9.8			
					42.9	6.3			
					42.9	4.6			
					38.4	3.1			
LVB5513	B12b-TS-15594	10/4/2010	1444		50.8	9.1	18.6	64.0%	0.214
					37.7	3.5			
					29.8	2.1			
					29.1	2.2			
					30.7	1.8			
LVB5513	B12b-TS-15595	10/4/2010	1444		58.4	17.3	28.8	66.6%	0.212
					38.1	4.3			
					32.9	3.1			
					31.8	2.7			
					30.1	1.7			
LVB5508	B12b-TS-15596	9/29/2010	0930		26.1	1.4	37.2	67.0%	0.472
					63.3	24.7			
					29.4	2.0			
					29.6	2.8			
					40.6	6.2			
LVB5517	B12b-TS-15598	10/7/2010	1007		45.1	9.3	34.1	70.7%	0.118
					53.8	9.5			
					48.3	7.8			
					43.1	5.2			
					32.5	2.5			
CLO6802	B12b-TS-15599	10/4/2010	1503		66.8	24.6	85.3	66.1%	0.182
					68.3	26.5			
					27.7	1.5			
					67.2	20.6			
					53.3	12.9			
LVB5504	B12b-TS-15600	10/4/2010	1425		49.1	8.1	63.3	64.2%	0.483
					52.9	14.7			
					73.8	28.3			
					47.9	11.2			
					25.1	0.9			
CLO5814	B12b-TS-15603	10/7/2010	1040		68.8	16.6	95.8	68.3%	0.187
					73.0	25.4			
					69.4	22.8			
					56.8	10.5			
					67.2	21.4			
LVB5508	B12b-TS-15605	10/11/2010	1445		74.9	36.6	72.8	73.1%	0.307
					67.3	31.4			
					30.0	2.4			
					25.0	1.4			
					25.7	1.2			

Table 4 - Closed Area Juvenile Blue Crab Sample Stations, Sample IDs, Processing Data, and Analytical Results

Station ID	Sample ID	Date	Time	Flag	Width (mm)	Crab Weight (g)	Sample Weight (g)	Percent Moisture	Total Hg wet weight (µg/g)
					68.3	22.8			
					65.1	18.8			
CLO5900	B12b-TS-15604	10/11/2010	1457		34.6	3.3	64.5	67.1%	0.236
					64.1	17.9			
					30.5	2.1			
					51.3	11.5			
					37.4	3.8			
CLO6802	B12b-TS-15602	10/11/2010	1521		37.1	3.9	23.1	65.8%	0.114
					28.4	2.2			
					27.4	1.8			
					59.0	14.6			
					45.6	7.3			
CLO6802	B12b-TS-15601	10/11/2010	1521		36.3	4.0	29.4	62.2%	0.156
					29.6	2.2			
					25.3	1.4			
					44.6	8.3			
					27.8	1.4			
CLO5815	B12b-TS-15607	10/11/2010	1544		32.3	2.5	22.3	64.5%	0.195
					25.6	1.0			
					54.5	9.2			
					63.2	13.6			
					29.0	1.7			
CLO5803	B12b-TS-15608	10/11/2010	1430		28.0	1.3	26.5	72.4%	0.185
					35.1	3.0			
					48.9	6.9			
					60.6	16.6			
					45.5	6.1			
LVB5517	B12b-TS-15610	10/11/2010	1532		40.5	4.8	31.3	70.6%	0.0900
					30.6	1.5			
					29.6	2.0			
					63.9	14.6			
					45.1	6.8			
CLO5900	B12b-TS-15609	10/12/2010	1655		35.0	3.1	31.7	70.5%	0.113
					38.6	4.9			
					32.8	2.5			
					75.0	36.8			
					59.6	13.3			
CLO5814	B12b-TS-15606	10/13/2010	0942		32.4	2.2	54.2	63.9%	0.258
					28.0	1.5			
					25.5	1.0			
					26.2	1.2			
					27.8	1.1			
CLO5815	B12b-TS-15611	10/15/2010	0920		29.1	1.7	6.7	67.1%	0.0615
					27.0	1.4			
					28.3	1.4			

Table 4 - Closed Area Juvenile Blue Crab Sample Stations, Sample IDs, Processing Data, and Analytical Results

Station ID	Sample ID	Date	Time	Flag	Width (mm)	Crab Weight (g)	Sample Weight (g)	Percent Moisture	Total Hg wet weight (µg/g)
CLO5814	B12b-TS-15612	10/15/2010	0905		30.4	2.0	49.7	63.9%	0.111
					49.4	9.6			
					25.0	0.8			
					59.9	16.4			
					63.2	20.7			
CLO5803	B12b-TS-15617	10/21/2010	1110		34.7	2.9	10.3	70.2%	0.107
					30.3	1.6			
					38.8	3.6			
					28.7	1.3			
					25.0	0.9			
CLO5803	B12b-TS-15619	10/29/2010	0835		28.5	1.6	8.8	63.7%	0.114
					27.1	1.4			
					31.3	2.0			
					25.0	1.2			
					32.8	2.3			
Average Values					**42.9**	**8.0**	**40.0**	**67.5%**	**0.228**

Table 5 - Adjacent Area Juvenile Blue Crab Sample Stations, Sample IDs, Processing Data, and Analytical Results

Station ID	Sample ID	Date	Time	Flag	Width (mm)	Crab Weight (g)	Sample Weight (g)	Percent Moisture	Total Hg wet weight (μg/g)
LVB6853	B12b-TS-15561	9/23/2010	1145		27.9	1.4	22.5	69.4%	0.103
					44.5	8.3			
					37.2	4.9			
					36.4	4.8			
					34.5	3.6			
LVB6853	B12b-TS-15562	9/23/2010	1145		51.5	10.6	22.3	70.4%	0.0847
					32.0	2.9			
					32.6	3.2			
					33.6	3.7			
					26.5	2.2			
LVB6853	B12b-TS-15563	9/23/2010	1145		36.0	4.9	26.5	71.0%	0.0786
					31.0	2.7			
					40.0	5.7			
					55.0	9.9			
					36.1	4.0			
LVB6803	B12b-TS-15564	9/23/2010	1100		36.2	3.9	15.2	68.7%	0.0801
					34.2	4.4			
					31.3	2.5			
					28.1	2.3			
					34.1	2.4			
LVB6803	B12b-TS-15565	9/23/2010	1100		48.9	8.4	16.8	71.4%	0.0732
					32.3	2.7			
					28.5	2.0			
					30.0	2.1			
					27.2	1.5			
LVB6850	B12b-TS-15566	9/23/2010	0837		67.2	23.9	78.3	68.4%	0.112
					69.8	24.1			
					52.7	10.0			
					47.6	9.6			
					55.2	12.4			
LVB6837	B12b-TS-15567	9/23/2010	0909		25.0	1.4	19.6	67.8%	0.0882
					30.3	2.4			
					46.7	7.0			
					36.1	4.1			
					43.0	5.2			
LVB6880	B12b-TS-15583	9/27/2010	1324		45.9	5.5	17.5	67.9%	0.0716
					40.7	4.9			
					38.5	3.2			
					30.9	2.4			
					26.8	1.6			
LVB6880	B12b-TS-15582	9/27/2010	1324		35.1	4.3	16.3	75.5%	0.0764
					31.4	3.1			
					35.1	3.9			
					32.1	3.1			
					28.4	1.9			

Table 5 - Adjacent Area Juvenile Blue Crab Sample Stations, Sample IDs, Processing Data, and Analytical Results

Station ID	Sample ID	Date	Time	Flag	Width (mm)	Crab Weight (g)	Sample Weight (g)	Percent Moisture	Total Hg wet weight (µg/g)
LVB6880	B12b-TS-15581	9/27/2010	1324		43.3 36.9 32.3 27.3 27.2	5.5 4.2 2.4 1.9 1.7	15.6	67.2%	0.0951
LVB6852	B12b-TS-15577	9/27/2010	1901		74.6 34.9 28.5 25.4 25.2	27.1 3.1 2.0 1.7 1.2	35.4	81.5%	0.0858
LVB6852	B12b-TS-15578	9/27/2010	1901		54.9 44.1 28.7 25.7 25.5	11.7 8.7 2.0 1.6 1.4	25.1	68.4%	0.125
LVB6837	B12b-TS-15576	9/27/2010	1410		58.7 46.7 51.9 38.8 31.5	15.6 10.2 9.2 4.3 3.1	42.1	73.4%	0.0926
LVB6837	B12b-TS-15575	9/27/2010	1410		71.6 50.6 41.7 38.9 31.3	18.5 4.1 6.8 4.5 2.8	36.2	68.7%	0.0939
LVB6850	B12b-TS-15574	9/27/2010	1512		65.5 48.8 35.7 37.1 35.6	19.6 9.5 3.9 3.9 3.1	40.3	68.3%	0.0992
LVB6850	B12b-TS-15573	9/27/2010	1512		50.5 51.7 29.3 29.3 23.7	8.1 10.4 2.5 1.8 1.8	24.6	68.2%	0.0995
LVB5838	B12b-TS-15569	9/28/2010	0915		39.9 26.9 28.3 33.6 25.0	4.6 1.4 1.7 2.5 1.0	11.3	63.7%	0.0940
LVB5838	B12b-TS-15568	9/28/2010	0915		48.8 30.1 32.4 37.5 32.1	10.5 1.4 2.7 3.8 2.9	21.1	66.0%	0.0952
LVB5839	B12b-TS-15572	9/27/2010	1437		42.2 33.9 26.9 25.1 26.4	6.9 3.8 2.1 1.5 1.5	15.7	66.8%	0.0983

Table 5 - Adjacent Area Juvenile Blue Crab Sample Stations, Sample IDs, Processing Data, and Analytical Results

Station ID	Sample ID	Date	Time	Flag	Width (mm)	Crab Weight (g)	Sample Weight (g)	Percent Moisture	Total Hg wet weight (µg/g)
LVB5839	B12b-TS-15571	9/27/2010	1437		44.1	7.9	18.3	69.8%	0.102
					33.6	3.6			
					31.9	2.6			
					32.2	2.6			
					26.6	1.7			
CLO6803	B12b-TS-15586	9/27/2010	1752		47.0	6.0	10.9	70.4%	0.0704
					30.4	2.2			
					27.8	1.2			
					25.7	1.1			
					25.2	0.9			
LVB5839	B12b-TS-15589	9/29/2010	0830		53.0	11.4	23.7	70.8%	0.111
					37.1	3.8			
					36.3	4.2			
					30.9	2.9			
					26.5	1.5			
LVB5838	B12b-TS-15597	10/7/2010	1225		43.5	7.0	14.5	66.9%	0.0566
					31.1	2.4			
					28.0	1.5			
					29.6	2.3			
					26.7	1.1			
LVB6871	B12b-TS-15613	10/14/2010	0910		72.3	34.6	120.2	68.0%	0.0701
					50.3	12.1			
					32.8	2.5			
					68.9	33.7			
					74.9	37.6			
LVB6852	B12b-TS-15614	10/20/2010	0808		69.7	25.8	85.1	66.5%	0.126
					25.0	1.0			
					70.6	25.1			
					67.8	31.9			
					29.9	2.1			
LVB6870	B12b-TS-15615	10/21/2010	1025		71.2	37.7	123.6	67.9% 1803.0%	0.0758
					75.0	35.2			
					69.2	31.6			
					45.7	8.2			
					51.6	10.9			
LVB6870	B12b-TS-15616	10/26/2010	1000		66.9	29.9	62.8	67.8%	0.0927
					60.1	17.9			
					50.2	8.3			
					40.9	6.1			
					25.1	1.1			
LVB6871	B12b-TS-15618	10/26/2010	0935		45.5	8.9	64.9	68.7%	0.0854
					60.0	18.0			
					32.1	2.6			
					74.6	33.9			
					33.9	2.2			

Table 5 - Adjacent Area Juvenile Blue Crab Sample Stations, Sample IDs, Processing Data, and Analytical Results

Station ID	Sample ID	Date	Time	Flag	Width (mm)	Crab Weight (g)	Sample Weight (g)	Percent Moisture	Total Hg wet weight (µg/g)
LVB6871	B12b-TS-15621	11/1/2010	1453		61.0	18.3	88.1	66.9%	0.0748
					61.1	28.7			
					63.8	9.4			
					31.4	3.1			
					67.3	31.0			
LVB6870	B12b-TS-15620	11/1/2010	1509		56.0	16.1	43.6	66.3%	0.0880
					60.2	19.8			
					34.1	3.8			
					28.5	2.2			
					26.6	2.1			
Average Values					**40.8**	**7.8**	**38.6**	**125.0%**	**0.0900**

[1] U Flag -Sample result <10 times the average reagent blank result

APPENDIX C

DREDGE ISLAND INSPECTION RECORDS 2010

DREDGE ISLAND INSPECTION RECORD

Inspector's Name: Kevin Dworsky

Weather: Clear Skies

Temperature: 70

KBD accompanied by Brett Soutar of Benchmark Ecological Services Inc. during inspection.

