UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

June 9, 2011

Halaco Superfund Site: EPA testing results for sediments in the Oxnard Industrial Drain and lagoon near the former Halaco facility in Oxnard, California

The attached report provides testing results for sediments in the Oxnard Industrial Drain (OID) and lagoon near the former Halaco facility in Oxnard, California. The report includes a description of the testing effort, a tabular summary of results, and figures depicting selected results. The testing is part of the remedial investigation (RI) performed by the U.S. Environmental Protection Agency (EPA) for the Halaco Superfund Site in Oxnard, California. Halaco operated an aluminum and magnesium smelter at the Site from 1965 to 2004.

Testing

EPA and its contractors collected 89 sediment samples from 40 locations in the OID and lagoon in June 2010 to define the nature and extent of contamination attributable to Halaco's operations.

All samples were analyzed for aluminum, magnesium, and other metals that may be present in Halaco's wastes, including thorium and radium. In addition, 50 percent of the samples were analyzed for a variety of organic chemicals: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), total petroleum hydrocarbons (TPH), and dioxins and furans.

Findings

Based on the testing, EPA has concluded the following:

- Sediments in the OID adjacent to the Halaco properties have been contaminated by metals from Halaco's waste materials. Halaco wastes are likely to have first contaminated OID sediments in the late 1960s when Halaco discharged waste material into a settling pond in or adjacent to the OID.

- Sediments in portions of the lagoon have been contaminated by metals, dioxins, furans and PCBs from Halaco's waste materials. The highest levels of contamination were found in subsurface sediments (at a depth of approximately two feet) in the lagoon “finger” under the footbridge at the end of Perkins Rd. Metals concentrations are at background levels in sediments in the lagoon fingers near the ocean. Changes between 1965 and 2011 in the size and shape of the lagoon help explain why contamination was found in some parts of the lagoon but not others.

- Thorium and radium that probably came from Halaco’s wastes were found in subsurface sediments in the lagoon “finger” under the footbridge at the end of Perkins Rd. They were generally at background levels in the OID and in the main portion of the lagoon.

- The other organic chemicals tested for (VOCs, SVOCs, TPH) were detected infrequently and at low concentrations. These chemicals do not appear to be at harmful levels or attributable to Halaco’s wastes.

- EPA has completed a screening-level risk assessment that indicates that the contaminated sediments may pose a risk to fish and wildlife that ingest contaminated sediment and prey from the site.

- The contaminated soils and sediments do not pose a significant health risk to occasional visitors to, or users of, the OID and lagoon.

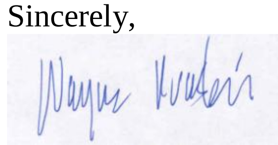
Next Steps

To complete its evaluation of the risks posed by the contaminated soils and sediments to human health and the environment, EPA will collect and analyze invertebrates and fish from the OID and lagoon, and conduct laboratory “toxicity tests” using contaminated sediments from the site. EPA will use the results to develop site-specific soil and sediment cleanup levels protective of fish and wildlife at the Site. This testing is planned for late June 2011.

After completion of the additional testing, EPA will evaluate cleanup options and begin to develop cleanup proposals for areas posing a significant health risk to human health or wildlife. EPA will seek and consider public comments on its cleanup proposals.

If you have comments or seek additional information, please contact me at 415-972-3181 or praskins.wayne@epa.gov. Additional information is also available at http://www.epa.gov/region9/halaco

Sincerely,



Wayne Praskins
EPA Project Manager

Enclosure (“Solid Matrix Sampling and Analysis Results for the Oxnard Industrial Drain and Lagoon Areas, Halaco Superfund Site Remedial Investigation,” June 2011)

SOLID MATRIX SAMPLING AND ANALYSIS RESULTS FOR THE

OXNARD INDUSTRIAL DRAIN AND LAGOON AREAS

HALACO SUPERFUND SITE
REMEDIAL INVESTIGATION

OXNARD, CALIFORNIA

EPA CONTRACT NO. EP-S9-08-04
EPA TASK ORDER NO. 015-RIRI-09X6
CH2M HILL PROJECT NO. 385135

Prepared for
U.S. Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, California 94105

Prepared by
CH2M HILL
325 East Hillcrest Dr., Suite 125
Thousand Oaks, California 91360

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Acronyms and Abbreviations

µg/kg	microgram(s) per kilogram
95% UCL	95 percent upper confidence limit
bgs	below ground surface
COC	chain of custody
CRQL	contract-required quantitation limits
Cs 137	cesium 137
EPA	U.S. Environmental Protection Agency
FSP	Field Sampling Plan
FWS	U.S. Fish and Wildlife Service
GPS	Global Positioning System
Halaco	Halaco Engineering Co.
K 40	potassium 40
KLI	Kinnetic Laboratories, Inc.
MS/MSD	matrix spike/matrix spike duplicate
mg/kg	milligram(s) per kilogram
msl	mean sea level
ng/kg	nanogram(s) per kilogram
NAVD 88	North American Vertical Datum of 1988
ND	not detected
NCL	Nature Conservancy Land
NPL	National Priorities List
OID	Oxnard Industrial Drain
OSWER	Office of Solid Waste and Emergency Response
pCi/g	picocurie(s) per gram
PCB	polychlorinated biphenyl
PCDD	polychlorinated dibenzo-p-dioxin (or dioxin)
PCDF	polychlorinated dibenzofuran (or furan)

PVC	polyvinyl chloride
QAPP	Quality Assurance Project Plan
Ra 228	radium 228
Ra 226	radium 226
RI	Remedial Investigation
SDG	sample delivery group
SVOC	semivolatile organic compound
SOP	standard operating procedure
Site	Halaco Engineering Co. Superfund Site
TEF	toxicity equivalency factor
Th 232	thorium 232
Th 230	thorium 230
Th 228	thorium 228
TPH	total petroleum hydrocarbons
VCWPD	Ventura County Watershed Protection District
VOC	volatile organic compound
WDA	Waste Disposal Area
WMU	Waste Management Unit

SECTION 1

Introduction

This report provides the results of sediment testing for the Oxnard Industrial Drain (OID) and associated lagoon areas at and near the Halaco Engineering Co. Superfund Site (Site) in Oxnard, California. See Figure 1a for locations. The sediment samples were collected in June 2010. The report includes a description of the testing effort, a brief narrative and tabular summary of results, and figures depicting selected results. Surface water testing in the OID and lagoon areas, and the results of soil and sediment testing at other parts of the Site, will be described in separate reports. This testing is part of the remedial investigation (RI) performed by the U.S. Environmental Protection Agency (EPA) for the Site. The testing was completed in accordance with an EPA-approved Quality Assurance Project Plan (QAPP; CH2M HILL, 2009a) and Field Sampling Plan (FSP; CH2M HILL, 2009b).

1.1 Objectives

The primary objectives of the testing were to provide data needed to determine the nature and extent of sediment contamination. The data also will be used to characterize the ecological and human health risks posed by the contaminated sediments and to evaluate remedial options.

1.2 Background

The Site is located in eastern Ventura County at and near 6200 Perkins Road in Oxnard, California. Halaco Engineering Company (Halaco) operated a secondary metal smelter at the Site from 1965 to 2004, recovering aluminum and magnesium for reuse. The site background, including a description of Halaco's operations and waste disposal practices, and the physical and ecological settings, is described in the QAPP. A brief summary is provided below.

The Site includes an 11-acre parcel containing the former smelter, a 26-acre Waste Management Area where wastes were deposited and managed, and adjacent areas affected by Halaco's wastes. The 26-acre area includes the Waste Management Unit (WMU), which contained Halaco's former waste settling ponds, and the Waste Disposal Area (WDA) to the north, which received waste from the WMU. The adjacent areas affected by Halaco's wastes include portions of:

- Land owned by the Nature Conservancy east and north of the Waste Management Area, referred to as NCL-East and NCL-North
- Wetland and beach areas south of the former Smelter Parcel and WMU
- Oxnard Industrial Drain (OID), which bisects the Smelter Parcel and Waste Management Area ("the Halaco properties"), and an associated lagoon

During its 40 years of operation, Halaco acquired scrap metal from more than 400 suppliers in a variety of forms and in varying levels of purity. Halaco processed dross, sludge, castings, sheets, pellets, granules, cans, car parts, and other scrap. Halaco reports that it processed one type of scrap, a low-level radioactive magnesium-thorium alloy, until about 1977. Other metals found in aluminum and magnesium alloys include copper, silver, zinc, lead, chromium, titanium, tin, manganese, and nickel.

Halaco produced large quantities of solid and liquid waste. Most of the waste was "process waste" generated during the smelting process. Other waste was generated by the air pollution control equipment and from used oil and spent solvent. From 1965 to about 1970, Halaco discharged much or all of its waste to a settling pond adjacent to the OID and used waste solids as fill in the smelter area. In about 1970, Halaco began pumping its wastewater across the OID into unlined earthen settling ponds in the area later named the WMU. Beginning in or before 1980, Halaco moved waste solids from the WMU to the WDA.

Halaco reports that all operations ceased in September 2004. In 2007, EPA estimated that more than 700,000 cubic yards of waste solids remained onsite. The bulk of the solids is in the WMU, which covers about 15 acres and rises up to 40 feet above grade. Previous testing at the Site showed that elevated levels of several metals are present in the waste, and that soils, sediments, and groundwater have been contaminated by Halaco's wastes. Constituents found at elevated levels included aluminum, barium, beryllium, cadmium, chromium, copper, lead, magnesium, manganese, nickel, and zinc. Elevated levels of radioactive thorium (and decay products) also were found in some areas. In past sampling, elevated levels of ammonia and petroleum hydrocarbons also were detected at the Site. The ammonia is believed to be a byproduct of the smelting process.

1.3 EPA Actions from 2006 through 2010

In 2006, EPA completed a testing effort at the Site called the Integrated Assessment (Weston Solutions, Inc., 2007) to (1) determine the Site's eligibility for placement on the Superfund National Priorities List (NPL), and (2) evaluate the need for immediate actions to stabilize the Site. In September 2007, EPA added the former Halaco facility and adjacent areas of contamination to the NPL. Shortly thereafter, EPA began the RI to determine the nature and extent of contamination at the Site, identify human health and ecological risks posed by the contamination, and identify areas needing remediation.

In 2006 and 2007, two removal actions were completed to address immediate site risks while EPA evaluated the Site for placement on the NPL. The first removal action, completed by the property owners between August 2006 and February 2007, included the removal of drums and other hazardous substances from the Site. A second, EPA-funded removal action was completed in 2007 to stabilize and secure the Site and limit offsite migration of contaminated wastes. It included re-grading the waste pile to reduce the steepness of the slopes, placing matting on the slopes to reduce erosion, stabilizing the banks along the lower portion of the OID, removing an estimated 9,000 cubic yards of waste from the smelter area, removing an estimated 7,600 cubic yards of material from a wetland area adjacent to the Halaco property, and installing more than 6,000 feet of fencing around the perimeter of the Waste Management Area. See the "Team 9" report (2008) for additional details. Figure 1a is an aerial photo of the Site after the second removal action was completed.

In 2007, EPA completed additional site characterization activities. These included a radiation assessment of surface and subsurface conditions throughout the Smelter Parcel (Team 9, 2008).

In 2008, EPA completed a screening-level ecological and human health risk assessment to support RI activities for the Site (CH2M HILL, 2008a). This screening-level risk assessment identified major contaminants of potential concern and environmental exposure pathways for ecological and human receptors. This assessment used conservative estimates of exposure and potential ecological and human health effects to identify areas of the Site that may pose unacceptable risks to human health and/or the environment and may warrant remediation.

Also in 2008, EPA completed a preliminary evaluation of the sources, nature, extent, and movement of contamination in surface water and groundwater at the Site (CH2M HILL, 2008b). This preliminary evaluation compiled and evaluated information on the sources, nature and extent of surface water and groundwater contamination at the Site, and the physical processes that affect the movement of the contamination.

In 2009, using the results of the Integrated Assessment, the radiation assessment, screening-level risk assessment, and preliminary groundwater evaluation, EPA identified data gaps and prepared a plan for additional sampling and analysis activities needed before remediation can occur (EPA Region 9, 2009). CH2M HILL then prepared the data quality objectives, QAPP, and FSP for this RI based on the testing plan.

In 2010, EPA demolished two abandoned industrial buildings at the Site. The two buildings were in poor condition and at risk of collapse.

SECTION 2

Initial Conceptual Site Model

This section describes what was known about the OID and lagoon areas prior to the 2009-2010 RI activities, and why portions of these areas were thought to be a potential threat to human health or the environment.

2.1 Historical OID and Lagoon Alignment

The OID and lagoon alignments have changed since predevelopment conditions in the early 1900s as shown in the historical aerial photographs in Attachment A. These photographs, for the period 1929 through 1991, are from an aerial photographic analysis performed by the EPA Environmental Monitoring Systems Laboratory (Lockheed Engineering and Management Services Company, 1982, and Lockheed Engineering and Sciences Company, 1991).

The 1929 aerial photograph shows predevelopment conditions, with the OID flowing southwest through NCL-North and the former Smelter Parcel. The OID terminated in a small lagoon near the current southeastern area of the Smelter Parcel. The modern-day lagoon as shown in Figure 1a was not present.

The 1945 aerial photographs shows fill activities on the Smelter Parcel and a realigned OID that is east of the 1929 predevelopment alignment. These fill activities are from the City of Oxnard's burn dump activities, which continue through the 1959 photograph. Also visible in the 1945 photograph is the former coastal canal that conveyed surface water from the Hueneme Drain (a.k.a. Bubbling Springs) southeast to the Mugu Lagoon. This coastal canal was already constructed in the 1930s according to an Oxnard Drainage District No. 3 drawing (undated). It appears to still be operational in the 1951 photograph, but appears to be partially filled with sand and dilapidated in the 1959 photograph. The modern-day lagoon is still not present during this early development period.

The 1965 aerial photograph shows the Halaco properties immediately prior to development by Halaco. Burn dump activities are no longer visible and the portion of the coastal canal to the east of the OID is no longer present and appears to be filled with sand. The 1969 photograph shows early Halaco operations at the Smelter Parcel and Halaco process waste being discharged to a small pond in the former OID alignment. The 1970 photograph shows a realigned OID that is east of the alignment from 1945 through 1965. It appears that Halaco process waste filled this early OID channel in the late 1960s to create the alignment that exists today. The photographs from 1970 through 1991 also show Halaco's waste disposal activities at the Waste Management Area east of the OID.

The 1991 aerial photo shows the early stages of the modern-day lagoon, which is much smaller than today. During this time, Ventura County manually breached the beach berm at the end of the J Street Drain to prevent upstream flooding. Flow from the J Street Drain and OID discharged into the smaller lagoon at that time and then exited this breach to the ocean.

2.2 Sources, Nature, and Extent of Contamination

The OID adjacent to the Halaco properties, and portions of the lagoon near the mouth of the OID, were known to have been contaminated by Halaco's waste material based on site activities observed in historical aerial photographs (Section 2.1) and data from the Integrated Assessment performed by EPA in 2006. Halaco discharged waste to a settling pond adjacent to the OID from about 1965 to 1970 (see the "1969 pond" shown in Figures 2 and 3) and apparently used some or all of the waste solids as fill in the "1959 OID channel" shown in Figures 2 and 3. Currently, an area of approximately 4 to 5 acres in the southeastern corner of the Smelter Parcel is underlain by Halaco wastes.

Wastes are also believed to have eroded into the current OID channel from the contaminated waste fill at the Smelter Parcel to the west and the WMU to the east. In addition, seepage from the WMU when Halaco used the WMU as a settling pond for its wastewater (approximately 1970 to 2002), and deposition of air emissions during the years that Halaco operated (1965 to 2004) may have contributed to the contamination. The WMU is as high as 40 feet above the OID area, and the slopes of the WMU adjacent to the OID were steep and erosion-prone before EPA completed its stabilization work in 2007.

Sampling completed in the OID and lagoon area as part of the Integrated Assessment confirmed the presence of Halaco's wastes. As part of the Integrated Assessment, EPA collected eight surface sediment samples in the OID adjacent to the Halaco properties (SDF-1 through 3, SDF-5, and SDF-7 through SDF-10), six samples in the OID to the north of the Halaco properties thought to represent background conditions (SDF-11 through SDF-16), and two samples in the lagoon (SDF-4 and SDF-6). EPA analyzed all of these samples in the field for metals using X-ray fluorescence and in an offsite lab for metals and five radionuclides (cesium [Cs] 137, potassium [K] 40, thorium [Th] 228, Th 230, and Th 232).

Most of the sediment samples collected from the OID adjacent to the Halaco properties and the samples in the lagoon showed the presence of Halaco process waste. Several metals were found at elevated concentrations, including aluminum, barium, beryllium, cadmium, chromium, copper, lead, magnesium, nickel, and zinc.

The OID receives surface runoff from the OID and Rice Road Drain watersheds. The combined watersheds include approximately 9.3 square miles of the Oxnard plain and are shown in Figure 1b. The watersheds are largely paved, with residential, commercial/industrial, and agricultural land uses occupying approximately 36, 23, and 19 percent of the watershed, respectively (Ventura County Watershed Protection District [VCWPD], 2011). As "industrial drain" in the name OID suggests, there were probably industrial discharges directly into the OID in the past. Stormwater runoff into the OID is also likely to have contributed pollutants to OID sediments, historically and currently.

2.3 Contaminant Fate and Transport

Historical aerial photographs show that the configuration of the OID and lagoon has changed since Halaco began operations in 1965, as summarized in Section 2.1. The current configuration of the lagoon appears to date back to about 1992, when Ventura County stopped manually breaching the shoreline sand berm (the "barrier beach-dune system") near the mouth of the J Street Drain. Before 1992, the berm was breached to minimize upstream flooding. VCWPD stopped breaching the beach berm in response to a Cease and Desist Order from U.S. Fish and Wildlife Service (FWS) due to the presence of the endangered tidewater goby in the OID and lagoon system.

That change caused the Bubbling Springs Drain, J Street Drain, and the OID to all discharge into the lagoon, increasing the size of the lagoon and causing the sand berm to periodically breach farther to the southeast (near sample locations LGF-11 and BBR-4 through BBR-6 shown in Figure 2). During winter 2009/2010, Ventura County manually breached the shoreline sand berm near the northwest corner of the lagoon to mitigate flooding in the Ormond Beach area (near sample location LGF-7 shown in Figures 2 and 3). In winter 2010/2011, Ventura County "groomed" the sand berm to facilitate breaching in the same location. This practice is expected to continue, maintaining the location where the sand berm breaches at or near the northwest corner of the lagoon. It also may cause changes in the size and configuration of the lagoon. Contaminated sediments may be transported to the ocean during periods when the dunes are breached.

Section 4.4 provides additional information on the historical movement of contaminated sediments in the OID and lagoon.

2.4 Threat Posed by Contaminated Sediment to Human Health and the Environment

In the 2008 screening level risk evaluation, EPA concluded that Halaco wastes in the OID adjacent to the Waste Management Area were present at concentrations exceeding ecological screening levels, but that additional evaluation was needed to determine the magnitude of the risks to human health and wildlife residing, nesting, or feeding in the OID and lagoon areas (CH2M HILL, 2008a).

SECTION 3

Remedial Investigation Activities

This section describes the RI activities that were completed for the OID and lagoon areas. To control measurement error, analytical measurements were undertaken as documented in the project QAPP, and samples were collected and shipped as documented in the project FSP and field standard operating procedures (SOPs) contained within the FSP.

RI activities were completed as planned for the OID and lagoon areas to address the data gaps identified in the QAPP (CH2M HILL, 2009a). Figure 2 shows solid matrix sampling locations sitewide, and Figure 3 shows the sampled locations for the OID and lagoon areas.

In addition, EPA researchers conducted a radiation survey in the OID and lagoon in June 2010. The survey is described in Section 3.6.

3.1 Field Investigation Activities

Surface and shallow subsurface sediment samples were collected in the OID and lagoon areas to delineate the extent of contamination and to assess background conditions. All samples were analyzed for metals and the radionuclides Th 232, Th 230, Th 228, radium 228 [Ra 228], and Ra 226. Fifty percent of the samples were analyzed to check for the presence of the following organic analytes:

- Volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs)
- Total petroleum hydrocarbons (TPH), quantified as gas, diesel, and motor oil
- Polychlorinated biphenyls (PCBs)
- Dioxins/furans (polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans [PCDDs/PCDFs])

Samples were collected and analyzed as further described below.

- Surface and shallow sediment samples were collected from the portion of the OID between the Halaco properties at seven locations. These samples were collected and analyzed from 0, 2, and 4 feet below ground surface (bgs) (OID-1 through OID-7).

- Surface and shallow sediment samples were collected from the OID north of the Halaco properties at seven locations. These samples were collected from 0 and 2 feet bgs (OID-8 through OID-14).

- Surface and shallow sediment samples were collected from the main lagoon from 10 locations. These samples were collected from 0, 2, and 4 feet bgs (LGM-1 through LGM-10).

- Surface and shallow sediment samples were collected from 12 locations from the fingers extending northwest and southeast from the main lagoon. These samples were collected from 0 and 2 feet bgs. Four of these locations were along the finger underneath the footbridge (LGF-1 through LGF-4), two locations were at the end of the J Street Drain

(LGF-5 and LGF-6), and six locations were along the fingers near the ocean (LGF-7 through LGF-12).

In addition, shallow sediment samples were collected at the bottom of the main lagoon from four locations and analyzed for grain size distribution and Atterberg limits to provide data to evaluate the cost of removing contaminated sediments (LGM-1, LGM-3, LGM-8, and LGM-9).

The 2-foot-deep OID sediment samples collected north of the Halaco properties were originally intended to be used to evaluate background conditions because they were thought less likely to be affected by Halaco's operations than surface sediment samples. The surface samples may not represent background conditions because Halaco's wastes may have moved northward when the beach berm was breached and seawater moved inland with the rising tide. As described in Section 4, the 2-foot depth samples had elevated metals concentrations that may indicate the presence of Halaco's waste or they may be from other sources; regardless, they may not be appropriate for use in assessing background conditions.

Professional judgment was used to determine the number of samples and select preliminary sampling locations. After a grid was applied to identify preliminary sampling locations, the preliminary locations were displaced randomly in the x and y directionsapproximately 10 percent of the nominal sample spacing:

- The preliminary locations in the main part of the lagoon were displaced randomly up to 15 feet in the x and y directions.
- The preliminary locations for the OID and fingers of the main lagoon were randomly displaced between 15 and 30 feet along the long axis of these features.

The sediment samples were collected during June 2010. The OID and lagoon were submerged during this time, with the surface water elevation at 8.42-feet mean sea level (msl). The beach berm was not breached during this time. Figure 3 shows the water depth present at each location during sample collection.

3.2 Field Sample Collection Procedures

CH2M HILL and subcontractor Kinnetic Laboratories, Inc. (KLI) collected the OID and lagoon sediment samples. CH2M HILL led the sample collection activities, logged all samples, filled and labeled sample containers, completed chain-of-custody (COC) documentation, and shipped samples to the offsite analytical laboratories. KLI provided and operated the vibracore sampling device used to collect the sediment samples. Attachment B provides photographs of the vibracore unit in use.

The field work was performed in accordance with an access authorization granted by the City of Oxnard on October 8, 2009, and a Biological Opinion (8-8-10-F-3) issued by FWS to EPA in a letter dated February 26, 2010. EPA requested formal consultation with FWS in a letter dated November 12, 2009, because of the presence or potential presence of federally listed endangered or threatened species in the sampling areas. CH2M HILL provided a qualified biological monitor in the field to assure that sampling at each location was in compliance with the Biological Opinion.

Sediment samples were collected in accordance with a City of Oxnard Well Permit Application. The City of Oxnard Development Services provided notice that the Well Permit Application materials were complete in an October 7, 2009 e-mail.

Sediment samples were collected using a 4-inch-diameter, 20-foot-long vibracore deployed from a small barge. The barge was launched from the foot bridge at the end of Perkins Road using a crane. The barge was towed with a small boat. The boat was also used to ferry personnel, supplies, and samples from the sample locations to the foot bridge staging area.

Sampling equipment was decontaminated in accordance with SOP 6-24 of the FSP. Samples were collected with new, soft polyethylene liner housed within the vibracore tube. The vibracore cutting head and other non-disposable sampling equipment coming into contact with samples were decontaminated by washing the sampling equipment in an Alconox solution (or equivalent), rinsing with potable water, and rinsing with distilled water.

Sediment samples were generally collected at the planned locations. Sample locations specified in the FSP were field-located using Global Positioning System (GPS) equipment (Trimble Geo XT) prior to sample collection. The deepest portions of the OID and lagoon fingers were selected for sampling at each sample location for the OID and lagoon fingers by measuring the depth to bottom from the water surface along a transect passing through the planned sample locations. As-sampled locations were recorded and are shown on Figures 2 and 3. CH2M HILL used the field procedures documented in SOP 6-1 of the FSP for location of field samples with GPS equipment.

Soil samples were logged in accordance with SOP 6-10 from the FSP, including identifying the soil type in accordance with the Unified Soil Classification System.

3.3 Sample Collection and Quality Control Samples

Samples for laboratory analysis were placed in containers as detailed in Table 5-3 of the FSP. The following quality control samples were collected as specified in the QAPP and FSP:

- Field duplicates were collected at a frequency of one in every 10 samples.
- Field equipment blanks were collected at a frequency of once per day when non-dedicated sampling equipment was used.
- Extra volume for laboratory matrix spikes and matrix spike duplicates was collected at a frequency of one in every 20 collected samples.

The sample naming convention described in the FSP was used.

Duplicate samples were identified by adding "100" to the sample location number. For example, SM-OID-101-A is the duplicate sample for SM-OID-001-A.

3.4 Sample Custody and Tracking Procedures

COC procedures were followed in accordance with the FSP and QAPP. This included generating COC forms requesting analytical services from each of the analytical laboratories. EPA's Forms II Lite program was used to generate sample labels, bottle tags, and COC forms; track samples from the field to the laboratory; and facilitate electronic capture of sample information into databases.

All samples were placed on ice upon field collection and then shipped on ice to the analytical laboratories, except for the samples for radionuclide and geotechnical analysis. The samples for radionuclide and geotechnical analysis did not require this step. All samples were shipped to the analytical laboratories using Federal Express to facilitate tracking from the field to the laboratory.