Date: 3/18/10 (1Q10)

Time Begin: 1000

Time End: 1300

Inspector's Signature:

SPECIFIC ITEM TO INSPECT	TYPICAL PROBLEMS ENCOUNTERED	CONDITIONS OBSERVED		COMMENTS OR CORRECTIVE ACTION(S) IMPLEMENTED AND DATES
		NORMAL	ABNORMAL	
General Dredge Island	Erosion	X	☐	Minor erosion on north entrance ramp. All vehicular signs on Island are damaged.
	Deterioration	X	☐	
	Settling/Ponding	X	☐	
	Uplift	X	☐	
	Washouts	X	☐	
	Rodent Holes	X	☐	
Access Bridge	Deterioration	☐	X	Conditions similar to previous reports. Bridge abutments severely eroded. Hazard warning signs in good condition. Detailed inspection not performed.
	Damage	☐	X	
	Navigation Lights	☐	X	
CDF Dike	Erosion	☐	X	Minor to moderate erosion observed on interior CDF dikes, north end, as previously noted. North end still has the largest amount of erosion. Approximately the same amount of water in CDF as in December. Minor geomembrane exposed along interior dike on all sides of the dike. No action necessary. Due to low tide, was unable to view exterior for seepage. There was none noted will on the dike. Vegetation and trees over the dikes have increased since December.
	Deterioration	X	☐	
	Damage	X	☐	
	Vegetation	X	☐	
Stone Storm Protection	Erosion	X	☐	No damage observed. Significant vegetation present and healthy. Vegetation has increase since December.
	Settlement	X	☐	
	Stone Deterioration	X	☐	
	Stone Movement	X	☐	
	Fabric Exposure	X	☐	
	Damage	X	☐	
Gravel Erosion Protection	Erosion	☐	X	Minor to moderate erosion of inside slopes along entire CDF as noted in previous inspections. The inside side slopes have numerous areas where the fabric is exposed due to erosion.
	Fabric Exposure	☐	X	
	Deterioration	☐	X	
	Damage	☐	X	
Emergency Spillway	Obstructions	X	☐	Generally good condition.
	Cracks in Concrete	X	☐	
	Deterioration	X	☐	
	Damage	X	☐	

DREDGE ISLAND INSPECTION RECORD

Decant Structures	Weir Board Elevation Depth of Water Obstructions Deterioration Rust/Corrosion Damage Overflow Quality Overflow Quantity Flap Gate	X X X □ □ X X X X	□ □ □ X X □ □ □ □	North Structure: Coated surfaces on structure exhibiting moderate rust and pitting on handrails. Channel iron also exhibits moderate to severe corrosion. Water is 6.85' on the exterior of the structure from base plate and is seeping into structure. WL in structure is 24.45' below base plate. South Structure: Minor rust observed on handrails. Water level on the exterior of structure is at ground level. WL 18.2' below base plate. No flow.
Gravel Road	Potholes Ponding Deterioration Washouts	X X X X	□ □ □ □	Generally in good condition. Some rutting at several locations. Vegetation present over most of road and has increased from December Inspection.
Water Stops	Erosion Membrane Exposed Deterioration Damage	□ □ X X	X X □ □	Severe erosion, fines accumulation, and geomembrane exposed at water stop on CCND dike as previously reported.
Reflectors Station Tags	Intact/Reflecting Intact/Legibility	X X	□ □	Some reflector posts leaning, few reflectors missing.

DREDGE ISLAND INSPECTION PHOTO LOG

ALCOA PCO – Point Comfort, Texas

1 – North Entry Ramp

2 – North Entry Ramp, minor erosion

3 – North Dike, viewing south

4 – North Dike showing minor to moderate erosion

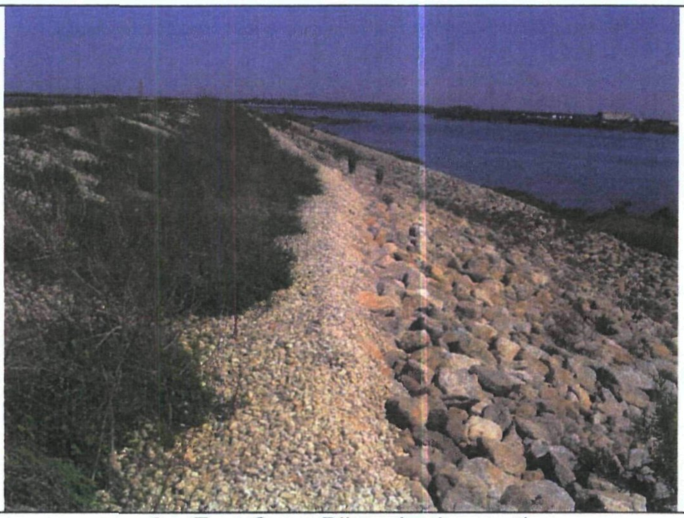
5 – Northeast Decant Structure

6 – East Dike, outer wall, large intrusive trees on various locations of the island

DREDGE ISLAND INSPECTION PHOTO LOG

ALCOA PCO – Point Comfort, Texas

7 – East Inner Dike, viewing north



8 – East Outer Dike, viewing north

9 – Fabric is exposed in various spots around outer armor

10 – Moderate fabric exposed in large areas over island

11 – West Inner Dike, showing minor erosion

12 – West Dike, showing minor erosion around emergency spillway

DREDGE ISLAND INSPECTION PHOTO LOG

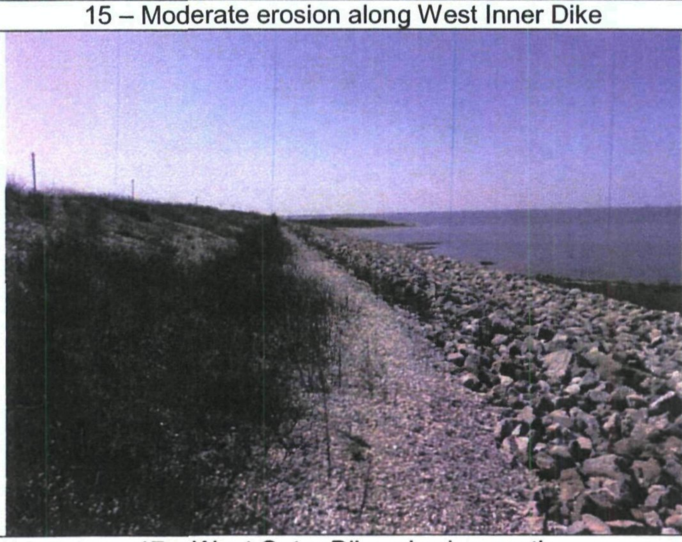
ALCOA PCO – Point Comfort, Texas

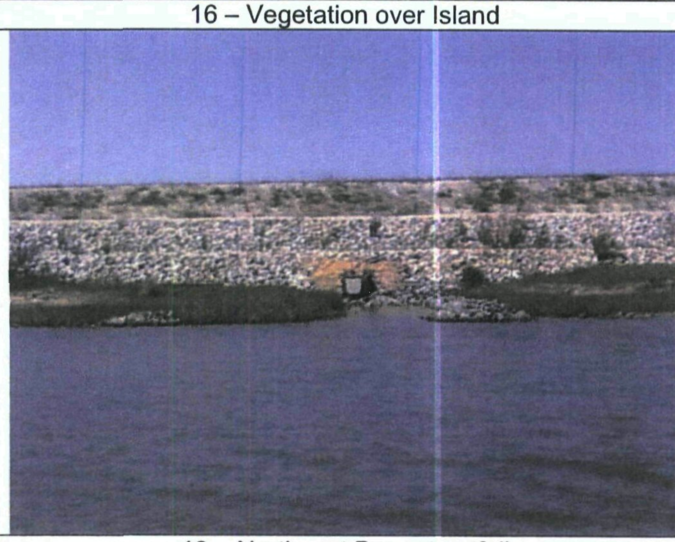

13 – North Inner Dike, viewing east


14 – Southwest Decant Structure


15 – Moderate erosion along West Inner Dike


16 – Vegetation over Island


17 – West Outer Dike, viewing south


18 – Northeast Decant outfall

DREDGE ISLAND INSPECTION RECORD

Inspector's Name: Kevin Dworsky	**Date:** 6/07/10 (2Q10)
Weather: Cloudy, Humid	**Time Begin:** 1300
Temperature: 86	**Time End:** 1500
KBD accompanied by Brett Soutar of Benchmark Ecological Services Inc. during inspection.	**Inspector's Signature:**

SPECIFIC ITEM TO INSPECT	TYPICAL PROBLEMS ENCOUNTERED	CONDITIONS OBSERVED NORMAL	CONDITIONS OBSERVED ABNORMAL	COMMENTS OR CORRECTIVE ACTION(S) IMPLEMENTED AND DATES
General Dredge Island	Erosion	X	☐	Minor erosion on north entrance ramp. All vehicular signs and some of the reflectors on Island are damaged. Vegetation has increased and may become an issue in the near future.
	Deterioration	X	☐	
	Settling/Ponding	X	☐	
	Uplift	X	☐	
	Washouts	X	☐	
	Rodent Holes	X	☐	
	Vegetation	☐	X	
Access Bridge	Deterioration	☐	X	Conditions similar to previous reports. Bridge abutments severely eroded. Hazard warning signs in good condition. Detailed inspection not performed.
	Damage	☐	X	
	Navigation Lights	☐	X	
CDF Dike	Erosion	☐	X	Minor to moderate erosion observed on interior CDF dikes, north end, as previously noted. North end still has the largest amount of erosion. The amount of water has gone down from the last inspection. Minor geomembrane exposed along interior dike on all sides of the dike. No action necessary. Due to large amounts of vegetation, was unable to view exterior for seepage. There was none noted on the dike. Vegetation and trees on the dikes have increased since March.
	Deterioration	X	☐	
	Damage	X	☐	
	Vegetation	☐	X	
Stone Storm Protection	Erosion	X	☐	No damage observed. Significant vegetation present and healthy. Vegetation has increased since March.
	Settlement	X	☐	
	Stone Deterioration	X	☐	
	Stone Movement	X	☐	
	Fabric Exposure	X	☐	
	Damage	X	☐	
Gravel Erosion Protection	Erosion	☐	X	Minor to moderate erosion of inside slopes along entire CDF as noted in previous inspections. The inside side slopes have numerous areas where the fabric has become exposed but appears to still be in good condition. The fabric does not have any noted tears in it.
	Fabric Exposure	☐	X	
	Deterioration	☐	X	
	Damage	☐	X	
Emergency Spillway	Obstructions	X	☐	Generally good condition. Slight erosion and some cracking
	Cracks in Concrete	X	☐	
	Deterioration	X	☐	
	Damage	X	☐	

DREDGE ISLAND INSPECTION RECORD

Decant Structures	Weir Board Elevation Depth of Water Obstructions Deterioration Rust/Corrosion Damage Overflow Quality Overflow Quantity Flap Gate	X X X ☐ ☐ X X X X	☐ ☐ ☐ X X ☐ ☐ ☐ ☐	North Structure: Coated surfaces on structure exhibiting moderate rust and pitting on handrails. Channel iron also exhibits moderate to severe corrosion. Water is 7.75' on the exterior of the structure from base plate and is seeping into structure. WL in structure is 25.69' below base plate. The Dike side of the structure is dry and there is very little water inside the structure. There is very little flow to the inside of the structure. South Structure: Minor rust observed on handrails. The area around the structure is dry (7.38'). WL 17.55' below base plate. No flow.
Gravel Road	Potholes Ponding Deterioration Washouts	X X X X	☐ ☐ ☐ ☐	Generally in good condition. Some rutting at several locations. Vegetation present over most of road and has increased since March inspection.
Water Stops	Erosion Membrane Exposed Deterioration Damage	☐ ☐ X X	X X ☐ ☐	Severe erosion, fines accumulation, and geomembrane exposed at water stop on CCND dike as previously reported.
Reflectors Station Tags	Intact/Reflecting Intact/Legibility	X X	☐ ☐	Some reflector posts leaning, few reflectors missing.

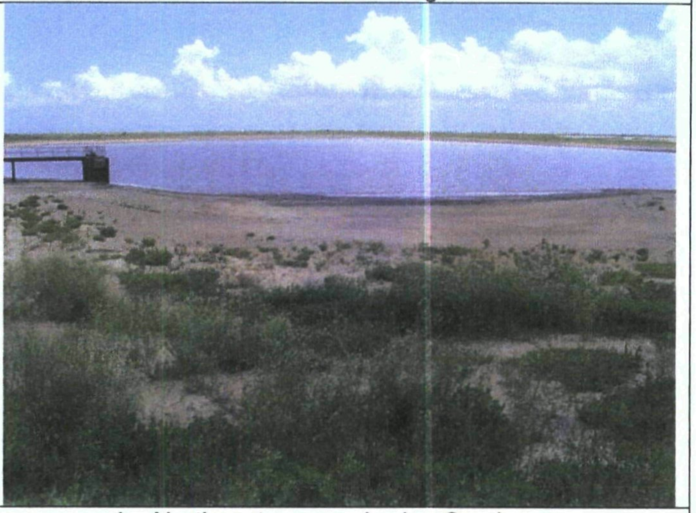
DREDGE ISLAND INSPECTION PHOTO LOG

ALCOA PCO – Point Comfort, Texas

1 – North Dike viewing moderate damage

2 – North Dike viewing East

3 – North Dike, viewing West



4 – Northeast corner viewing Southwest

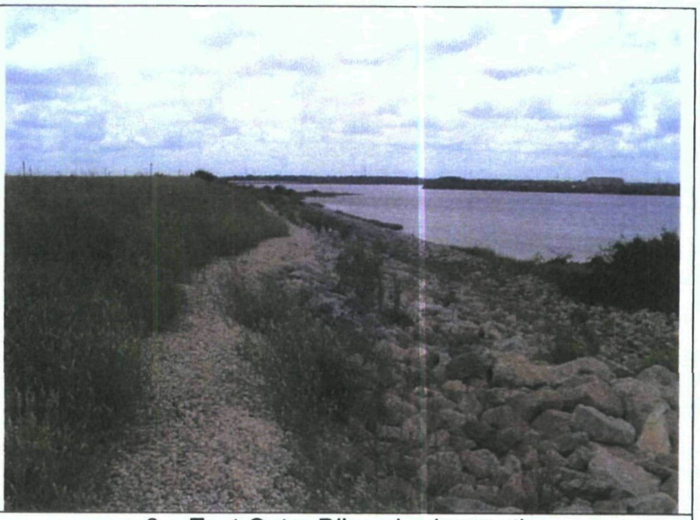
5 – Northeast Decant Structure

6 – East Dike, outer wall, large intrusive trees on various locations of the island

DREDGE ISLAND INSPECTION PHOTO LOG

ALCOA PCO – Point Comfort, Texas

7 – East Inner Dike, viewing South



8 – East Outer Dike, viewing north

9 – Southeast corner viewing Northwest

10 – Outside of East Dike viewing North

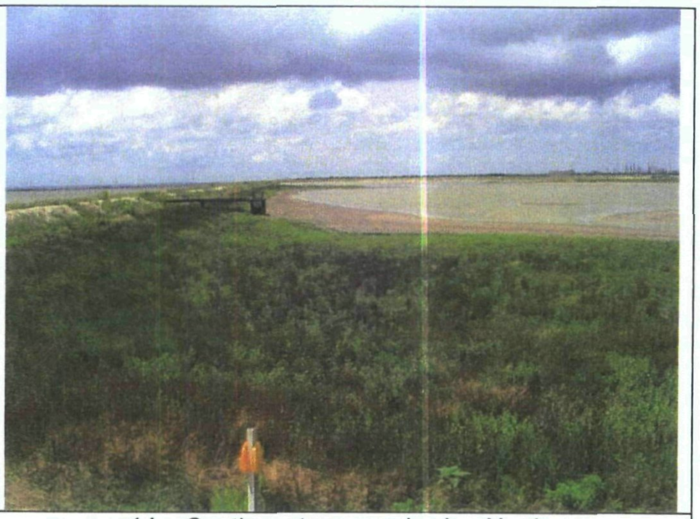
11 – Interior of South Dike viewing West

12 – Outside of South Dike viewing west

DREDGE ISLAND INSPECTION PHOTO LOG

ALCOA PCO – Point Comfort, Texas

13 – South Dike viewing West



14 – Southwest corner viewing North

15 – South Dike viewing East

16 – Vegetation over Island

17 – West Outer Dike, viewing south

18 – Northeast Decant outfall

DREDGE ISLAND INSPECTION RECORD

Inspector's Name: Kevin Dworsky

Weather: Cloudy, Breezy

Temperature: 86

KBD accompanied by Brett Soutar of Benchmark Ecological Services Inc. during inspection.

Date: 9/17/10 (3Q10)

Time Begin: 1030

Time End: 1230

Inspector's Signature:

SPECIFIC ITEM TO INSPECT	TYPICAL PROBLEMS ENCOUNTERED	CONDITIONS OBSERVED NORMAL	CONDITIONS OBSERVED ABNORMAL	COMMENTS OR CORRECTIVE ACTION(S) IMPLEMENTED AND DATES
General Dredge Island	Erosion	X	☐	Minor erosion on north entrance ramp. All vehicular signs and some of the reflectors on Island are damaged. Thick vegetation on roads, interior dikes, around decant structures, Outer Dikes, and on toes of the exterior dikes. Hard to inspect the dikes and ramp thoroughly due to the vegetation. Large trees/bushes are forming on the roads and armor. Action will need to be taken in the future to remove all unwanted vegetation.
	Deterioration	X	☐	
	Settling/Ponding	X	☐	
	Uplift	X	☐	
	Washouts	X	☐	
	Rodent Holes	X	☐	
	Vegetation	☐	X	
Access Bridge	Deterioration	☐	X	Conditions similar to previous reports. Bridge abutments severely eroded. Hazard warning signs in good condition. Detailed inspection not performed.
	Damage	☐	X	
	Navigation Lights	☐	X	
CDF Dike	Erosion	☐	X	Moderate erosion observed on interior CDF dikes, north end, as previously noted. North end still has the most significant erosion. Minor erosion on all other interior dikes in several locations. Water level has stayed approximately the same since the last inspection. Minor to moderate geomembrane exposed along interior dike on all sides of the dike. Action in the near future is necessary. Due to large amounts of vegetation, was unable to view exterior for seepage. There was none noted from the dike. Vegetation and trees on the dikes has increased since June.
	Deterioration	X	☐	
	Damage	X	☐	
	Vegetation	☐	X	
Stone Storm Protection	Erosion	X	☐	No damage observed. Significant vegetation present and healthy. Vegetation has increased since June. The amount of trees/bushes that are pushing through the armor has increased. Action to remove the vegetation will be necessary.
	Settlement	X	☐	
	Stone Deterioration	X	☐	
	Stone Movement	X	☐	
	Fabric Exposure	X	☐	
	Damage	X	☐	
Gravel Erosion Protection	Erosion	☐	X	Minor to moderate erosion of inside slopes along entire CDF as noted in previous inspections. The inside side slopes have numerous areas where the fabric has become exposed but appears to still be in good condition. The fabric does not have any noted tears in it.
	Fabric Exposure	☐	X	
	Deterioration	☐	X	
	Damage	☐	X	
Emergency Spillway	Obstructions	X	☐	Generally good condition. Slight erosion and some cracks in the concrete.
	Cracks in Concrete	X	☐	
	Deterioration	X	☐	
	Damage	X	☐	

DREDGE ISLAND INSPECTION RECORD

Decant Structures	Weir Board Elevation Depth of Water Obstructions Deterioration Rust/Corrosion Damage Overflow Quality Overflow Quantity Flap Gate	X X X ☐ ☐ X X X X	☐ ☐ ☐ X X ☐ ☐ ☐ ☐	North Structure: Coated surfaces on structure exhibiting moderate rust and pitting on handrails. Channel iron also exhibits moderate to severe corrosion. Water is 7.2' from base plate on the exterior of the structure and is seeping into structure. WL in structure is 25.7' below base plate. There is very little flow to the inside of the structure. Vegetation at the entrance of the structure has made access difficult. South Structure: Minor rust observed on handrails. The area around the structure is dry (6.9' below the base plate to the top of the sediment). There is very little water in the structure. Inside the structure, the sediment is 17.9' below base plate. No flow.
Gravel Road	Potholes Ponding Deterioration Washouts	X X X X	☐ ☐ ☐ ☐	Generally in good condition. Some rutting at several locations. Vegetation present over most of road and has increased since June inspection. Beginning to get difficult to walk on the road due to vegetation. There has been some slight erosion of the sides of the road.
Water Stops	Erosion Membrane Exposed Deterioration Damage	☐ ☐ X X	X X ☐ ☐	Severe erosion, fines accumulation, and geomembrane exposed at water stop on CCND dike as previously reported.
Reflectors Station Tags	Intact/Reflecting Intact/Legibility	X X	☐ ☐	Some reflector posts leaning, few reflectors missing.