3.5 Laboratory Analysis and Data Validation

The solid matrix samples were analyzed in offsite laboratories as follows:

- **Metals.** All samples were analyzed for metals under the EPA Contract Laboratory Program by ALS Laboratory Group (formerly DataChem) in Salt Lake City, Utah. The metals were analyzed using the following techniques:
  - Inductively coupled plasma atomic emission spectroscopy: aluminum (Al), barium (Ba), beryllium (Be), calcium (Ca), cobalt (Co), copper (Cu), iron (Fe), lead (Pb), magnesium (Mg), manganese (Mn), nickel (Ni), potassium (K), sodium (Na), and zinc (Zn).
  - Inductively coupled plasma mass spectrometer to generate lower detection limits: antimony (Sb), arsenic (As), cadmium (Cd), chromium (Cr), selenium (Se), silver (Ag), thallium (Tl), and vanadium (V).
  - Cold vapor atomic adsorption: Mercury (Hg)
- **Radionuclides.** All samples were analyzed for three thorium and two radium radionuclides under subcontract by Eberline Services, Inc. at its laboratory in Oak Ridge, Tennessee. Thorium isotopes (Th 232, Th 230, and Th 228) were analyzed using Method DOE HASL 300 4.5.2.3 Modified. Ra 226 was analyzed using EPA Method 903.1 Modified. Ra 228 was analyzed using EPA Method 904.0 Modified.
- **VOCs, SVOCs, and PCBs.** Fifty percent of the samples were analyzed for VOCs, SVOC, and PCBs under the EPA Contract Laboratory Program by ALS Laboratory Group (formerly DataChem) in Salt Lake City, Utah.
- **Dioxins/Furans.** Fifty percent of the samples were analyzed for dioxins/furans under the EPA Contract Laboratory Program. The samples were first extracted by ALS Laboratory Group (formerly DataChem) in Salt Lake City, Utah. The extract was then shipped to and analyzed by Southwest Research Institute in San Antonio, Texas.
- **TPH.** Fifty percent of the samples were analyzed for TPH quantitated as gasoline, diesel, and motor oil by the Region 9 Laboratory. TPH as gasoline (TPH-gas) was analyzed as purgeable petroleum hydrocarbons by EPA Method 8015C. TPH as diesel (TPH-diesel) and TPH as motor oil (TPH-oil) were analyzed as extractable petroleum hydrocarbons by EPA Method 8015B.

The laboratory analytical results for the solid matrix samples were reviewed or validated as follows:

- **Metals, VOCs, SVOCs, PCBs, and Dioxins.** The EPA Contract Laboratory Program lab data for metals went through the EPA Computer-Aided Data Review and Evaluation automated data review. This is equivalent to a stage S2BVE under EPA's national guidance for validating laboratory analytical data for Superfund use.
- **Radionuclides.** The subcontract Eberline lab data for radionuclides were reviewed by Rob Terry of EPA Region 9's Technical Support Section and found to be reliable.
- **TPH.** The EPA Region 9 Lab data for TPH went through internal review. The Region 9 Lab's internal data review process is equivalent to Tier 1A review under the Region 9 guidance. According to the Region 9 Lab's data review, the sediment samples had high organic content that may have caused poor method performance (the samples were generally dark and wet, and some had a pronounced organic odor likely due to naturally occurring organic material). All samples in the sample delivery groups (SDGs) for TPH-Extractable analysis (diesel and motor oil range), including matrix spike/matrix spike duplicate (MS/MSD) samples, exhibited poor surrogate spike (hexacosane) recoveries for initial extraction and re-extractions. MS/MSD samples also exhibited repeatable poor diesel spike recovery. In addition, the hydrocarbon pattern for some samples for TPH purgeable analysis (gasoline) did not resemble available standards (gasoline, etc.) and the reported hydrocarbon concentration was due to a single peak. This poor performance leads to uncertainty in the accurate identification and quantitation of the TPH concentrations in the sediment samples.

3.6 Radiation Survey

On June 29 and 30, 2010, members of the EPA Radiation and Indoor Environments National Laboratory scanned the sediments in the OID and lagoon for gamma radiation. The scan was intended to supplement the laboratory analysis of sediment samples to determine whether elevated levels of thorium or other radionuclides were present. Attachment C provides photographs of the radiation survey activities.

The scan was completed using a submersible 2-inch by 2-inch sodium iodide crystal detector encased in a protective polyvinyl chloride (PVC) housing with an 80-foot signal cable. The detector probe was fixed to an expandable pole long enough to reach the sediment at any point in the lagoon and weighted to ensure that the probe was continuously dragged along the sediment. It was wrapped in plastic bags that were periodically changed to reduce the possibility of spurious results caused by contamination of the probe itself.

The equipment was loaded onto a small aluminum johnboat that was propelled with a battery-powered outboard motor. KLI provided and piloted the boat. Scan data were collected for 1-second intervals and displayed on a satellite image of the area in real time. Boat speeds were kept at approximately 5 feet per second. The data were saved as position, time, and total (gross) gamma count.

SECTION 4

Remedial Investigation Results

This section presents the results of the sediment testing completed in the OID and lagoon areas. The results are provided in the following tables, figures, and attachments:

- Tables 1 through 7 provide the metals, radionuclides, detected VOCs, detected SVOCs, PCBs, dioxins/furans, and TPH analytical results, respectively.
- Figures 4a, 4b, and 4c illustrate the analytical results for the surface and subsurface samples for lead, one of the metals in Halaco's wastes. The subsurface depths are 2 feet bgs (the "B Interval") and 4 feet bgs (the "C Interval").
- Figures 5a, 5b, and 5c illustrate the analytical results for the surface and subsurface samples for Th 232, a radionuclide in some of Halaco's older wastes. The subsurface depths are 2 and 4 feet bgs (the "B" and "C" intervals, respectively).
- Attachments B and C provide photographs of vibracore sampling equipment used to collect sediment samples and radiation surveying of the sediments.
- Attachment D provides lithologic descriptions for the sediment samples.
- Attachment E provides the list of metals, VOC, SVOC, PCB, and dioxin/furan analytes reported by the laboratories, and the contract-required quantitation limits (CRQLs).
- Attachment F provides results for the radiation surveying of the sediments.
- Attachment G provides the measurements of geotechnical parameters (grain size and Atterberg limits) for sediment samples collected from the lagoon.

Lead and Th 232 are used as representative contaminants to illustrate the relative levels of contamination. Their use in the figures does not imply that lead or Th 232 pose more or less risk to human health or the environment than the other metals and radionuclides. Figures 4a, 4b, 4c, 5a, 5b, and 5c also incorporate lead and Th 232 data from the Integrated Assessment.

The metal concentrations and radionuclide activities in the OID and lagoon areas are, as expected, less than in Halaco's waste materials. The metal concentrations and radionuclide activities in Halaco's waste materials and background soils, and the nature and extent of contamination due to Halaco's wastes, are described below.

4.1 Sample Water Depths and Elevations

The depth of water above the sediment samples was determined using a weighted tape. The elevations of the OID and lagoon sediment sample locations were calculated by subtracting the depth of water above the sediment-water interface from the surface water elevation. The surface water elevation on the days the samples were collected (approximately 8.42 feet) was determined from the staff gauge mounted on the footbridge at the end of Perkins Road (North American Vertical Datum of 1988 [NAVD 88]). For the OID and lagoon finger samples, the sediment samples were first located along the long axis of the channel, and then shifted as needed perpendicular to the long axis to the deepest part of the channel. Table 8 lists the water depth and elevation at each sampling location.

In the OID, the elevation of the sediment-water interface (channel bottom) is lowest along the reach between the Smelter Parcel and the Waste Management Area (OID-1 through OID-6). The elevations in this reach range from -0.6 feet to 0.7 feet elevation (NAVD 88). The elevations to the north are slightly higher, ranging between 1.9 and 4.0 feet elevation (OID-7 through OID-14). The channel bottom decreases in elevation from north to south, the direction of surface water drainage.

In the main lagoon, and in the lagoon finger under the footbridge, the elevation of the sediment-water interface ranges between 3 feet and 5 feet (LGF-1 through LGF-4). For the lagoon fingers near the ocean, the elevations are highest at the end of the J Street Drain and then generally decrease toward the southwest where the coastal sand berm has breached over the past several years (LGF-6 through LGF-12).

The elevations measured in the main lagoon ranged from 3 feet to 5.9 feet.

4.2 Waste Material Concentrations and Activities

All of Halaco's wastes have high concentrations of metals, and the older wastes are also elevated in the radionuclides thorium and radium. As described in Section 1, Halaco reports that it processed one type of scrap, a low-level radioactive magnesium-thorium alloy, until about 1977. In addition, testing of Halaco's wastes at the Smelter Parcel and Waste Management Area indicates that some of Halaco's wastes are elevated in PCBs and dioxins/furans. The presence of dioxins and furans is consistent with a March 2005 draft EPA report that documents the production of dioxin-like compounds by six secondary aluminum smelters tested in the early 1990s (EPA, 2005).

Table 9 summarizes the range of metals concentrations detected in WMU waste materials, and in background soils, during the RI sampling activities. Complete results for waste samples collected at the Halaco properties will be provided in a future report.

The older waste materials with elevated radionuclides are present in the southeastern area of the Smelter Parcel and the bottom several feet of the WMU. The radionuclide levels are higher in waste present in the southeastern area of the Smelter Parcel. The median, second highest, and highest Th 232 activities in waste at the Smelter Parcel with elevated radionuclides were 12.0, 90.1, and 653 picocuries per gram [pCi/g]. The median and highest Th 232 activities at the bottom of the WMU were 5.4 and 13.8 pCi/g.

Th 232, Th 228, and Ra 228 are part of the same natural radionuclide decay series and their activities are similar, as expected. Activities for Th 230 also tend to be similar to these three radionuclides, even though it is part of another decay series. Ra 226 activities are significantly less and are in the range expected after decay of the parent radionuclide (Th 230) for a period of tens of years.

4.3 Background Soil Concentrations and Activities

EPA has not yet developed site-specific soil or sediment cleanup levels. The levels are likely to be risk-based except when a risk-based value is below the background level for a chemical. Generally, EPA does not clean up to levels below background (Office of Solid Waste and Emergency Response [OSWER] guidance 9285.6-07P [EPA, 2002]). Twenty soil and fourteen sand samples believed to be unaffected by Halaco's wastes were sampled at several locations and depths in the beach, wetlands, and NCL areas to assess background metals concentrations and radionuclide activities. The two types of materials generally have different concentrations of naturally occurring metals. The "soil" materials sampled include primarily silt and clay. The "sand" materials sampled include primarily beach sand.

The metals concentrations and radionuclide activities in the background locations vary. Metal and radionuclide levels are generally higher in soils than in sands, and there is variability within soil and sand, as shown in Table 9. For example, lead concentrations for the 20 background sand samples vary from 1.5 to 3.4 milligrams per kilogram (mg/kg), and the levels for the 20 background soil samples vary from 4.9 to 12.3 mg/kg.

EPA is conducting a statistical analysis of the metals and radionuclide data to identify representative background values. A statistical parameter often used to establish background levels is known as the 95 Percent Upper Tolerance Limit (95%UTL). The 95% UTL is a calculated value that only the highest 5 percent of background concentrations are expected to exceed. The 95% UTL also can be described as a confidence limit on the 95th percentile of the data. The extent to which sample locations exceed the 95% UTL provides an indication of the extent and degree of site-related contamination.

The preliminary 95% UTL values for lead are 3.4 mg/kg for sand and 14.4 mg/kg for soil. The preliminary 95% UTL values for Th 232 are 1.7 pCi/g for sand and 2.1 pCi/g for soil. The preliminary values for soil are used in Figures 4a, 4b, 5a, and 5b to define the concentration range represented by the white symbols. The UTL values have been calculated from a combined dataset that includes the samples in Table 4 and an additional six background samples collected during the 2006 Integrated Assessment (samples SDB 31 through SDB 36). Preliminary UTL values for most of the metals in Halaco's waste are provided in Table 9.

Organic compounds are present as background. Some of these compounds appear attributable to contamination from Halaco's operations while others do not, as further described in Section 4.4. Low levels of dioxins and furans were detected in all sediment samples. They were detected at the highest concentrations in samples with high metals concentrations. The lower concentrations of detected dioxins and furans do not appear attributable to Halaco's waste. PCBs were not detected, except at two locations with elevated metals. The higher dioxin and furan levels and presence of PCBs are associated with Halaco's waste. Both locations were in the lagoon finger under the footbridge at the end of Perkins Road. Low levels of TPH and select VOCs and SVOCs were detected in sediment samples but do not appear to be significant or attributable to Halaco's waste.

4.4 Nature and Extent of Contamination

Figures 4a, 4b, and 4c depict the extent of metals contamination in the OID and lagoon areas, using lead as an "indicator" metal. These figures use the following lead concentration ranges:

- < 14 mg/kg (white) – lead levels in silt/clay soil unaffected by Halaco wastes
- 14 to 100 mg/kg (blue) – up to seven times higher than background
- 100 to 400 mg/kg (yellow) – up to four times higher than blue
- 400 to 800 mg/kg (orange) – up to two times higher than yellow
- > 800 mg/kg (red)

The relative concentrations of metals to one another in waste samples from the WMU, and the relative concentrations of metals in affected samples from the OID and lagoon areas, are generally consistent. This observation indicates that any one of several metals found in Halaco's waste could be used to portray the relative levels of metals contamination. Table 9 provides the ratios between the median metals concentrations for the WMU waste materials and the background soils.