DREDGE ISLAND INSPECTION PHOTO LOG

ALCOA PCO – Point Comfort, Texas

1 – North Dike viewing moderate damage

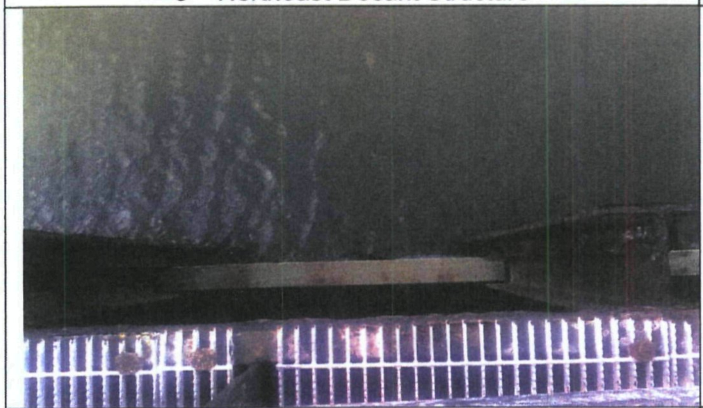
2 – North Dike viewing East

3 – North Dike, viewing West

4 – Northeast corner viewing South

5 – Northeast Decant Structure

6 – East Dike, outer wall, large intrusive trees



7 – Severe Rusting on Northeast Decant Structure

8 – East Outer Dike, viewing north

DREDGE ISLAND INSPECTION PHOTO LOG

ALCOA PCO – Point Comfort, Texas

9 – Southeast corner viewing West

10 – Outside of East Dike viewing South

11 – Interior of South Dike viewing West

12 – Outside of South Dike viewing west

13 – South Dike viewing East

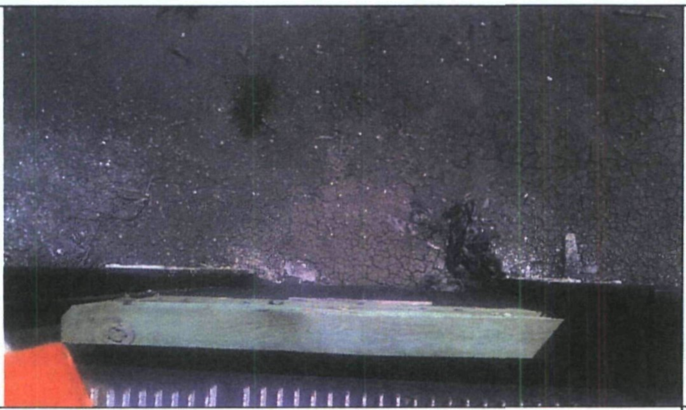
14 – Southwest corner viewing North

15 – West Outer Dike viewing North

16 – Insect mounds in various locations on the Island

DREDGE ISLAND INSPECTION PHOTO LOG

ALCOA PCO – Point Comfort, Texas



17 – Southwest Decant Structure Water Level

18 – West Outer Dike Viewing South

19 – Exposed Fabric on West Interior Dike

20 – Northwest corner viewing East

21 – North Ramp

22 – North Ramp

SITE INSPECTION LOG

Inspector's Name: Dan Bullock, P.E. (BBA, LLC)
Weather: Clear, Windy
Temperature: Approx. 70 F

Inspector's Signature: [signature]
Date: 12-15-10 TX PE NO. 82596
Time Begin: Approx. 9:30 a.m.
Time End: Approx. 12:05 p.m.

Sheet: 1 of 2

Specific Item to Inspect	Typical Problems Encountered	Conditions Observed: Normal	Conditions Observed: Abnormal	Comments or Corrective Action(s) Implemented and Dates
General Dredge Island	Erosion Deterioration Settling/Ponding Uplift Washouts Rodent Holes	☒ ☒ ☒ ☒ ☒ ☒	☐ ☐ ☐ ☐ ☐ ☐	All vehicle traffic signs need replacement/repair if island to be used for vehicular traffic – which is currently not the case.
Access Bridge	Deterioration Damage Navigation Lights	☐ ☐ ☐	☒ ☒ ☒	Conditions similar to those observed and reported in 12/19/06 inspection report (which included overview of bridge damage). Hazard signs indicating presence of water hazards appear in good condition. Detailed inspection of bridge not performed as part of this site visit. Bridge abutments severely eroded.
CDF Dike	Erosion Deterioration Damage Vegetation	☐ ☒ ☒ ☒	☒ ☐ ☐ ☐	North-end generally as noted in December 2009 inspection, with erosion cut on interior slope up to approximately 24-30 inches in depth in areas (compared to approximately 18-24 inches noted in 2009 inspection). See attached figure and photographs for approximate locations and condition of observed erosion areas. Minor erosion observed in areas of exterior dike side slope where entry ramp meets dike. Exterior CDF dikes appear in generally good condition. CDF dikes appear stable and there is no required action at this time; however, water levels in CDF should be maintained as low as possible, and erosion rills on the dike interior and exterior should continue to be monitored during quarterly inspections. Water levels observed during the December 2010 inspection were higher than observed in any previous annual inspections, and are contributing to increased dike erosion. Interior slope of dike does not have armor for protection against wave action. Reported standard operation of impoundment is to maintain very low water levels, such that wave action will be minimized and armor of interior side slopes would not be necessary. If instead, water levels are to be maintained at elevations near those observed during inspection; increased frequency of inspection, repair of existing interior dike erosion, and placement of side slope armor should be implemented immediately. Side slopes of ramp (both sides) generally exhibit erosion rills less than 12 inches in depth. Erosion along crest of ramp, along both sides of ramp, observed to be up to 18 inches in depth and may result in eventual sloughing, which could effectively reduce the crest width slightly. The geomembrane component of the water stop on the CCND dike, near the Alcoa CDF Station 23+00, is exposed due to severe erosion of the overlying topsoil cover material (see attached photos). Erosion in this area currently does not appear to impact the CDF dikes but should continue to be monitored during quarterly inspections.
Stone Storm Protection	Erosion Settlement Stone Deterioration Stone Movement Fabric Exposure Damage	☒ ☒ ☒ ☒ ☒ ☒	☐ ☐ ☐ ☐ ☐ ☐	No damage observed. Minor vegetation growth within stone protection observed – should implement a weed control program and continue to monitor.

STATE OF TEXAS
DANIEL B. BULLOCK
82596
REGISTERED
PROFESSIONAL ENGINEER

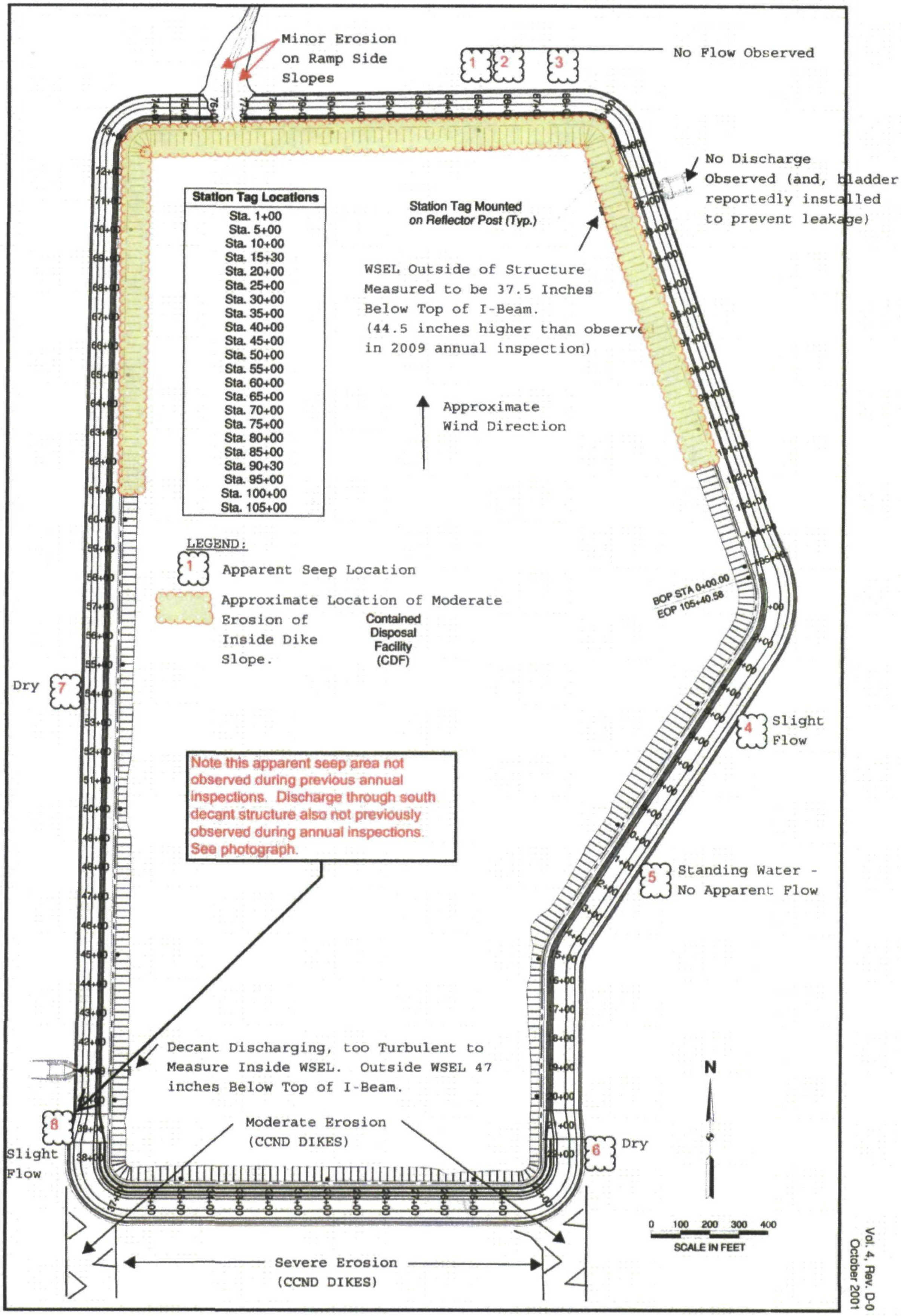
Daniel B. Bullock
2-08-11

Gravel Erosion Protection	Erosion Fabric Exposure Deterioration Damage	☐ ☐ ☐ ☐	☒ ☒ ☒ ☒	The inside slope of dikes at the locations discussed above were previously repaired (in 2007), but gravel erosion protection on the interior slope was not replaced as part of that work. As noted above these areas again exhibit minor to moderate erosion. No immediate action is required but these areas should continue to be monitored on a regular basis. Most of the remaining sections (generally along the south) of dike inside slope areas exhibit minor erosion and loss of gravel protection, no immediate action is required at these locations but they should continue to be monitored.
Emergency Spillway	Obstructions Cracks in Concrete Deterioration Damage	☒ ☒ ☒ ☒	☐ ☐ ☐ ☐	Generally good condition. Some localized, surficial concrete deterioration observed.
Decant Structures	Weir Board Elevation Depth of Water Obstructions Deterioration Rust/Corrosion Damage Overflow Quality (NA) Overflow Quantity Flap Gate	☒ ☒ ☒ ☐ ☐ ☒ ☐ ☒ ☒	☐ ☐ ☐ ☒ ☒ ☐ ☐ ☐ ☐	<u>North Structure:</u> Repairs including replacement of grating on south side of structure, removal of loose rust from handrails and substructure and placement of new metal surface coating were completed in January and February 2008. Repaired areas exhibit moderate to severe rust and pitting on handrails. Re-coating of these surfaces are recommended to prevent metal loss. I-beams and channel iron slots containing the stoplogs on the structure exhibits moderate and severe corrosion, per attached photos. Installation and removal of stoplogs may be difficult in areas of severe corrosion, possibly requiring use of thinner stoplogs. Repair of stoplog slots exhibiting severe corrosion is recommended. This structure should continue to be closely monitored for metal degradation during quarterly inspections. CDF water surface elevation (WSEL) measured approximately 37.5 inches below platform support I-Beam of the north decant structure. December 2009 inspection indicates 82 inches, therefore it appears the WSEL in December 2010 is approximately 44.5 inches higher than in December 2009. <u>South Structure:</u> Minor to moderate rust observed on south decant structure hand rails. Outside decant structure WSEL approximately 47 inches below top of I-Beam (there was no WSEL outside of structure in Dec 2009 – it was dry ground). Due to on-going discharge and associated water turbulence, no measurement of inside WSEL was obtained. South decant discharge observed, see photos. No water quality measurements were obtained during this inspection.
Gravel Road	Potholes Ponding Deterioration Washouts	☒ ☒ ☒ ☒	☐ ☐ ☐ ☐	Generally good condition, some rutting at Station 105+00 and thin gravel surface observed at approximate Sta 65+00. Vegetation growth and occasional small mesquite trees observed within gravel road (some mesquite trees had also been recently removed) – should continue to implement tree removal and weed control program, and continue to monitor.
Water Stops	Erosion Membrane Exposed Deterioration Damage	☐ ☐ ☒ ☒	☒ ☒ ☐ ☐	Erosion and fines accumulation observed near water stop areas. Observed in previous inspections. Appears to be associated with CCND dikes and repairs made in this area during CDF construction. Geomembrane exposed on CCND dike water stop as discussed under the CDF dike inspection item above. Continue to monitor.
Reflectors Station Tags	Intact/Reflecting Intact/Legibility	☒ ☒	☐ ☐	Some reflectors observed to be leaning, if island is to be used for vehicular traffic in the future (currently it is not due to no access bridge), a more detailed review of reflectors and signage should be completed.