Figures 5a, 5b, and 5c depict the extent of radionuclide contamination in the OID and lagoon areas, using Thorium 232 as an "indicator" radionuclide. These figures use the following activity ranges:

- < 2 pCi/g (white) – radionuclide levels unaffected by Halaco wastes
- 2 to 5 pCi/g (blue) – radionuclide levels potentially affected by Halaco waste
- 5 to 10 pCi/g (yellow) – radionuclide levels two times higher than blue
- 10 to 30 pCi/g (orange) – radionuclide levels three times higher than yellow
- >30 pCi/g (red)

As described above, Th 232, Th 228, and Ra 228 are part of the same natural radionuclide decay series and their activities are similar, as expected. Activities for Th 230 also tend to be similar to these three radionuclides, even though Th 230 is part of another decay series. Ra 226 activities are significantly less and are in the range expected after decay of the parent radionuclide (Th 230) for a period of tens of years.

4.4.1 Metals and Radionuclides

The testing results for metals and radionuclides indicate that some of the sediments in the OID and lagoon are affected by Halaco's waste material. The distribution of affected sediments appears to be related to the history of Halaco's disposal activities and the configuration of the OID and lagoon system.

Discharges and surface runoff into the OID from sources other than Halaco may be responsible for some of the contaminants detected in the sediments. There are no industrial operations known to currently discharge directly into the OID but there may have been discharges in the past, as the name of the drainage suggests. Stormwater runoff also may have contributed pollutants to the OID. Studies of other urbanized watersheds in California have found elevated levels of several metals in stormwater runoff, including copper, nickel, lead, and zinc (e.g., Soller et al., 2005).

OID – Between the Smelter Parcel and the Waste Management Area

Metals concentrations are elevated in surface sediments in the portion of the OID between the Halaco properties as shown by the blue symbols in Figure 4a (OID-1 through OID-7) and one yellow symbol (SDF9). The metals concentrations in this reach decrease with depth as shown by the mostly white symbols in Figures 4b and 4c. The metals concentrations at one of the seven locations, OID-2, remain elevated to 4 feet bgs, the total depth sampled.

Radionuclide activities in OID surface and shallow subsurface sediments are at or near background levels between the Halaco properties as shown by the mostly white symbols in Figures 5a, 5b, and 5c. The June 2010 radiation scan detected two areas where the measured rates of gamma radiation appeared elevated; the first in the OID near a former bridge, and the second where the OID empties into the lagoon (Attachment F). A multichannel analyzer was used to generate stationary spectra at the two locations. The spectra suggest that the elevated rates may be due to the presence of potassium 40, a radioactive isotope present in potassium, not thorium or radium.

Halaco wastes are likely to have first contaminated OID sediments in or soon after 1965, when Halaco discharged waste material directly into the OID and into a settling pond in or adjacent to the OID. After 1970, when Halaco discharged its waste material to settling ponds on the WMU, waste may have been carried into the OID by stormwater runoff and wind. The erosion control measures implemented by EPA are helping to eliminate or reduce stormwater and wind erosion of waste materials and contaminated soils into the OID. Before Halaco ceased operating in 2002, contaminated groundwater affected by Halaco’s wastewater discharges may have also seeped into the OID and contributed contaminants to the sediments.

OID – North of the Smelter Parcel and the Waste Management Area

Halaco’s wastes have had little or no impact on OID surface sediments north of the Halaco properties as shown by the white symbols in Figure 4a (OID-8 through OID-14). The northernmost surface sample (SDF-16, collected during the Integrated Assessment) has elevated levels of lead (as shown by the blue symbol) and other metals, but multiple samples collected in the OID between SDF-16 and the Halaco properties have lower levels of metals, making it unlikely that Halaco wastes are the source of the contaminants in SDF-16 .

The metals concentrations in some of the subsurface sediment samples collected at 2 feet bgs are elevated in lead as shown by the blue symbols and one yellow symbol in Figure 4b (OID-8, 9, 10, 11, and 14). The source of these metals is uncertain. The elevated metals concentration may be due to Halaco waste, but it is also possible that the source is stormwater runoff or other pollutant sources in the OID watershed.

Radionuclide activities in OID surface and shallow subsurface sediments do not appear to be elevated north of the Halaco properties as shown by the white symbols in Figures 5a and 5c. The June 2010 radiation scan did not cover this portion of the OID (Attachment F).

Surface water discharge rates and velocities in the OID are low most of the year when there is little or no rainfall in the OID watershed and the coastal sand berm prevents discharge to the ocean. In the late 1960s, when large quantities of Halaco waste solids may have entered the OID, the wastes could have moved both northward and southward of the Halaco properties as the material settled. Most of the time, flow would have been to the south (toward the ocean), but northward flow may have occurred when the coastal sand berm was breached and surface water moved inland in response to a rising tide. If the subsurface sediments to the north are affected by Halaco's waste, then lower concentration surface sediments may have subsequently covered the contaminated sediments.

Lagoon – Main Area

The main area of the lagoon has been present since about 1992, when Ventura County stopped manually breaching the shoreline sand berm (the "barrier beach-dune system") near the mouth of the J Street Drain to minimize upstream flooding. Metals concentrations are elevated in the surface sediments in the main part of the lagoon as shown by the blue symbols in Figure 4a (LGM-1 through LGM-10). Similar to the OID between the Halaco properties, the metals concentrations in the main lagoon decrease with depth as shown by the mostly white symbols in Figures 4b and 4c. The metals concentration at LGM-2 remains elevated at a depth of 4 feet bgs, the total depth sampled.

Radionuclide activities are not elevated above background in surface or subsurface sediments in the main lagoon as shown by the symbols in Figures 5a, 5b, and 5c. The June 2010 radiation scan did not detect any hot spots in the lagoon, except where the OID empties into the lagoon (Attachment F). As noted above, the June 2010 radiation scan measured rates of gamma radiation that appeared elevated in this area. However, the spectra generated by the multichannel analyzer suggested that the elevated rates may be due to the presence of potassium 40, a radioactive isotope present in potassium, not thorium or radium.

As in the OID, Halaco wastes may have entered the lagoon through the direct discharge of waste, stormwater runoff, and windblown transport of wastes or contaminated soils. The erosion control measures implemented by EPA in 2007 are helping to eliminate or reduce stormwater and wind erosion of contaminated materials into the lagoon.

Lagoon – Finger under Footbridge

Metals concentrations are elevated in the surface and subsurface sediments in the lagoon finger under the footbridge at the end of Perkins Road as shown by the blue and yellow symbols in Figures 4a and 4b (LGF-1 through LGF-4). The metals concentrations are higher in the subsurface sediments at a depth of 2 feet bgs, the total depth sampled. Radionuclides are not elevated above background in surface sediments but are elevated in the subsurface sediments as shown by the white symbols in Figure 5a and the yellow and orange symbols in Figure 5b. The concentrations of metals and activities of radionuclides are the highest among the sediments tested in the OID and lagoon system. The elevated radionuclide activities indicate that at least some portion of this waste probably dates back to the late 1960s or 1970s when Halaco reports that it processed low-level radioactive magnesium-thorium alloy scrap. The June 2010 radiation scan did not examine this area (Attachment F).

The lagoon finger under the footbridge is a remnant of the former coastal canal that historically conveyed surface water from the Bubbling Springs Drain (a.k.a. Hueneme Drain) southwest to Mugu Lagoon. In aerial photographs from 1965, 1969, and the 1970s, the lagoon finger is visible and appears to be connected to the OID. Halaco wastes that entered the OID are likely to have moved into the lagoon finger.

Lagoon – Finger Extension at the End of J Street Drain

Lead concentrations are elevated in the surface and subsurface sediments in the lagoon finger at the end of the J Street Drain as shown by the blue symbols in Figures 4a and 4b (LGF-5 and LGF-6). Radionuclides are not elevated above background in these sediments, as shown by the white symbols in Figures 5a and 5b, and the June 2010 radiation scan did not detect any hot spots in this area (Attachment F). The source of the elevated metals is uncertain. It is possible that the elevated metals in sediments at the end of the J Street Drain could be from Halaco's waste present in the lagoon finger under the footbridge (the former coastal canal) that moved through historical piping under the J Street Drain and then moved through VCWPD's pumping station that lifts (transfers) water from the Bubbling Springs Drain to the lower portion of the J Street Drain. The relative levels of metals in LGF-5 and LGF-6 (particularly the relatively low levels of aluminum and magnesium, the two Halaco target metals) suggest, however, that the metals are from non-Halaco sources in the Bubbling Springs or J Street Drain watersheds.

Lagoon – Fingers near Pacific Ocean

Metals concentrations are not elevated above background in the surface and subsurface sediments in the lagoon fingers near the ocean as shown by the white symbols in Figures 4a and 4b (LGF-7 through LGF-12). Radionuclides are also at or near background levels in these sediments as shown by the white symbols in Figures 5a and 5b. The June 2010 radiation scan did not detect any hot spots in these areas. One reason that these sediments are not affected may be that this portion of the lagoon did not come into existence until after VCWPD stopped manually breaching the beach berm at the end of J Street Drain in 1992.

4.4.2 Organic Compounds

VOCs and SVOCs

VOCs and SVOCs were detected infrequently and at low concentrations near the detection limits in the OID and lagoon sediment samples, as shown in Tables 3 and 4, respectively. Tables 3 and 4 summarize the detected analytes and their concentrations. Attachment D provides the complete list of analytes tested and the CRQLs.

With the exception of acetone (a VOC), all detections are flagged with a "J", indicating that the detected VOCs or SVOCs were positively identified but that the associated numerical value is the approximate concentration (because quality control criteria were not met, or the concentration of the analyte was below the quantitation limit). Acetone is a known laboratory contaminant and may be a laboratory artifact. In addition, several of the SVOC analytes (benzaldehyde, phenol, acetophenone, and bis(2-ethylhexyl)phthalate) were detected in most samples at similar concentrations, indicating that these constituents also may be laboratory artifacts.

A correlation between detected VOC and SVOC concentrations and elevated metals concentrations is not observed. Based on the sampling results, VOCs and SVOCs are not considered to be useful indicators of Halaco's waste in OID and lagoon sediments given the low frequency of detections, the low concentrations, and lack of a significant correlation between these analytes and the elevated metals concentrations that occur due to the presence of Halaco's waste.

PCBs and Dioxins/Furans

PCBs and dioxins/furans were detected preferentially at locations with elevated metals, indicating that their presence may be associated with Halaco's waste, as shown in Tables 5 and 6, respectively. In addition to presenting the dioxin and furan congener concentrations, Table 6 also presents the calculated effective 2,3,7,8-TCDD concentration for each sample. The effective 2,3,7,8-TCDD concentration in a sample is the sum of 2,3,7,8-TCDD equivalence concentrations of 17 dioxin and furan isomers. The 2,3,7,8-TCDD equivalence concentration for an isomer is the product of the measured concentration of the isomer multiplied by a Toxicity Equivalence Factor (TEF) for the isomer. TEFs range from 0.003 (for OCDD and OCDF) to 1 (for 2,3,7,8-TCDD and 1,2,3,7,8-PeCDD).

All dioxin and furan congeners analyzed were detected. The most frequent and highest detections occurred in samples with high metals concentrations. The calculated effective 2,3,7,8-TCDD concentrations range from less than 1 nanogram per kilogram (ng/kg) up to a maximum of 144 ng/kg.

- The footbridge lagoon finger surface and subsurface sediment samples had among the highest effective 2,3,7,8-TCDD concentrations (LGF-1 and LGF-3). LGF-1 had the maximum value (144 ng/kg) at 2 feet bgs.
- The OID surface and subsurface sediment samples, and the lagoon finger surface and subsurface sediment samples near the ocean, had effective 2,3,7,8-TCDD concentrations of less than 1 ng/kg (OID-1 through 13, LGF-7, -9, and -11), with the exception of the 2-foot bgs sediment sample at OID-11 (12 ng/kg).
- The main lagoon surface and subsurface sediment samples exhibited variable effective 2,3,7,8-TCDD concentrations. With the exception of two samples, the effective concentrations were less than 10 ng/kg. The sample at 2 feet bgs for LGM-5 had a concentration of 26 ng/kg, and the duplicate sample for LGM-3 at 2 feet bgs had a concentration of 120 ng/kg. The primary sample for LGM-3 at 2 feet bgs had a concentration of 1.5 ng/kg, much less than the duplicate sample, indicating a poor agreement between the primary and duplicate samples.

PCBs were detected at low concentrations at two of the 18 locations where they were analyzed (LGF-1 and LGF-3). Both locations were in the lagoon finger under the footbridge, and in both locations the PCBs were detected at 2 feet bgs but not in the surface samples. Aroclor 1248 was the only PCB detected. As described above, these two samples had some of the highest metals concentrations and radionuclide activities of all the samples in the OID and lagoon system.

Total Petroleum Hydrocarbons

TPH-gas and TPH-diesel were detected infrequently and at low concentrations near their detection limits as shown in Table 7. Correlations were not observed between the concentrations of TPH-gas and metals, or TPH-diesel and metals, indicating that Halaco waste was probably not the cause of the petroleum hydrocarbons. TPH-oil was detected in most samples at concentrations ranging up to a maximum of approximately 1,000 mg/kg. A correlation was not observed between TPH-oil and metals concentrations, indicating that Halaco waste was probably not the source.

As noted in Section 3.5, the high (naturally occurring) organic carbon content of the sediment samples caused poor method performance for both the TPH-diesel and TPH-oil laboratory analyses. Also, the hydrocarbon pattern for the samples with detected TPH-gas concentrations did not resemble available standards (gasoline, etc.), and the reported TPH-gas concentrations were due to a single peak. The TPH-gas, -diesel, and -oil results are not considered to be a useful indicators of Halaco's waste in OID and lagoon sediments given the infrequent and low level detections for TPH-gas and TPH-diesel, the laboratory analysis issues, and the poor correlation between all the TPH analyte and metals concentrations. The detected TPH could be due to naturally occurring carbon content of the sediment samples or from a variety of organic compounds in urbanized watersheds such as the OID, J Street, and Bubbling Springs Drain watersheds.