Note:
Due to identified safety concerns associated with walking on armor stone, this inspection was conducted without traversing the stone on exterior dike slopes. Exterior dike locations were observed via dike crest or by waterside inspection from a boat, as accessibility allowed. Access to apparent seep areas via boat was not possible due to wind and wave action, and shallow bay water conditions. New apparent seep area near Sta 39 + 00 (seep no. 8) should continue to be monitored. Other historic, apparent seep areas likely influenced by accumulation of dike seepage and/or surface water runoff accumulations at low points along dike toe. If seep no. 8 is observed during next quarterly inspection, it should be accessed and visually observed for water clarity, estimated flow quantity, and visual inspection of surrounding area.

FIGURE 4-3
Typical Inspection Log

12-15-2010 DI Inspection



URS

4-4

FIGURE 4-2
STATION NUMBER LOCATIONS

Vol. 4, Rev. D-0
October 2001

DREDGE ISLAND SITE INSPECTION PHOTOGRAPHS
12/15/2010

North Entry Ram, Minor Erosion

North Dike Inside Slope – Erosion Near Sta 78 +00

North Decant Structure

North Decant Structure

DREDGE ISLAND SITE INSPECTION PHOTOGRAPHS
12/15/2010

North Decant I-Beam/Angle Iron Rust/Deterioration

North Decant Structure

Exterior Side Slope Armor

Dike Crest, Vegetation on Crest and Side Slopes

DREDGE ISLAND SITE INSPECTION PHOTOGRAPHS
12/15/2010

CCND Severe Erosion – Exposed FML

South Decant Structure

South Decant Structure

South Decant Structure

DREDGE ISLAND SITE INSPECTION PHOTOGRAPHS
12/15/2010

Discharge from South Decant Structure

Flow from Toe of Exterior Rock Armor – Near Sta 39 + 00, Immediately South of South Decant Discharge (apparent Seep No. 8)

APPENDIX D

CAPA SOIL CAP INSPECTION RECORDS 2010

CAPA CAP INSPECTION RECORD

Date: 3/18/10 **Time Started:** 1450 **Time Ended:** 1505

Weather Conditions: 70° F, Clear Sky

Observations/Comments:

ITEM TO INSPECT	TYPICAL PROBLEMS ENCOUNTERED	CONDITIONS		COMMENTS, CORRECTIVE ACTIONS NEEDED, COORECTIVE ACTIONS IMPLEMENTED (WITH DATE)
		Normal	Abnormal	
Cap	Erosion	√		
	Settling	√		
	Ponding	√		
	Washouts	√		
	Holes	√		
	Vehicle Ruts	√		Vehicles have possibly driven on Northeast corner of cap.
	Intrusive Vegetation	√		Vegetation is beginning to appear.
Signage	In Place	√		
	Legible	√		
Storm Drains	Grates	√		
	Debris	√		
Equipment or Wastes	Proper Storage	√		
Extraction Wells	Controllers	√		
	Boxes	√		
	Electrical	√		
	Conduit	√		
	Transfer Piping	√		
Treatment System	Equipment	√		
	Leaks	√		
	Odors	√		

Additional Comments or Observations: Cap is in good condition. Will check to see if ruts on northeast corner are within cap area.

Inspector:
Kevin Dworsky

Inspectors Signature:

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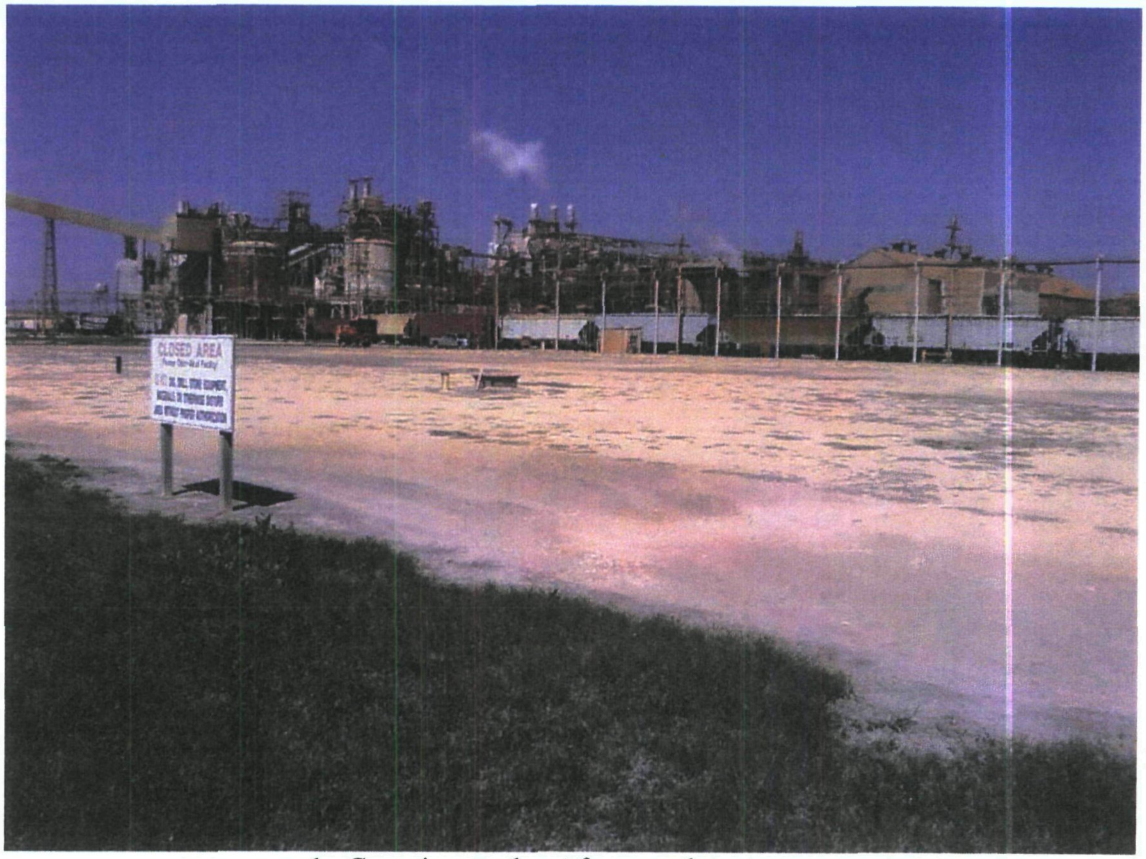

1 - Cap, view northeast from southwest corner


2 - Cap, view southwest from northeast corner

3 - Cap, showing ruts at northeast corner of site

4 - Vegetation on Cap

CAPA CAP INSPECTION RECORD

Date: 6/07/10 **Time Started:** 900 **Time Ended:** 930

Weather Conditions: 80° F, Cloudy, Humid

Observations/Comments:

ITEM TO INSPECT	TYPICAL PROBLEMS ENCOUNTERED	CONDITIONS Normal	CONDITIONS Abnormal	COMMENTS, CORRECTIVE ACTIONS NEEDED, COORECTIVE ACTIONS IMPLEMENTED (WITH DATE)
Cap	Erosion	√		Southwest corner has areas of minor erosion
	Settling	√		
	Ponding	√		Some ponding in various locations
	Washouts	√		
	Holes	√		
	Vehicle Ruts	√		There are a few ruts from recent herbicide spraying
	Intrusive Vegetation	√		Some vegetation was missed during recent spraying
Signage	In Place	√		
	Legible	√		
Storm Drains	Grates	√		
	Debris	√		
Equipment or Wastes	Proper Storage	√		
Extraction Wells	Controllers	√		
	Boxes	√		
	Electrical	√		
	Conduit	√		
	Transfer Piping	√		
Treatment System	Equipment	√		
	Leaks	√		
	Odors	√		

Additional Comments or Observations: Cap is in good condition. Ruts in previous inspection at northeast corner have been determined to be outside of cap area.

Inspector:
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Inspectors Signature:

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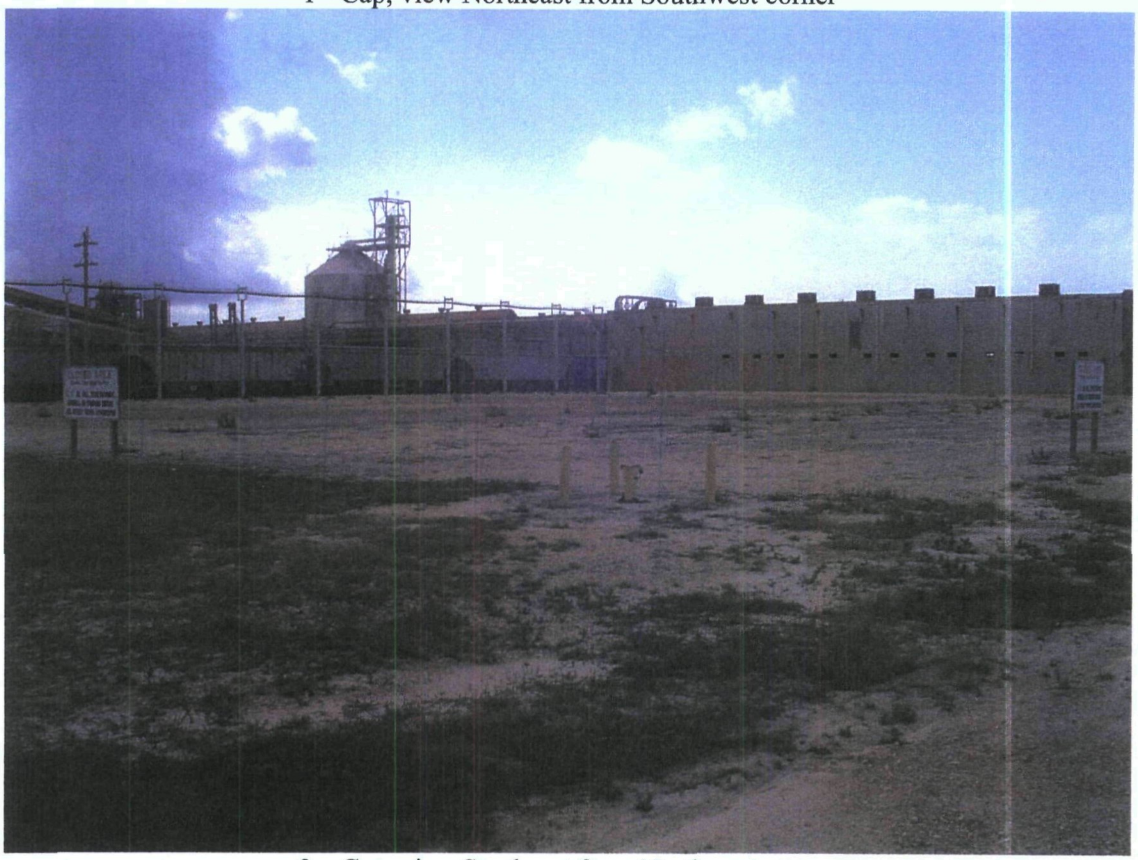
1 - Cap, view Northeast from Southwest corner



2 – Cap, view Southeast from Northwest corner

3 – Cap, view Northwest from Southeast corner

4 – Cap, erosion at Southwest Corner

CAPA CAP INSPECTION RECORD

Date: 9/20/10 **Time Started:** 1230 **Time Ended:** 1245

Weather Conditions: 78° F, Cloudy, Raining

Observations/Comments:

ITEM TO INSPECT	TYPICAL PROBLEMS ENCOUNTERED	CONDITIONS		COMMENTS, CORRECTIVE ACTIONS NEEDED, COORECTIVE ACTIONS IMPLEMENTED (WITH DATE)
		Normal	Abnormal	
Cap	Erosion	√		Southwest corner has areas of minor to moderate erosion
	Settling	√		
	Ponding	√		Some ponding in various locations across cap
	Washouts	√		
	Holes	√		
	Vehicle Ruts	√		There are a few ruts from recent herbicide spraying
	Intrusive Vegetation	√		Some vegetation was missed during recent spraying
Signage	In Place	√		
	Legible	√		
Storm Drains	Grates	√		
	Debris	√		Vegetation is covering the west storm drain
Equipment or Wastes	Proper Storage	√		
Extraction Wells	Controllers	√		
	Boxes	√		
	Electrical	√		
	Conduit	√		
	Transfer Piping	√		
Treatment System	Equipment	√		
	Leaks	√		
	Odors	√		

Additional Comments or Observations: Cap is in good condition.