SECTION 5

Conclusions

This section provides conclusions regarding the nature and extent of contamination in sediments in the OID and lagoon attributable to Halaco's operations. From the OID, 35 samples (not including duplicate samples) were collected from 14 locations and analyzed at offsite laboratories. From the lagoon, 54 samples (not including duplicate samples) were collected from 26 locations and analyzed at offsite laboratories. All samples were analyzed for metals and radionuclides, and 50 percent of the samples were analyzed for VOCs, SVOCs, TPH, PCBs, and dioxins/furans. Past testing in the OID focused primarily on metals and radionuclides. Only limited sampling had been performed previously in the lagoon.

These data indicate the following:

- The OID adjacent to the Halaco properties and portions of the lagoon are impacted by metals and radionuclides from Halaco's waste material.
- PCBs were detected at two locations with elevated metals, indicating that their presence may be associated with Halaco's waste. Both locations were in the lagoon finger under the footbridge at the end of Perkins Road.
- Low levels of dioxins and furans were detected in all samples. They were detected at the highest concentrations in samples with high metals concentrations. The calculated effective 2,3,7,8-TCDD concentrations (a weighted sum of the concentrations of 17 dioxin and furan isomers) range from less than 1 ng/kg in sediments not impacted by Halaco's waste up to a maximum of 144 ng/kg in sediments clearly affected by Halaco's waste.
- VOCs, SVOCs, TPH-gas, and TPH-diesel were detected infrequently and at low concentrations near their detection limits. TPH-oil was detected in most samples at relatively low concentrations. There was not a significant correlation between these organic analytes and the elevated metals concentrations associated with Halaco's waste. The presence of these organic analytes does not appear to be significant or attributable to Halaco's waste.
- The distribution of affected sediments appears to be related to the history of Halaco's disposal activities and the configuration of the OID and lagoon system. The configuration of the OID and lagoon system changed significantly during the 40 years that Halaco operated.

The distribution of metals, radionuclides, PCBs, and dioxins/furans are described below by area. The distribution of VOCs, SVOCs, and TPH are not further described because the presence of these organic analytes does not appear to be significant or attributable to Halaco's waste.

OID – Between the Smelter Parcel and the Waste Management Area

Metals concentrations are elevated in OID surface sediments between the Halaco properties. The metals concentrations in this reach decrease with depth, but remain elevated at some locations to the total depth sampled (4 feet bgs). Radionuclide activities in OID surface and shallow subsurface sediments do not appear to be elevated based on the sediment samples analyzed in offsite laboratories. The two areas where the measured rates of gamma radiation appeared elevated during the June 2010 radiation scan may be due to the presence of potassium 40, a radioactive isotope present in potassium, not thorium or radium. Effective 2,3,7,8-TCDD concentrations are low (below 1 ng/kg), and PCBs were not detected. Halaco wastes are likely to have first contaminated OID sediments in the late 1960s when Halaco discharged waste material directly into the OID and into a settling pond in or adjacent to the OID.

OID – North of the Smelter Parcel and the Waste Management Area

Metals concentrations are not significantly elevated in OID surface sediments north of the Halaco properties. The metals concentrations in some of the subsurface sediment samples (2 feet bgs) are elevated, but the source of the metals is uncertain. Radionuclide activities in OID surface and shallow subsurface sediments are not elevated relative to background. Effective 2,3,7,8-TCDD concentrations were below 2 ng/kg in seven of eight samples and at 12 ng/kg in one sample (OID-11). PCBs were not detected.

Lagoon – Main Area

Metals concentrations are elevated in the surface sediments in the main part of the lagoon. Similar to the contaminated portion of the OID, the metals concentrations in the main lagoon decrease with depth, but remain elevated at some locations to the total depth sampled (4 feet bgs). Radionuclide activities are not elevated above background in surface or subsurface sediments in the main lagoon. Effective 2,3,7,8-TCDD concentrations are variable. PCBs were not detected.

Lagoon "Fingers"

Metals concentrations, radionuclide activities, and dioxin and furan concentrations are moderately elevated in the surface sediments in the lagoon finger under the footbridge at the end of Perkins Road, and significantly elevated in the subsurface sediments (2 feet bgs). Effective 2,3,7,8-TCDD concentrations range up to 144 ng/kg. One PCB congener (Aroclor 1248) was detected at low concentrations in the subsurface sediment samples. The concentrations of metals, radionuclides, dioxins/furans, and PCBs are higher in this area than in other parts of the OID and lagoon.

Lead concentrations are elevated in the surface and subsurface sediments in the lagoon finger at the end of the J Street Drain, but the elevated levels are probably attributable to non-Halaco sources. Radionuclides are not elevated above background in these sediments. Effective 2,3,7,8-TCDD concentrations are slightly elevated (between 10 and 20 ng/kg). PCBs were not detected.

Metals concentrations and radionuclide activities are not elevated above background in the surface and subsurface sediments in the lagoon fingers near the ocean. Effective 2,3,7,8-TCDD concentrations are low (below 1 ng/kg) and PCBs are not detected. The lagoon expanded into this area sometime after 1992, when VCWPD stopped manually breaching the beach berm at the end of J Street Drain.

SECTION 6

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Tables

TABLE 1
Metals Analytical Results, Solid Matrix, OID and Lagoon Areas
Halaco Site Remedial Investigation, Oxnard, California

Location ID	Duplicate (Dup)	Sample ID	CLP ID	Sample Date	Depth (ft, bgs)	Aluminum Result	Q	Antimony Result	Q	Arsenic Result	Q	Barium Result	Q	Beryllium Result	Q	Cadmium Result	Q	Calcium Result	Q	Chromium Result	Q	Cobalt Result	Q	Copper Result	Q	Iron Result	Q
OID - Site																											
OID-001		SM-OID-001-A	MY5T95	6/10/2010	Surface	21600		0.12	J+	6.9	J+	208		1.2	J	0.23	J+	12100		31.9	J+	14.6		54.1		39200	
	Dup	SM-OID-101-A	MY5T98	6/10/2010	Surface	18600		0.38	J+	5.6	J+	217		1	J	0.27	J+	10000		29.6	J+	14.2		30.4		35800	
		SM-OID-001-B	MY5T96	6/10/2010	2	10500		0.28	J+	3.7	J+	155		0.51	J	0.65	J+	9460		22.5	J+	7	U	23.6		18000	
	Dup	SM-OID-101-B	MY5T99	6/10/2010	2	22800		0.18	J+	9.2	J+	209		1.4	J	5	J+	12700		33.7	J+	14.9		40.6		48200	
		SM-OID-001-C	MY5T97	6/10/2010	4	6990		0.42	J+	4.6	J+	103		0.34	J	0.87	J+	8610		13.8	J+	5.4	UJ	11.4		13300	
	Dup	SM-OID-101-C	MY5TA0	6/10/2010	4	17600		0.44	J+	8.5	J+	204		1	J	0.6	J+	15100		33.6	J+	11.3		29.3		39300	
OID-002		SM-OID-002-A	MY5TA5	6/11/2010	Surface	23900		0.38	J+	7.5	J+	228		1.2		1	J+	16000		38.1	J+	12.9		50.3		43200	
		SM-OID-002-B	MY5TA2	6/11/2010	2	19900		0.57	J+	18.2	J+	254		1.1		0.98	J+	10400		34.9	J+	13.1		38.7		42300	
		SM-OID-002-C	MY5TA3	6/11/2010	4	19500		0.27	J+	3.5	J+	176		1.1		0.49	J+	12400		30.3	J+	12.3		34.8		38900	
OID-003		SM-OID-003-A	MY5TA6	6/11/2010	Surface	13200		0.43	J+	6.2	J+	163		0.84		1.4	J+	10200		25.3	J+	7.1	UJ	30.2		27900	
		SM-OID-003-B	MY5TA7	6/11/2010	2	8720		0.36	J+	2.6	J+	137		0.43	UJ	0.67	J+	15400	J	16.4	J+	6.3	UJ	16.9		17900	
		SM-OID-003-C	MY5TA8	6/11/2010	4	7620		0.2	J+	3.7	J+	117		0.36	UJ	0.54	J+	9030		13	J+	5.3	UJ	12.3		15500	
OID-004		SM-OID-004-A	MY5TA9	6/11/2010	Surface	21300		0.25	J+	4.8	J+	220		1.2		3.5	J+	15600		32.2	J+	18.8		61.3		36200	
		SM-OID-004-B	MY5TB0	6/11/2010	2	8300		0.29	J+	3.8	J+	89.4		0.41	UJ	0.75	J+	11400		15	J+	5.8	UJ	15.8		18500	
		SM-OID-004-C	MY5TB1	6/11/2010	4	11100		0.18	J+	3.3	J+	181		0.6	UJ	1.2	J+	126000		15.5	J+	7.2	UJ	27.7		29200	
OID-005		SM-OID-005-A	MY5TB2	6/11/2010	Surface	3600		1.7	J+	6	J+	397		0.91		0.95	UM	31400		41.2	J+	2.9	UJ	25.5		8470	
		SM-OID-005-B	MY5TB3	6/11/2010	2	5840		0.28	J+	2.7	J+	93.4		0.29	UJ	0.61	J+	8700	J	10.9	J+	4.4	UJ	10.5		12200	
		SM-OID-005-C	MY5TB4	6/11/2010	4	9370		0.2	J+	3.2	J+	110		0.53	UJ	1.1	J+	37300		15.7	J+	6.1	UJ	19.1		26500	
OID-006		SM-OID-006-A	MY5TB5	6/11/2010	Surface	6410		0.32	J+	1.2	J+	118		0.33	UJ	0.36	J+	9590		15.9	J+	4.1	UJ	17.6		12500	
		SM-OID-006-B	MY5TB6	6/11/2010	2	2670		0.29	J+	3.1	J+	33.2		0.15	UJ	0.18	J+	3910		4.8	J+	2.4	UJ	5		7010	
		SM-OID-006-C	MY5TB7	6/11/2010	4	3030		0.21	J+	1.3	J+	65.2		0.17	UJ	0.28	J+	6280		5.6	J+	2.4	UJ	4.8		6390	
OID-007		SM-OID-007-A	MY5TB8	6/11/2010	Surface	4100		0.48	J+	2.4	J+	410		0.42	UJ	0.61	J+	11400		14.3	J+	3.2	UJ	18.9		8600	
		SM-OID-007-B	MY5TB9	6/11/2010	2	6280		0.32	J+	3.5	J+	867		0.68	UJ	0.42	J+	74800		19.9	J+	3.8	UJ	31.2		11400	
OID - North of Site																											
OID-008		SM-OID-008-A	MY5TC1	6/11/2010	Surface	1580		0.14	J+	0.61	J+	17.5	UJ	0.064	UJ	0.3	J+	8870		2.8	J+	1.2	UJ	5.7		2420	
		SM-OID-008-B	MY5TC2	6/11/2010	2	17500		0.36	J+	10.4	J+	187		0.98	UJ	2.5	J+	60000		33.2	J+	10.3	UJ	61.4		36800	
OID-009		SM-OID-009-A	MY5TC3	6/11/2010	Surface	2180		0.3	J+	1.2	J+	27.3		0.095	UJ	0.48	J+	19500		4	J+	2	UJ	33.3		4430	
		SM-OID-009-B	MY5TC4	6/11/2010	2	6740		0.28	J+	2.1	J+	230		0.44	UJ	0.77	J+	167000		8.4	J+	5	UJ	31.5		14100	
OID-010		SM-OID-010-A	MY5TC5	6/11/2010	Surface	1550		0.17	J+	0.71	J+	25.5	UJ	0.071	UJ	0.28	J+	10700		3	J+	1.4	UJ	5.8		3410	
		SM-OID-010-B	MY5TC6	6/11/2010	2	7240		0.28	J+	6.3	J+	116		0.38	UJ	1	J+	102000		15.9	J+	4.2	UJ	46.1		15800	
OID-011		SM-OID-011-A	MY5TC7	6/11/2010	Surface	2280		0.21	J+	1.1	J+	36.1		0.11	UJ	0.44	J+	14900		3.9	J+	1.9	UJ	12.7		4780	
		SM-OID-011-B	MY5TC8	6/11/2010	2	10500		7.7	J+	4.9	J+	168		0.5	UJ	2.4	J+	85100		23.9	J+	5.9	UJ	50.9		19900	
OID-012		SM-OID-012-A	MY5TC9	6/11/2010	Surface	2130		0.33	J+	0.9	J+	25.2	UJ	0.1	UJ	0.52	J+	16400		3.1	J+	1.7	UJ	6.5		5120	
		SM-OID-012-B	MY5TD0	6/11/2010	2	6080		0.3	J+	1.5	J+	133		0.28	UJ	1.1	J+	179000		7.6	J+	5.1	UJ	23.8		14400	
OID-013		SM-OID-013-A	MY5TD1	6/11/2010	Surface	2170		0.12	J+	0.85	J+	24.4	J	0.093	UJ	0.46	M	17600		5.5	J+	1.9	UJ	6.1		4400	
		SM-OID-013-B	MY5TD2	6/11/2010	2	16200		0.22	J+	4.6	J+	180		0.79		0.56	J+	12700		23.6	J+	8.7		18.7		31200	
OID-014		SM-OID-014-A	MY5TD3	6/11/2010	Surface	1750		0.13	J+	0.87	J+	19.9	UJ	0.084	UJ	0.38	J+	23300		4.5	J+	1.5	UJ	7.9		3870	
		SM-OID-014-B	MY5TD4	6/11/2010	2	5080		1.9	J+	2.1	J+	91		0.26	UJ	0.87	J+	48000		9.3	J+	3.7	UJ	24.3		11300	
Lagoon Fingers - Footbridge																											
LGF-001		SM-LGF-001-A	MY5TG8	6/8/2010	Surface	6870	J	0.68	J+	3.1	J+	110	UJ	0.75	UJ	1	J+	178000	J	16.8	J+	3.8	UJ	70.8	J	14300	J
		SM-LGF-001-B	MY5TG9	6/8/2010	2	34100		6.1	J+	13.9	J+	9100		39.6	J	1.4	J+	78600		79.5	J+	4.6	UJ	803		8520	
LGF-002		SM-LGF-002-A	MY5TH0	6/8/2010	Surface	5250		0.62	J+	2.9	J+	94.6		0.69	UJ	0.93	J+	145000		18.4	J+	2.6	UJ	56.8		9690	
		SM-LGF-002-B	MY5TH1	6/8/2010	2	20200		3.4	J+	8.5	J+	3340		13.3	J	0.78	J+	83700		62.9	J+	6	UJ	322		18900	
LGF-003		SM-LGF-003-A	MY5TH2	6/8/2010	Surface	4750		0.36	J+	1.9	J+	77.9		0.59	UJ	0.31	J+	48600		7.9	J+	2.4	UJ	40.6		8230	
	Dup	SM-LGF-103-A	MY5TH4	6/8/2010	Surface	3190		0.34	J+	1.7	J+	58.3		0.37	UJ	0.34	J+	61900		8.6	J+	1.6	UJ	32.1		5380	
		SM-LGF-003-B	MY5TH3	6/8/2010	2	23600		3.6	J+	7.7	J+	4910		14.8	J	0.64	UM	79000		79.5	J+	4.6	UJ	506		11000	
	Dup	SM-LGF-103-B	MY5TH5	6/8/2010	2	28900		3.1	J+	7.2	J+	5960		18.3	J	0.68	UM	68200		86.4	J+	4.1	UJ	735		7950	
LGF-004		SM-LGF-004-A	MY5TH6	6/8/2010	Surface	2430		0.23	J+	1.8	J+	53.9		0.25	UJ	0.18	J+	7180		8.5	J+	1.4	UJ	10.7		4920	
		SM-LGF-004-B	MY5TH7	6/8/2010	2	20400		2.5	J+	5.6	J+	7030		17.4		0.45	UM	37100		62.7	J+	3.7	UJ	511		6670	
Lagoon Fingers - West																											
LGF-005		SM-LGF-005-A	MY5TH9	6/9/2010	Surface	6060		1.3	J+	6.7	J+	120		0.29	UJ	1.6	J+	83200		22.2	J+	4.4	UJ	57.8		24600	
		SM-LGF-005-B	MY5TJ0	6/9/2010	2	3180		0.48	J+	3.1	J+	62.8		0.28	J	0.41	J+	14600		8.5	J+	2.2	UJ	12	J	8960	
LGF-006		SM-LGF-006-A	MY5TJ1	6/9/2010	Surface	3500		1	J+	7	J+	76.6		0.19	J	1.1	J+	82400		13.9	J+	2.4	UJ	29.4	J	17000	
		SM-LGF-006-B	MY5TJ2	6/9/2010	2	1710		0.19	J+	1.7	J+	33.9		0.1	UJ	0.09	J+	6670		4.6	J+	1.7	UJ	4.3		5000	
LGF-007		SM-LGF-007-A	MY5TJ3	6/9/2010	Surface	1860		0.13	J+	1.6	J+	31.3		0.098	UJ	0.17	J+	7000		7.1	J+	1.3	UJ	3.6		4780	
		SM-LGF-007-B	MY5TJ4	6/9/2010	2	1740		0.062	J+	1	J+	102		0.077	UJ	0.07	J+	4520		3.8	J+	1.2	UJ	2.5	UJ	4110	
LGF-008		SM-LGF-008-A	MY5TJ5	6/8/2010	Surface	1240		0.17	J+	0.84	J+	31.2		0.074	UJ	0.069	J+	4880		5.5	J+	0.95	UJ	2.3	UJ	3360	
		SM-LGF-008-B	MY5TJ6	6/8/2010	2	1900		0.1	J+	1.4	J+	39.6		0.087	UJ	0.038	J+	4010		3.7	J+	1.3	UJ	2.4	UJ	4290	
LGF-009		SM-LGF-009-A	MY5TJ7	6/9/2010	Surface	1110		0.077	J+	0.89	J+	14.1	UJ	0.051	UJ	0.049	J+	4050		3.6	J+	0.76	UJ	1.8	UJ	2460	
		SM-LGF-009-B	MY5TJ8	6/9/2010	2	1570		0.1	J+	1.3	J+	25.9	UJ	0.074	UJ	0.064	J+	7990		4.7	J+	1.1	UJ	3	UJ	3490	
Lagoon Fingers - East																											
LGF-010		SM-LGF-010-A	MY5TJ9	6/9/2010	Surface	1300		0.087	J+	1.6	J+	20.6	UJ	0.07	J	0.081	J+	5490		5.1	J+	0.89	UJ	1.3	UJ	3270	
		SM-LGF-010-B	MY5TK0	6/9/2010	2	1330		0.083	J+	1.4	J+	25.5	UJ	0.076	J	0.077	J+	5100		6.3	J+	0.98	UJ	1.1	UJ	3500	
LGF-011		SM-LGF-011-A	MY5TK1	6/10/2010	Surface	2490		0.25	J+	1.9	J+	27.8		0.13	J	0.16	J+	11700		6.9	J+	1.5	UJ	6.5	J	5840	
		SM-LGF-011-B	MY5TK2	6/10/2010	2	1870		0.056	J+	2	J+	24	J	0.11	J	0.044	J+	4580		5.7	J+	1.2	UJ	1.3	UJ	4550	
LGF-012		SM-LGF-012-A	MY5TK3	6/9/2010	Surface	1360		0.078	J+	1.5	J+	14.8	J	0.072	J	0.11	J+	7050		3.7	J+	0.92	UJ	1.9	UJ	3350	
		SM-LGF-012-B	MY5TK4	6/9/2010	2	1530		0.07	J+	2.1	J+	34.4		0.091	J	0.076	J+	5600		8.7	J+	1	UJ	1.3	UJ	4080	