Inspector:
Kevin Dworsky

Inspectors Signature:

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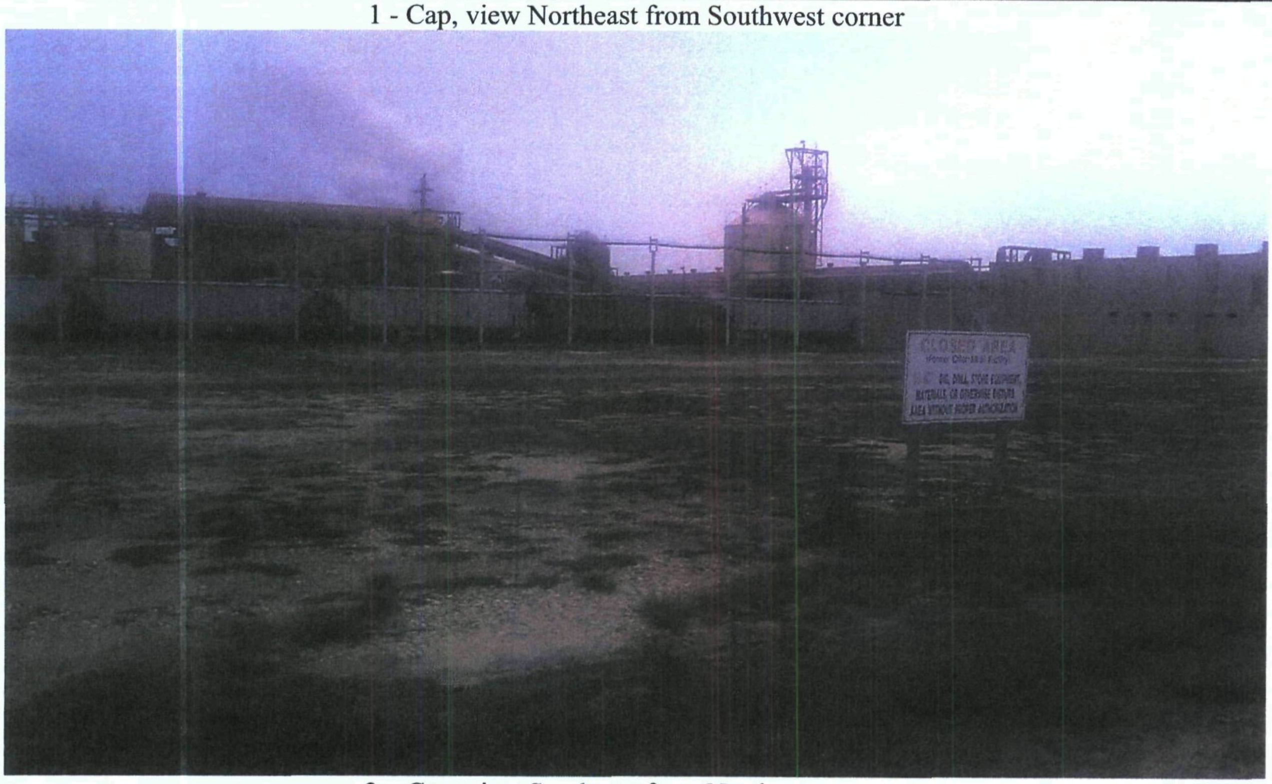
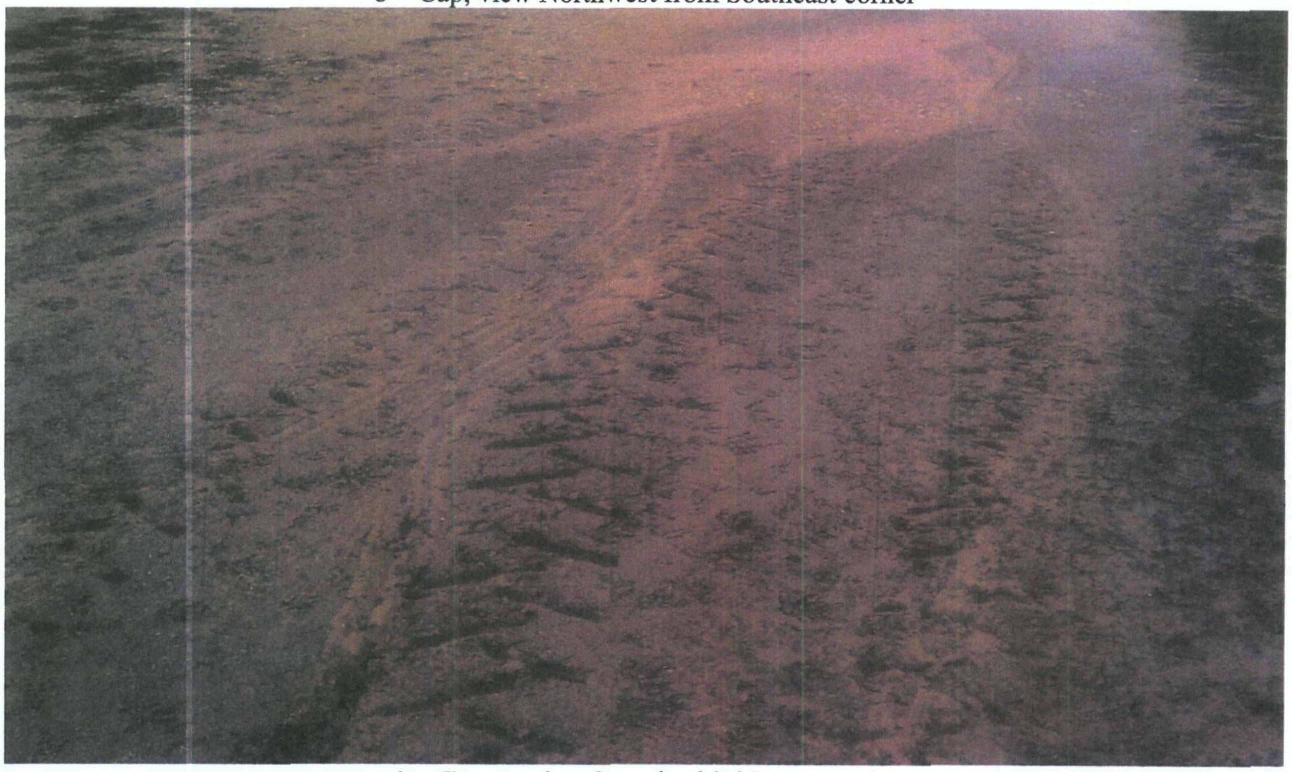
1 - Cap, view Northeast from Southwest corner



2 – Cap, view Southeast from Northwest corner

3 – Cap, view Northwest from Southeast corner



4 – Cap, rutting from herbicide treatment

CAPA CAP INSPECTION RECORD

Date: 12/15/2010 **Time Started:** 1300 **Time Ended:** 1325

Weather Conditions: 68° F, Clear Sky

Observations/Comments:

ITEM TO INSPECT	TYPICAL PROBLEMS ENCOUNTERED	CONDITIONS Normal	CONDITIONS Abnormal	COMMENTS, CORRECTIVE ACTIONS NEEDED, COORECTIVE ACTIONS IMPLEMENTED (WITH DATE)
Cap	Erosion	√		Southwest corner has areas of minor to moderate erosion
	Settling	√		
	Ponding	√		Some ponding in various locations
	Washouts	√		
	Holes	√		
	Vehicle Ruts	√		There are a few ruts from recent herbicide spraying
	Intrusive Vegetation	√		
Signage	In Place	√		
	Legible	√		
Storm Drains	Grates	√		
	Debris	√		West storm drain has vegetation covering grate.
Equipment or Wastes	Proper Storage	√		
Extraction Wells	Controllers	√		
	Boxes	√		
	Electrical	√		
	Conduit	√		
	Transfer Piping	√		
Treatment System	Equipment	√		
	Leaks	√		
	Odors	√		

Additional Comments or Observations: Cap is in good condition.

Inspector:
Kevin Dworsky

Inspectors Signature: [signature]

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1 - Cap, view Northeast from Southwest corner

2 – Cap, view Southeast from Northwest corner

3 – Cap, view Northwest from Southeast corner

4 – Cap, erosion at Southwest Corner

APPENDIX E

WITCO AREA INSPECTION RECORDS 2010

WITCO AREA INSPECTION RECORD

Date: 3/18/10 1Q10 **Time Started: 1425** **Time Ended: 1440**

Weather Conditions: 70° F, Clear Sky

Observations/Comments:

AREA	ITEM	CONDITIONS		COMMENTS, CORRECTIVE ACTIONS NEEDED, COORECTIVE ACTIONS IMPLEMENTED (WITH DATE)
		Normal	Abnormal	
Drainage Channel	Cracks in Concrete	√		Few old cracks
	Obstructions	√		None observed
	Erosion	√		
	Deterioration	√		
	Washouts	√		Minor washouts around rip rap
	Rip Rap		√	Moderate damage, stones dislodged, fabric exposed'
Soil Cap (Tank Farm)	Erosion	√		Difficult to inspect due to vegetation
	Settlement	√		
	Vegetation	√		Vegetation needs to be mowed/shredded
	Intrusive Trees	√		Trees beginning to form on Cap
	Drainage/Rip Rap	√		Clear, lots of vegetation present
	Animal Damage	√		None observed
	Vehicle Ruts	√		None observed
	Damage	√		None observed
Soil Cap (O/W Separator)	Erosion			
	Settlement			
	Vegetation			
	Damage			
Slope from Cap to Channel	Erosion	√		Geofabric in good shape
	Slumping	√		
	Vegetation	√		few trees are forming, slope is vegetated
Signage	Damage	√		
	Illegible	√		
DNAPL Collection Sump	Damage	√		WL in sump = 4.82' BMP, no DNAPL
	Other			

Additional Comments or Observations: Area in good condition. Cap area needs to be mowed/shredded. Rip rap at end of channel has experienced movement from erosion due to significant rain lately and will need to be addressed at some point. Will continue to monitor.