Sample ID	Lead Result	Q	Magnesium Result	Q	Manganese Result	Q	Mercury Result	Q	Nickel Result	Q	Potassium Result	Q	Selenium Result	Q	Silver Result	Q	Sodium Result	Q	Thallium Result	Q	Vanadium Result	Q	Zinc Result	Q
OID - Site																								
SM-OID-001-A	14		13300		442		0.062	J	40.1		7500	J+	1.2	J+	0.79	UM	7210		0.42	J+	53.8	J+	123	
SM-OID-101-A	11.5		11500		510		0.024	J	34.7		6670	J+	0.88	J+	0.65	UM	5330		0.39	J+	50.7	J+	106	
SM-OID-001-B	5.1		7430		258		0.034	J	19.8		4200	J+	0.85	J+	0.7	UM	4700		0.29	J+	39.7	J+	59.7	
SM-OID-101-B	18.3		13400		578		0.04	J	38.7		8130	J+	1.8	J+	0.74	UM	8800		0.46	J+	62.8	J+	120	
SM-OID-001-C	3.9		5350		210		0.14	U	14.5		2880	J+	0.57	J+	0.71	UM	6600		0.2	J+	26.5	J+	42.2	
SM-OID-101-C	9.8		12800		467		0.039	J	33.6		6210	J+	1.5	J+	0.75	UM	9410		0.39	J+	62.8	J+	104	
SM-OID-002-A	17.6	J	14500		801		0.063	J	38.9		9370	J+	1.1	J+	0.82	M	9190		0.49	J+	72.1	J+	117	
SM-OID-002-B	15	J	12200		487		0.075	J	33.6		8710	J+	1.5	J+	0.77	M	7030		0.49	J+	63.6	J+	105	
SM-OID-002-C	14.8	J	11800		395		0.05	J	34.8		9210	J+	1.1	J+	0.73	M	7870		0.39	J+	51.7	J+	102	
SM-OID-003-A	12.7	J	8330		322		0.058	J	21		5570	J+	1.5	J+	0.8	UM	6300		0.42	J+	48	J+	76.2	
SM-OID-003-B	6.2	J	6190		236		0.02	J	17.1		4450	J+	0.61	J+	0.65	M	3720		0.3	J+	29.9	J+	50.5	
SM-OID-003-C	5.2	J	5120		199		0.13	U	13.6		3850	J+	0.51	J+	0.65	M	2870		0.18	J+	23.3	J+	41.2	
SM-OID-004-A	18.9	J	13900		709		0.056	J	49.5		10100	J+	1.7	J+	0.23	J+	10200		0.69	J+	58.7	J+	126	
SM-OID-004-B	6.1	J	5840		350		0.015	U	14.9		4890	J+	0.83	J+	0.68	UM	3760		0.21	J+	27.5	J+	44.8	
SM-OID-004-C	9.4	J	12800		1270		0.18	U	21.2		6980	J+	1.2	J+	0.85	UM	9840		0.25	J+	28	J+	58.6	
SM-OID-005-A	44.5	J	3820		544		0.13	U	11.5		999	J+	1.5	J+	2.2	J+	2730		0.14	J+	25.9	J+	70	
SM-OID-005-B	4	J	4360		195		0.13	U	11.9		2810	J+	0.55	J+	0.65	M	4410		0.18	J+	20.9	J+	34	
SM-OID-005-C	7.5	J	8270		547		0.033	J	16.9		3700	J+	0.94	J+	0.66	M	4030		0.22	J+	29.5	J+	44.9	
SM-OID-006-A	5.1	J	5210		186		0.037	J	12.7		3320	J+	0.68	J+	0.68	UM	5800		0.24	J+	28.1	J+	39	
SM-OID-006-B	2	J	1880		96.5		0.015	J	6.2		1070	J+	0.31	J+	0.6	UM	1770		0.076	J+	10.1	J+	16.1	
SM-OID-006-C	2.4	J	2140		129		0.12	U	6		1190	J+	0.3	J+	0.62	UM	1580		0.074	J+	11.1	J+	17.8	
SM-OID-007-A	15.8	J	3070		181		0.019	J	9.7		1550	J+	0.51	J+	0.59	M	2450		0.079	J+	17	J+	113	
SM-OID-007-B	24.6	J	42800		252		0.029	J	12.7		2300	J+	0.48	J+	0.72	M	3170		0.099	J+	23.5	J+	86.1	
OID - North of Site																								
SM-OID-008-A	2.8	J	954		72.9		0.13	U	2.6	UJ	443	UJ	0.66	UM	0.63	UM	1230		0.042	J+	4.1	J+	42.9	
SM-OID-008-B	54.5	J	17800		906		0.063	J	31.8		8110	J+	1.8	J+	0.39	J+	7730		0.41	J+	56	J+	169	
SM-OID-009-A	4.1	J	1720		192		0.14	U	6.4		771	J+	0.42	J+	0.69	M	2590		0.048	J+	5.4	J+	54.1	
SM-OID-009-B	23	J	16200		448		0.051	J	17.1		3470	J+	1.4	J+	1.2	M	13000		0.13	J+	23.4	J+	69.7	
SM-OID-010-A	3.6	J	1390		94.7		0.12	U	3.3	UJ	597	UJ	0.36	J+	0.65	UM	2830		0.042	J+	4.5	J+	37.8	
SM-OID-010-B	40.7	J	6620		464		0.024	J	12.3		3350	J+	1.3	J+	0.82	UM	6820		0.24	J+	27.3	J+	64.1	
SM-OID-011-A	4.5	J	1490		149		0.13	U	5.5		706	J+	0.55	J+	0.65	M	1600		0.043	J+	7.5	J+	45.1	
SM-OID-011-B	104	J	7800		581		0.13	J	25.9		4500	J+	2	J+	0.87	M	8680		0.22	J+	29.1	J+	262	
SM-OID-012-A	6.9	J	1910		134		0.12	U	4.4	UJ	619	J+	0.38	J+	0.62	UM	2870		0.045	J+	6.4	J+	38	
SM-OID-012-B	7	J	23900		694		0.24	U	20.2		2920	J+	2.2	J+	1.2	UM	13000		0.13	J+	21.4	J+	54.4	
SM-OID-013-A	3.2	J	1670		141		0.13	U	5.3		666	J+	0.47	J+	0.64	M	1870		0.053	J+	5.8	J+	52.8	
SM-OID-013-B	12.5	J	10100		301		0.035	J	26.9		6810	J+	0.75	J+	0.7	M	5440		0.29	J+	49.7	J+	80.3	
SM-OID-014-A	3.4	J	1820		131		0.13	U	4.7	UJ	558	J+	0.42	J+	0.63	UM	2130		0.049	J+	7.3	J+	48.7	
SM-OID-014-B	38.3	J	4070		327		0.026	J	11.8		2290	J+	0.93	J+	0.75	UM	4140		0.1	J+	15.5	J+	111	
Lagoon Fingers - Footbridge																								
SM-LGF-001-A	23.9	J	9530	J	337	J	0.58	UR	18.3	UJ	3050	J+	6.8	J+	2.8	UM	20800	J	0.24	J+	26.3	J+	223	J
SM-LGF-001-B	128		90800		1630		0.083	J	49.6		927	J+	2.5	J+	3.2	J+	3320		0.083	J+	28.2	J+	1250	
SM-LGF-002-A	17.6		6190		286		0.31	U	11.4	UJ	1810	J+	4.5	J+	1.5	UM	9060		0.17	J+	22.2	J+	168	
SM-LGF-002-B	108		38600		1030		0.038	J	32.8		3190	J+	2	J+	2.6	J+	5650		0.15	J+	35.6	J+	577	
SM-LGF-003-A	14		3430		227		0.15	U	8.7		1310	J+	0.94	J+	0.72	UM	1990		0.067	J+	9.4	J+	112	
SM-LGF-103-A	10.3		3060		189		0.18	U	6	UJ	777	J+	1.7	J+	0.85	UM	2260		0.077	J+	10.7	J+	73.9	
SM-LGF-003-B	89.3		69300		1370		0.039	J	32.5		1800	J+	1.2	J+	3.6	J+	4580		0.093	J+	32.2	J+	748	
SM-LGF-103-B	95.3		116000		1660		0.022	J	39.3		1020	J+	0.85	J+	4.1	J+	4490		0.058	J+	28.5	J+	976	
SM-LGF-004-A	8.4	J	1980		81.1		0.049	UJ	5.2	UJ	763	J+	0.56	J+	1.1	UM	2390		0.087	J+	10.2	J+	37.7	
SM-LGF-004-B	84.2	J	74800		1370		0.04	UJ	29.4		1100	J+	1.1	J+	5	J+	3100		0.067	J+	22.9	J+	621	
Lagoon Fingers - West																								
SM-LGF-005-A	36.1	J	6550		989		0.27	UJ	17.3		2590	J+	2.6	J+	1.4	UM	10900		0.22	J+	27.8	J+	427	
SM-LGF-005-B	25.3		2460		271		0.026	J	7.3		1010	J+	0.34	J+	0.62	UM	1240		0.093	J+	14.5	J+	60.8	
SM-LGF-006-A	35.4		4370		777		0.033	J	10.2		1390	J+	1.8	J+	1.1	UM	6990		0.1	J+	18.2	J+	213	
SM-LGF-006-B	7.5	J	1400		98.9		0.024	UJ	4.6	UJ	552	J+	0.48	J+	0.71	UM	1290		0.056	J+	8.1	J+	15.6	
SM-LGF-007-A	3	J	1450		69		0.026	UJ	4.4	J	592	J+	0.66	UM	0.64	UM	1240		0.045	J+	10.6	J+	19.7	
SM-LGF-007-B	1.6	J	1680		65.7		0.016	UJ	3.6	J	576	J+	0.63	UM	0.61	UM	1760		0.043	J+	6.2	J+	10.1	
SM-LGF-008-A	1.8	J	1040		51.9		0.025	UJ	3	J	357	J+	0.66	UM	0.64	UM	1130		0.039	J+	8.9	J+	12	
SM-LGF-008-B	1.5	J	1390		55.5		0.017	UJ	4.2	J	646	J+	0.7	UM	0.68	UM	1710		0.041	J+	5.9	J+	10.5	
SM-LGF-009-A	1.2	J	934		46.5		0.015	UJ	2.4	J	335	J+	0.58	UM	0.56	UM	990		0.029	J+	6.4	J+	11.2	
SM-LGF-009-B	2	J	1240		72.7		0.02	UJ	3.9	J	448	J+	0.7	UM	0.67	UM	1480		0.036	J+	5.6	J+	11.6	
Lagoon Fingers - East																								
SM-LGF-010-A	1.6		1260		57.6		0.13	U	3	UJ	383	J+	0.67	UM	0.64	UM	1580		0.028	J+	9.3	J+	9.4	
SM-LGF-010-B	1.8		1220		51.4		0.12	U	3.4	UJ	360	J+	0.67	UM	0.64	UM	1310		0.027	J+	10.8	J+	8.5	
SM-LGF-011-A	3.7		1940		75.1		0.14	U	5.2	UJ	791	J+	0.3	J+	0.67	UM	1930		0.05	J+	9.5	J+	25.5	
SM-LGF-011-B	2		1470		61.5		0.12	U	4.3	UJ	537	J+	0.67	UM	0.64	UM	1390		0.036	J+	6.6	J+	10.1	
SM-LGF-012-A	2.6		1250		48.5		0.12	U	3.2	UJ	406	J+	0.62	UM	0.6	UM	1100		0.036	J+	6.4	J+	10.7	
SM-LGF-012-B	2.1		1410		57.2		0.13	U	3.8	UJ	445	J+	0.64	UM	0.62	UM	1210		0.032	J+	8.8	J+	8.6	