Inspector:
Kevin Dworsky

Inspectors Signature:

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Drainage channel, view toward Lavaca Bay

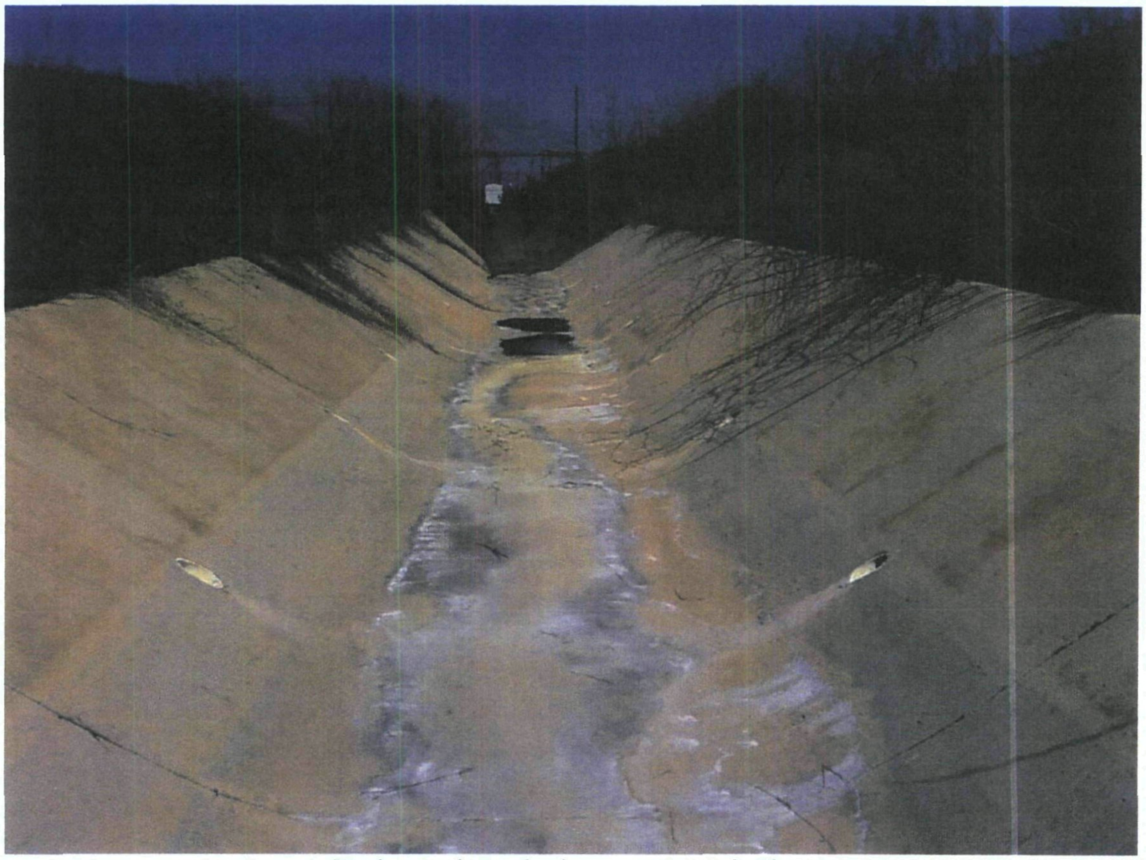

View of rip rap at end of drainage channel showing erosion, movement


Slope between tank farm and drainage channel/marsh showing thick vegetation, view north


View of rip rap at drainage from tank farm cap showing thick vegetation

Northeast corner of Witco Cap, viewing southwest


Southwest corner of Witco Cap, viewing northeast



Drainage channel, view east towards plant

View of rip rap at drainage from drainage channel showing thick vegetation

WITCO AREA INSPECTION RECORD

Date: 6/07/10 2Q10 **Time Started: 945** **Time Ended: 1015**

Weather Conditions: 82° F, Cloudy, Humid

Observations/Comments:

AREA	ITEM	CONDITIONS Normal	CONDITIONS Abnormal	COMMENTS, CORRECTIVE ACTIONS NEEDED, COORECTIVE ACTIONS IMPLEMENTED (WITH DATE)
Drainage Channel	Cracks in Concrete	√		Few old cracks
	Obstructions	√		None observed
	Erosion	√		
	Deterioration	√		
	Washouts		√	Moderate washouts around rip rap
	Rip Rap		√	Moderate damage, exposed fabric.
Soil Cap (Tank Farm)	Erosion	√		Few areas of ponding
	Settlement	√		
	Vegetation	√		
	Intrusive Trees	√		Mesquite trees are beginning to form on cap.
	Drainage/Rip Rap		√	Huisache trees have been sprayed but need to be cut out from the rip rap
	Animal Damage	√		None observed
	Vehicle Ruts	√		None observed
	Damage	√		Lot of recently mowed grass on the cap made it hard to see the structural soil.
Soil Cap (O/W Separator)	Erosion			
	Settlement			
	Vegetation			
	Damage			
Slope from Cap to Channel	Erosion	√		Geofabric in good shape
	Slumping	√		
	Vegetation	√		Mesquite and Huisache trees forming on slope
Signage	Damage	√		
	Illegible	√		
DNAPL Collection Sump	Damage	√		WL in sump = 4.28' BMP, no DNAPL
	Other			

Additional Comments or Observations: Area in good condition. Rip rap at end of channel has experienced movement from erosion due to significant rain lately and will need to be addressed in the near future.

Inspector:
Kevin Dworsky

Inspectors Signature: [signature]

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Northeast corner viewing Southwest

Northwest corner viewing Southeast

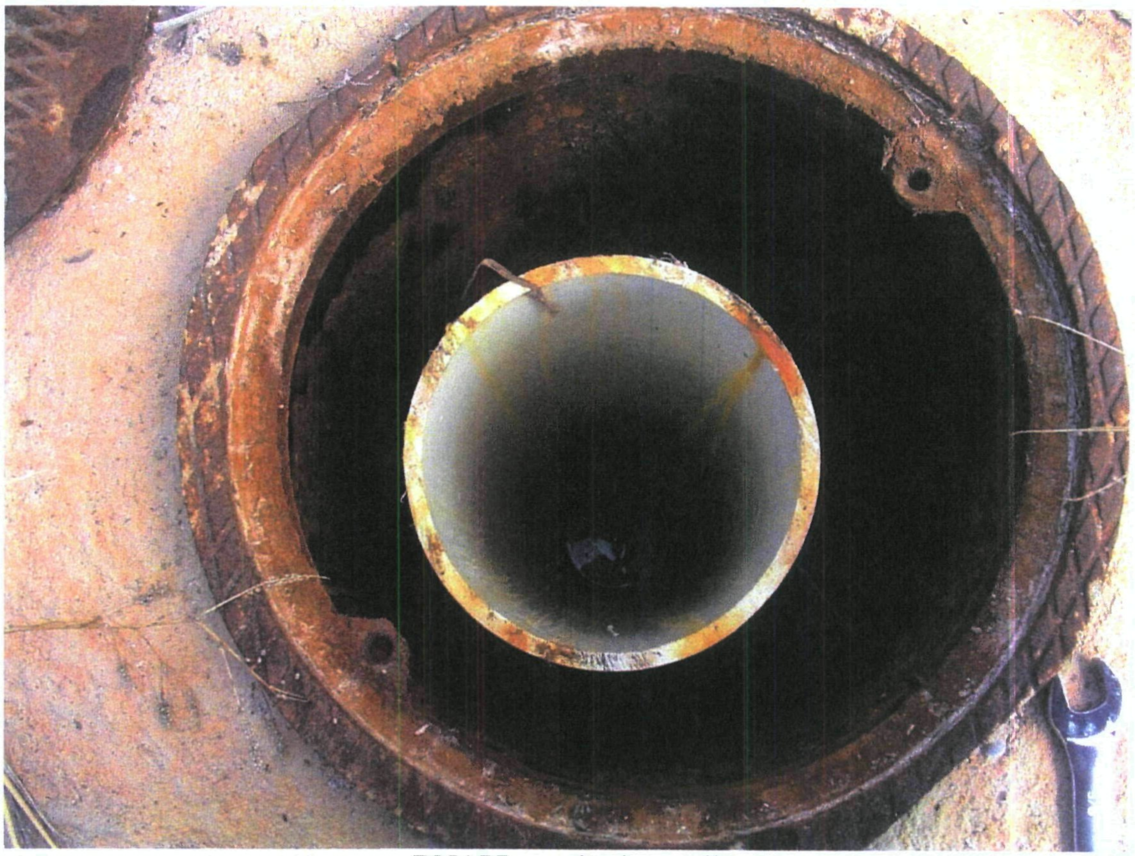
Southwest corner viewing Northeast

Southeast corner of cap viewing Northwest

Area of ponding on the cap

Slope between tank farm and drainage channel/marsh showing good vegetation, view north

DNAPL monitoring well



DNAPL monitoring well

View of rip rap at end of drainage channel showing erosion, view east

View of rip rap damage at the end of the drainage channel


View of rip rap damage at the end of the drainage channel


View of damaged rip rap, view west

View of the end of the drainage channel, view west

View of east end of drainage channel

View of rip rap from drainage channel showing wesache and vegetation

View of rip rap at drainage from tank farm cap showing recently sprayed vegetation

WITCO AREA INSPECTION RECORD

PAGE 1 of 1

Date: 9/20/2010 3Q10 **Time Started: 1245** **Time Ended: 1300**

Weather Conditions: 78° F, Cloudy, Raining

Observations/Comments:

AREA	ITEM	CONDITIONS		COMMENTS, CORRECTIVE ACTIONS NEEDED, COORECTIVE ACTIONS IMPLEMENTED (WITH DATE)
		Normal	Abnormal	
Drainage Channel	Cracks in Concrete	√		Few old cracks
	Obstructions	√		None observed
	Erosion	√		Slight erosion on east lip of concrete drainage channel
	Deterioration	√		
	Washouts		√	Moderate washouts around rip rap
	Rip Rap		√	Moderate damage, fabric exposed
Soil Cap (Tank Farm)	Erosion	√		Few areas of ponding
	Settlement	√		
	Vegetation	√		Large amounts of vegetaion across cap
	Intrusive Trees	√		Mesquite trees are beginning to form on cap.
	Drainage/Rip Rap		√	Huisache trees have been sprayed but needs to be cut out from the rip rap
	Animal Damage	√		None observed
	Vehicle Ruts	√		None observed
	Damage	√		Tall vegetation from the recent rains made it hard to inspect the cap
Soil Cap (O/W Separator)	Erosion			
	Settlement			
	Vegetation			
	Damage			
Slope from Cap to Channel	Erosion	√		Geofabric in good shape
	Slumping	√		
	Vegetation	√		Mesquite and huisache trees forming on slope
Signage	Damage	√		
	Illegible	√		
DNAPL Collection Sump	Damage	√		WL in sump = 2.96' BMP, no DNAPL
	Other			

Additional Comments or Observations: Area in good condition. Rip rap at end of channel has experienced movement from erosion due to significant rain lately and will need to be addressed in the near future.