TABLE 1
Metals Analytical Results, Solid Matrix, OID and Lagoon Areas
Halaco Site Remedial Investigation, Oxnard, California

Location ID	Duplicate (Dup)	Sample ID	CLP ID	Sample Date	Depth (ft, bgs)	Aluminum Result	Aluminum Q	Antimony Result	Antimony Q	Arsenic Result	Arsenic Q	Barium Result	Barium Q	Beryllium Result	Beryllium Q	Cadmium Result	Cadmium Q	Calcium Result	Calcium Q	Chromium Result	Chromium Q	Cobalt Result	Cobalt Q
Lagoon - Main																							
LGM-001		SM-LGM-001-A	MY5TD5	6/10/2010	Surface	9450		0.69	J+	3.9	J+	183		1.4	J	1.4	J+	102000		22	J+	5	UJ
		SM-LGM-001-B	MY5TD6	6/10/2010	2	1950		0.35	J+	1.6	J+	101		0.13	J	0.11	J+	5240		6	J+	1.2	UJ
		SM-LGM-001-C	MY5TD7	6/10/2010	4	20600		0.61	J+	9.3	J+	211		1.1	J	1.6	J+	30200		37.1	J+	12.6	
LGM-002		SM-LGM-002-A	MY5TD8	6/14/2010	Surface	6260		1.1	J+	4	J+	162		0.73	UJ	1.2	J+	64200		21	J+	3.4	UJ
		SM-LGM-002-B	MY5TD9	6/14/2010	2	1460		0.12	J+	0.73	J+	5160		0.073	UJ	0.048	J+	5430		4.2	J+	1.6	UJ
		SM-LGM-002-C	MY5TE0	6/14/2010	4	11600		0.33	J+	2.8	J+	5360		0.6	UJ	0.84	J+	28600		21	J+	8.7	
LGM-003		SM-LGM-003-A	MY5TE1	6/10/2010	Surface	4690		0.77	J+	3.1	J+	111		0.35	J	1.1	J+	70000		15.1	J+	3	UJ
	Dup	SM-LGM-103-A	MY5TE4	6/10/2010	Surface	6830		1.1	J+	3.6	J+	187		0.71	J	1.3	J+	127000		17.3	J+	3.9	UJ
		SM-LGM-003-B	MY5TE2	6/10/2010	2	3290		0.29	J+	1	J+	95.6		0.26	J	0.3	J+	7430		7.6	J+	1.4	UJ
	Dup	SM-LGM-103-B	MY5TE5	6/10/2010	2	5940		0.94	J+	1.9	J+	148		0.6	J	0.45	J+	17500		14.4	J+	2.1	UJ
		SM-LGM-003-C	MY5TE3	6/10/2010	4	3770		0.59	J+	1.9	J+	148		0.7	J	0.48	J+	11100		11	J+	1.9	UJ
	Dup	SM-LGM-103-C	MY5TE6	6/10/2010	4	1780		0.34	J+	1.3	J+	20.3	UJ	0.11	J	0.17	J+	4070		57.9	J+	1	UJ
LGM-004		SM-LGM-004-A	MY5TE7	6/14/2010	Surface	3750		0.65	J+	3.3	J+	101		0.29	UJ	0.69	J+	78200		15	J+	2	UJ
		SM-LGM-004-B	MY5TE8	6/14/2010	2	1340		0.11	J+	0.96	J+	58.4		0.11	UJ	0.089	J+	3420	J	3	J+	1	UJ
		SM-LGM-004-C	MY5TE9	6/14/2010	4	1840		0.12	J+	0.81	J+	22.1	J	0.098	UJ	0.12	J+	4210	J	3.8	J+	1.4	UJ
LGM-005		SM-LGM-005-A	MY5TF0	6/10/2010	Surface	2170		0.18	J+	1.6	J+	43.9		0.17	J	0.11	J+	11600		9.8	J+	1.3	UJ
		SM-LGM-005-B	MY5TF1	6/10/2010	2	16900		1.7	J+	5.8	J+	261		1.1		2	J+	128000		35.5	J+	5.1	UJ
		SM-LGM-005-C	MY5TF2	6/10/2010	4	1370		0.18	J+	1.1	J+	25.4		0.08	J	0.086	J+	4240		3.6	J+	1	UJ
LGM-006		SM-LGM-006-A	MY5TF3	6/14/2010	Surface	5940		0.53	J+	2.8	J+	105		0.33	UJ	0.75	J+	31400	J	14	J+	4.3	UJ
		SM-LGM-006-B	MY5TF4	6/14/2010	2	3330		0.51	J+	2.3	J+	73.7		0.32	UJ	0.4	J+	11000	J	6.7	J+	1.6	UJ
		SM-LGM-006-C	MY5TF5	6/14/2010	4	1730		0.14	J+	0.95	J+	12.7	J	0.11	UJ	0.12	J+	7370	J	3.9	J+	1.2	UJ
LGM-007		SM-LGM-007-A	MY5TF6	6/9/2010	Surface	1680		0.2	J+	1.2	J+	45.4		0.08	UJ	0.099	J+	6950		6.4	J+	1.3	UJ
		SM-LGM-007-B	MY5TF7	6/9/2010	2	2860		0.088	J+	1.6	J+	34.4		0.097	UJ	0.087	J+	2090		4.3	J+	1.1	UJ
		SM-LGM-007-C	MY5TF8	6/9/2010	4	3700		0.2	J+	5	J+	13	UJ	0.15	UJ	1.3	J+	7200		5.6	J+	1.9	UJ
LGM-008		SM-LGM-008-A	MY5TF9	6/14/2010	Surface	6110		0.94	J+	4.1	J+	145		0.4	UJ	1	J+	110000	J	16.8	J+	4	UJ
		SM-LGM-008-B	MY5TG0	6/14/2010	2	3180		0.45	J+	2.4	J+	65.9		0.19	UJ	0.53	J+	43400	J	9.1	J+	2.2	UJ
		SM-LGM-008-C	MY5TG1	6/14/2010	4	1220		0.14	J+	1.7	J+	20	J	0.082	UJ	0.19	J+	4300	J	5.6	J+	0.93	UJ
LGM-009		SM-LGM-009-A	MY5TG2	6/9/2010	Surface	6420		0.73	J+	3.6	J+	158		0.42	UJ	0.98	J+	89500		16	J+	3.9	UJ
		SM-LGM-009-B	MY5TG3	6/9/2010	2	1760		0.12	J+	1.7	J+	26.5		0.093	UJ	0.11	J+	6360		5.6	J+	1.2	UJ
		SM-LGM-009-C	MY5TG4	6/9/2010	4	1550		0.11	J+	1.3	J+	17.3	UJ	0.086	UJ	0.14	J+	4700		4.7	J+	1.1	UJ
LGM-010		SM-LGM-010-A	MY5TG5	6/14/2010	Surface	1710		0.64	M	0.64	M	20.3	J	0.1	UJ	0.46	M	8300	J	0.64	M	1.1	UJ
		SM-LGM-010-B	MY5TG6	6/14/2010	2	3050		0.32	J+	1.5	J+	296		0.85		0.09	J+	6120	J	3.8	J+	1.2	UJ
		SM-LGM-010-C	MY5TG7	6/14/2010	4	2060		0.2	J+	1.7	J+	49.9		0.12	UJ	0.12	J+	5360	J	6.7	J+	1.4	UJ