Inspector:
Kevin Dworsky

Inspectors Signature:

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Northeast corner viewing Southwest

Northwest corner viewing Southeast

Southwest corner viewing Northeast

View of vegetation on slope from drainage channel/marsh


Slope between tank farm and drainage channel/marsh showing good vegetation, view north


DNAPL monitoring well

View of rip rap at end of drainage channel showing erosion, view east

View of rip rap damage at the end of the drainage channel

View of damaged rip rap, view west

View of the end of the drainage channel, view west

View of east end of drainage channel

View of rip rap from drainage channel showing wesache and vegetation


View of rip rap at drainage from tank farm cap showing recently sprayed vegetation

WITCO AREA INSPECTION RECORD

PAGE 1 of 1

Date: 12/15/2010 4Q10 | **Time Started:** 1325 | **Time Ended:** 1350

Weather Conditions: 68° F, Clear Sky

Observations/Comments:

AREA	ITEM	CONDITIONS		COMMENTS, CORRECTIVE ACTIONS NEEDED, COORECTIVE ACTIONS IMPLEMENTED (WITH DATE)
		Normal	Abnormal	
Drainage Channel	Cracks in Concrete	√		Few old cracks
	Obstructions	√		None observed
	Erosion	√		Slight erosion on east lip of concrete drainage channel
	Deterioration	√		
	Washouts		√	Moderate washouts around rip rap
	Rip Rap		√	Moderate damage, fabric exposed
Soil Cap (Tank Farm)	Erosion	√		Few areas of ponding on cap
	Settlement	√		
	Vegetation	√		
	Intrusive Trees	√		
	Drainage/Rip Rap		√	Huisache needs to be cut out from the rip rap
	Animal Damage	√		None observed
	Vehicle Ruts	√		None observed
	Damage	√		None observed
Soil Cap (O/W Separator)	Erosion			
	Settlement			
	Vegetation			
	Damage			
Slope from Cap to Channel	Erosion	√		Geofabric is exposed and in stretch in a few locations, overall in good condition
	Slumping	√		
	Vegetation	√		Mesquite and huisache trees forming on slope
Signage	Damage	√		
	Illegible	√		
DNAPL Collection Sump	Damage	√		WL in sump = 3.27' BMP, no DNAPL
	Other			

Additional Comments or Observations: Area in good condition. Rip rap at end of channel has experienced movement from erosion due to significant rain lately and will need to be addressed in the near future.

Inspector:
Kevin Dworsky

Inspectors Signature:

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Northeast corner viewing Southwest

Northwest corner viewing Southeast

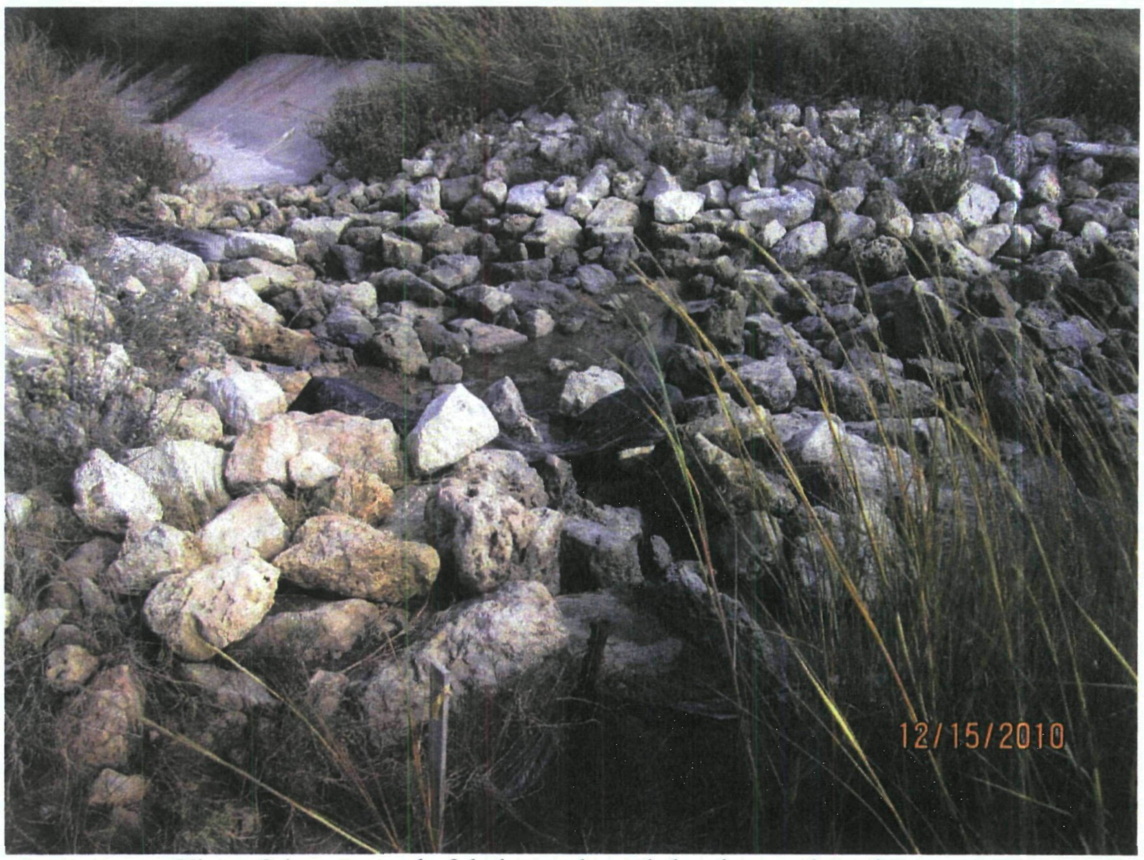
Southwest corner viewing Northeast

Southeast corner of cap viewing Northwest

Slope between tank farm and drainage channel/marsh showing mowed vegetation, viewing southeast

Slope between tank farm and drainage channel/marsh showing mowed vegetation, view northwest

DNAPL monitoring well

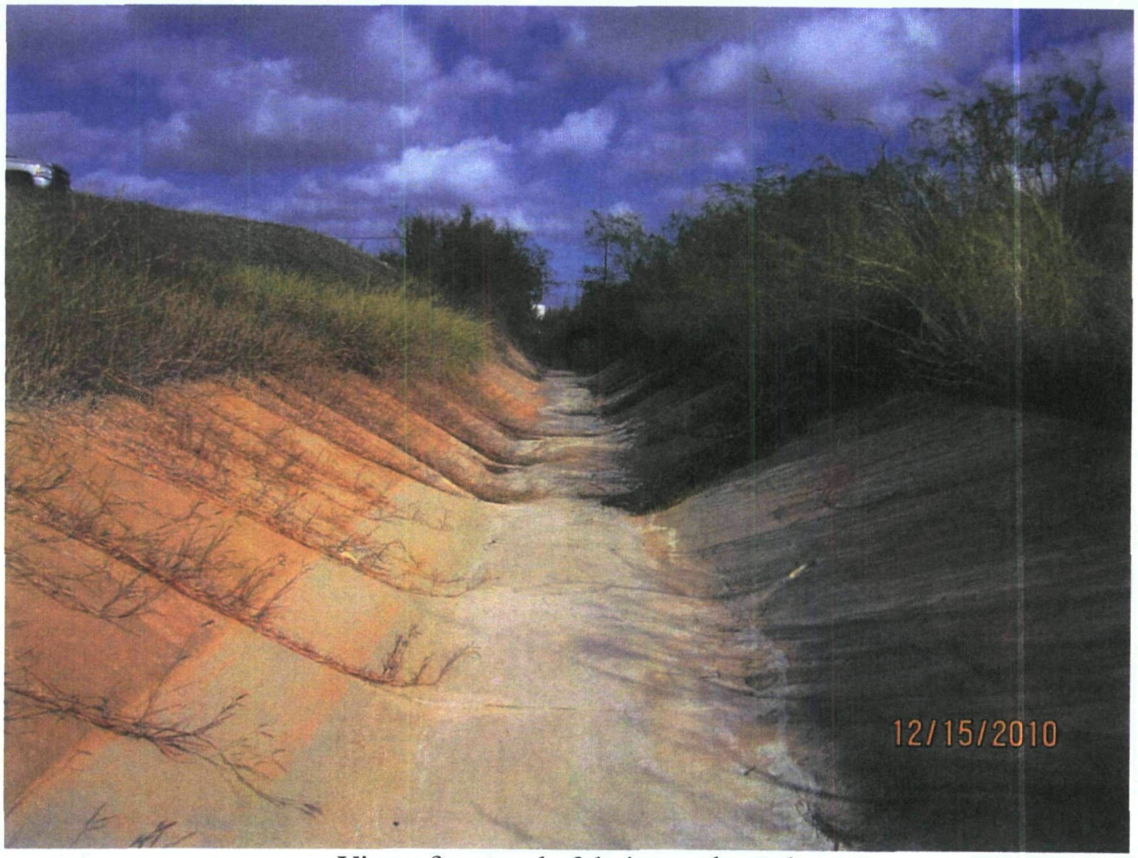


View of rip rap at end of drainage channel showing erosion, view east

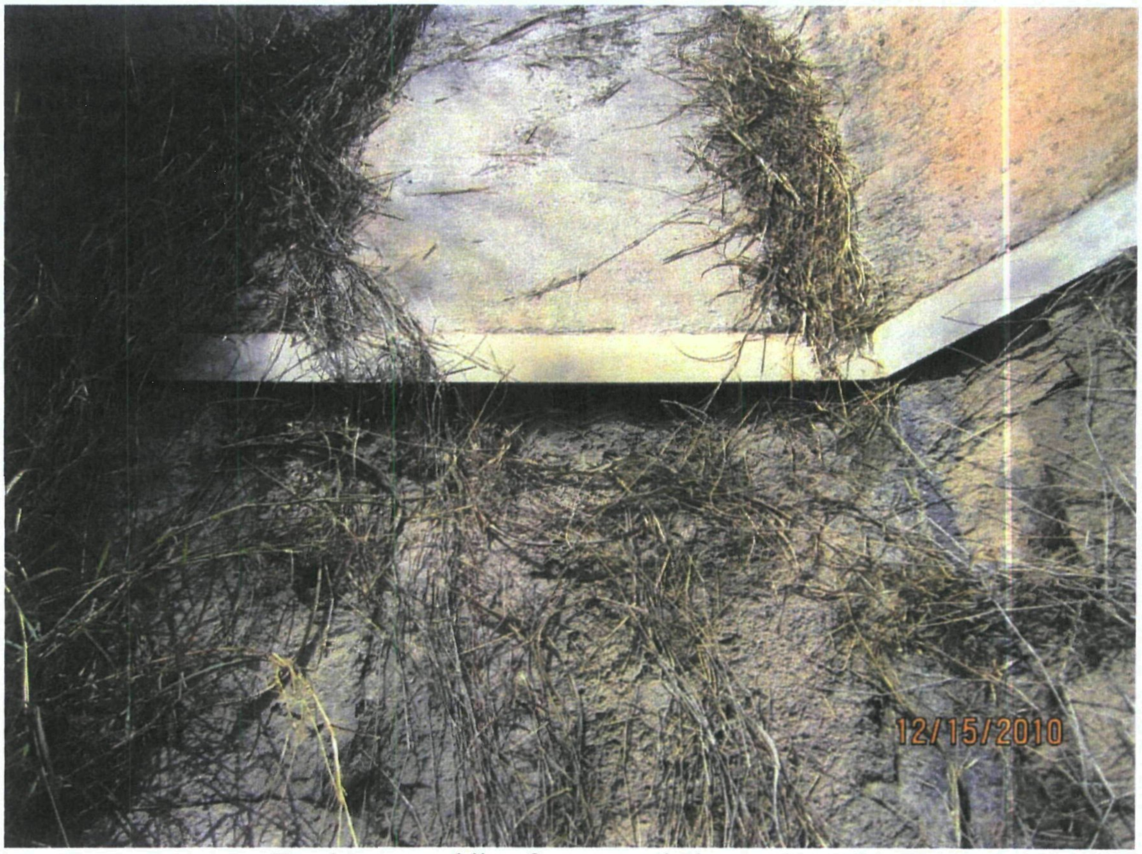
View of rip rap damage at the end of the drainage channel

View of damaged rip rap, view west

View of the end of the drainage channel, view west



View of east end of drainage channel



Erosion around lip of concrete drainage channel

Erosion around lip of concrete drainage channel

View of rip rap from drainage channel showing wesache and vegetation

View of rip rap at drainage from tank farm cap showing recently sprayed vegetation