Sample ID	Copper Result	Copper Q	Iron Result	Iron Q	Lead Result	Lead Q	Magnesium Result	Magnesium Q	Manganese Result	Manganese Q	Mercury Result	Mercury Q	Nickel Result	Nickel Q	Potassium Result	Potassium Q	Selenium Result	Selenium Q	Silver Result	Silver Q	Sodium Result	Sodium Q	Thallium Result	Thallium Q	Vanadium Result	Vanadium Q	Zinc Result	Zinc Q
SM-LGM-001-A	119		18000		29.1		6990		569		0.028	J	19.2		2810	J+	2	J+	0.39	J+	6360		0.18	J+	28.3	J+	302	
SM-LGM-001-B	20.8		4710		4.5		1310		75.9		0.12	U	4.6	UJ	463	J+	0.62	UM	0.6	UM	805		0.038	J+	7.8	J+	28.2	
SM-LGM-001-C	43		40700		11.9		12600		585		0.029	J	33.8		9450	J+	1.6	J+	0.17	J+	6730		0.36	J+	64.6	J+	104	
SM-LGM-002-A	78.5		12400		21.5	J	5650		289		0.029	J	14.2		3090	J+	2	J+	0.31	J+	11500		0.17	J+	24.3	J+	213	
SM-LGM-002-B	2.3	UJ	3570		1.9	J	1430		77.2		0.14	U	3.7	UJ	1640	J+	0.67	UM	0.65	UM	1730		0.032	J+	6.8	J+	8.8	
SM-LGM-002-C	32.9		19600		15.1	J	8300		569		0.043	J	20.8		10700	J+	1.1	J+	0.71	UM	4340		0.31	J+	38.8	J+	69.1	
SM-LGM-003-A	44.2		9400		12.2		4140		332		0.22	U	10.3		1600	J+	1.8	J+	1.1	UM	4430		0.12	J+	20.4	J+	158	
SM-LGM-103-A	95	J	12600		21.8		6350		505		0.082	J	13.8		2270	J+	2.2	J+	1.2	UM	6450		0.16	J+	24.9	J+	312	
SM-LGM-003-B	31.7	J	4070		12.8		1630		107		0.13	U	4.3	UJ	499	J+	0.67	UM	0.65	UM	1300		0.04	J+	8.8	J+	60	
SM-LGM-103-B	238	J	5880		15.9		3130		222		0.14	U	11.6		767	J+	0.33	J+	0.41	J+	1600		0.056	J+	12.8	J+	177	
SM-LGM-003-C	28.3	J	5770		11.1		3240		182		0.14	U	5.7		737	J+	0.71	UM	0.16	J+	1600		0.046	J+	10	J+	66.8	
SM-LGM-103-C	91.2	J	3720		6.3		1310		52.8		0.12	U	3.9	UJ	362	J+	0.65	UM	0.62	UM	1060		0.031	J+	11.7	J+	54.7	
SM-LGM-004-A	50.2		8600		15	J	3630		334		0.034	J	13.4		1220	J+	1.8	J+	1.2	UM	5690		0.099	J+	16.6	J+	164	
SM-LGM-004-B	5.9		3130		2.3	J	1050		52		0.14	U	3.2	UJ	407	J+	0.69	M	0.66	M	1030		0.048	J+	4.7	J+	13.9	
SM-LGM-004-C	2.7	UJ	4280		1.7	J	1450		64.6		0.13	U	4.2	UJ	670	J+	0.68	M	0.66	M	1410		0.055	J+	6.2	J+	10.4	
SM-LGM-005-A	14.1	J	5120		5		1530		91.7		0.13	U	4.3	UJ	467	J+	0.64	UM	0.61	UM	1040		0.035	J+	17.9	J+	25.3	
SM-LGM-005-B	217	J	18600		67.5		8910		671		0.051	J	22.3		3390	J+	2.5	J+	0.36	J+	7680		0.21	J+	37.5	J+	312	
SM-LGM-005-C	1.8	UJ	3630		1.8		1140		48.3		0.13	U	3	UJ	434	J+	0.65	UM	0.62	UM	1060		0.029	J+	5.9	J+	8.9	
SM-LGM-006-A	35.4		12300		15.2	J	4460		226		0.19	U	13		2410	J+	0.76	J+	0.94	M	4240		0.16	J+	21	J+	142	
SM-LGM-006-B	31.9		5100		6	J	1920		120		0.13	U	6.7		736	J+	0.32	J+	0.13	J+	1860		0.062	J+	7.1	J+	57.9	
SM-LGM-006-C	3.5		4380		1.8	J	1370		75.1		0.12	U	4.1	J	655	J+	0.68	M	0.65	M	2130		0.06	J+	5.6	J+	11.7	
SM-LGM-007-A	3.3	U	4410		2.4	J	1330		67.9		0.025	UJ	3.8	UJ	465	J+	0.33	J+	0.64	UM	1240		0.086	J+	12.2	J+	16.1	
SM-LGM-007-B	2.9		5080		1.8	J	1350		64.2		0.022	UJ	3.3	UJ	357	J+	0.53	UM	0.51	UM	358	J	0.051	J+	8.6	J+	11.5	
SM-LGM-007-C	4.9		6400		3.1	J	1520		75.2		0.027	UJ	6.9		711	J+	0.26	J+	0.54	UM	811		0.11	J+	10.4	J+	17.3	
SM-LGM-008-A	55.5		14100		46.8	J	5660		479		0.024	J	14		2300	J+	1.7	J+	1	M	4330		0.16	J+	23	J+	237	
SM-LGM-008-B	21.5		8620		11.1	J	2870		263		0.18	U	7.9		1060	J+	0.74	J+	0.84	M	2100		0.088	J+	12.2	J+	102	
SM-LGM-008-C	3	UJ	3130		1.7	J	1050		53.9		0.13	U	2.6	J	376	J+	0.3	J+	0.65	M	742		0.059	J+	8.7	J+	9.5	
SM-LGM-009-A	54		12800		20.2	J	5510		423		0.049	UJ	14.2		2340	J+	1.3	J+	0.92	UM	4760		0.17	J+	22.7	J+	196	
SM-LGM-009-B	3.6		4240		2.3	J	1390		69.2		0.02	UJ	4.3	UJ	533	J+	0.67	UM	0.65	UM	1010		0.054	J+	8.2	J+	14.4	
SM-LGM-009-C	7.3		3350		2.3	J	1240		55.8		0.12	U	3.5	UJ	413	J+	0.62	UM	0.6	UM	1070		0.043	J+	6.5	J+	16.6	
SM-LGM-010-A	5.7		3730		2.3	J	1230		70.3		0.13	U	3.3	J	500	J+	0.67	M	0.64	M	1160		0.04	J+	2.6	M	16.9	
SM-LGM-010-B	44		4490		8.5	J	3330		111		0.13	U	5.3		570	J+	0.68	M	0.65	M	1500		0.039	J+	5.3	J+	66.1	
SM-LGM-010-C	2.4	UJ	4880		2.1	J	1640		68.5		0.13	U	5.1	UJ	684	J+	0.68	M	0.66	M	1990		0.052	J+	8.2	J+	11.3	

Notes:
Units are in mg/kg
bgs = below ground surface
Data Qualifiers (Q):
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit listed in the table.
J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+ = The result is an estimated quantity that may be biased high.
J- = The result is an estimated quantity that may be biased low.
UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R = The data did not meet quality control criteria and are rejected as unusable. The analyte may or may not be present in the sample.
M = Data could not be fully qualified.

TABLE 2
Radionuclide Analytical Results, Solid Matrix, OID and Lagoon Areas
Halaco Site Remedial Investigation, Oxnard, California

Location ID	Duplicate (Dup)	Sample ID	Sample Date	Depth (ft, bgs)	Thorium 228 Result	Q	Uncer-tainty	Thorium 230 Result	Q	Uncer-tainty	Thorium 232 Result	Q	Uncer-tainty	Radium 226 Result	Q	Uncer-tainty	Radium 228 Result	Q	Uncer-tainty
OID - Site																			
OID-001		SM-OID-001-A	6/10/10	Surface	2.52		0.61	2.34		0.57	2.07		0.52	1.62		0.44	1.92	J	0.79
	Dup	SM-OID-101-A	6/10/10	Surface	2.04		0.57	1.46		0.44	1.95		0.55	1.27		0.34	1.99		0.57
		SM-OID-001-B	6/10/10	2	1.57		0.43	1.96		0.5	1.81		0.47	1.17		0.54	2.38		0.92
	Dup	SM-OID-101-B	6/10/10	2	2.72		0.7	2.33		0.61	2.58		0.66	1.3		0.35	1.63		0.47
		SM-OID-001-C	6/10/10	4	1.44		0.39	1.28		0.36	1.01		0.3	0.88		0.27	1.35		0.41
	Dup	SM-OID-101-C	6/10/10	4	1.61		0.43	1.68		0.45	1.58		0.43	1.68		0.54	1.71	J	1.08
OID-002		SM-OID-002-A	6/11/10	Surface	1.83		0.45	2.24		0.53	1.71		0.43	0.86	J	0.38	1.45		0.45
		SM-OID-002-B	6/11/10	2	2.43		0.64	2.69		0.69	2.37		0.62	1.58		0.49	1.37	J	1.05
		SM-OID-002-C	6/11/10	4	1.88		0.48	1.95		0.5	2.09		0.52	1.28		0.27	1.35		0.43
OID-003		SM-OID-003-A	6/11/10	Surface	1.69		0.49	2.13		0.59	1.75		0.5	1.2		0.24	1.68		0.39
		SM-OID-003-B	6/11/10	2	1.88		0.57	2.01		0.59	1.6		0.5	1.44		0.34	1.51	J	0.56
		SM-OID-003-C	6/11/10	4	1.32		0.43	1.6		0.49	1.39		0.44	1.03		0.23	1.31		0.27
OID-004		SM-OID-004-A	6/11/10	Surface	2.23		0.6	2.73		0.7	1.84		0.51	1.46		0.36	1.32	J	0.86
		SM-OID-004-B	6/11/10	2	1.45		0.48	2.53		0.73	1.27		0.44	0.69	J	0.35	0.6	J	0.57
		SM-OID-004-C	6/11/10	4	1.6		0.52	2.23		0.67	1		0.37	0.75		0.35	0.89	J	0.39
OID-005		SM-OID-005-A	6/11/10	Surface	0.6		0.24	1.34		0.41	0.61		0.24	0.36	J	0.22	0.44	J	0.35
		SM-OID-005-B	6/11/10	2	1.52		0.46	1.94		0.55	1.01		0.34	1.48		0.46	1.94	J	1.13
		SM-OID-005-C	6/11/10	4	0.96		0.32	1.15		0.36	1.02		0.33	0.57		0.23	0.62	J	0.34
OID-006		SM-OID-006-A	6/11/10	Surface	1.21		0.38	1.98		0.54	1.3		0.39	0.95		0.27	1.26		0.41
		SM-OID-006-B	6/11/10	2	0.97		0.34	1.36		0.43	0.92		0.32	0.8		0.25	1.19		0.42
		SM-OID-006-C	6/11/10	4	0.8		0.28	1.32		0.38	0.53		0.21	0.75		0.26	1.1		0.4
OID-007		SM-OID-007-A	6/11/10	Surface	1.01		0.32	1.73		0.47	0.76		0.26	0.74	J	0.31	0.68	J	0.42
		SM-OID-007-B	6/11/10	2	0.91		0.31	1.64		0.47	0.87		0.3	0.59		0.23	0.93		0.3
OID - North of Site																			
OID-008		SM-OID-008-A	6/11/10	Surface	0.59		0.22	0.89		0.29	0.45		0.18	0.31	J	0.18	0.16	U	0.24
		SM-OID-008-B	6/11/10	2	1.3		0.38	2.35		0.6	1.61		0.44	1.25	J	0.64	1.79	J	0.71
OID-009		SM-OID-009-A	6/11/10	Surface	0.52		0.22	1.24		0.38	0.43		0.19	0.58		0.2	0.19	U	0.33
		SM-OID-009-B	6/11/10	2	1.28		0.39	1.53		0.44	1.13		0.36	1.08	J	0.57	1.4	J	0.59
OID-010		SM-OID-010-A	6/11/10	Surface	0.56		0.24	0.65		0.26	0.57		0.24	0.37		0.21	0.21	U	0.24
		SM-OID-010-B	6/11/10	2	0.82		0.27	1.04		0.32	0.99		0.31	0.87		0.3	0.5	J	0.39
OID-011		SM-OID-011-A	6/11/10	Surface	0.5		0.25	0.62		0.28	0.69		0.3	0.39		0.18	0.55	J	0.32
		SM-OID-011-B	6/11/10	2	0.99		0.33	1		0.32	1.06		0.34	0.57	J	0.42	1.18	J	0.69
OID-012		SM-OID-012-A	6/11/10	Surface	1.08		0.33	0.67		0.24	0.86		0.28	0.48		0.14	0.56	J	0.29
		SM-OID-012-B	6/11/10	2	0.52		0.25	0.68		0.29	0.4		0.21	0.7	J	0.36	0.69	U	0.71
OID-013		SM-OID-013-A	6/11/10	Surface	0.41		0.18	0.43		0.19	0.46		0.19	0.25	J	0.23	0.26	U	0.5
		SM-OID-013-B	6/11/10	2	1.93		0.54	1.93		0.54	1.65		0.48	1.52		0.44	1.79	J	0.74
OID-014		SM-OID-014-A	6/11/10	Surface	0.52		0.23	0.59		0.24	0.46		0.21	0.19	J	0.14	0.33	J	0.24
		SM-OID-014-B	6/11/10	2	0.99		0.34	0.71		0.27	0.77		0.28	0.48	J	0.39	0.74	J	0.45
Lagoon Fingers - Footbridge																			
LGF-001		SM-LGF-001-A	6/8/10	Surface	0.9		0.39	1.41		0.53	1.09		0.44	0.21	U	0.74	1.72	J	1.5
		SM-LGF-001-B	6/8/10	2	7.72		2.03	13.33		3.35	6.88		1.82	0.59	U	0.67	6.61		1.66
LGF-002		SM-LGF-002-A	6/8/10	Surface	0.87		0.38	1.04		0.42	0.84		0.36	0.32	U	0.37	0.94	J	0.7
		SM-LGF-002-B	6/8/10	2	4.65		1.12	9.19		2.05	5.13		1.21	0.34	U	0.37	4.82		0.91
LGF-003		SM-LGF-003-A	6/8/10	Surface	0.78		0.33	1.18		0.43	1.04		0.4	0.44	J	0.27	0.66	J	0.48
	Dup	SM-LGF-103-A	6/8/10	Surface	0.79		0.3	0.62		0.25	0.55		0.23	0.15	U	0.26	0.53	J	0.39
		SM-LGF-003-B	6/8/10	2	5.95		1.59	12.02		3	5.85		1.56	0.9	J	0.52	6.58		1.25
	Dup	SM-LGF-103-B	6/8/10	2	5.18		1.18	8.82		1.91	4.52		1.04	1.33	J	1.15	4.9		1.53
LGF-004		SM-LGF-004-A	6/8/10	Surface	0.65		0.27	0.7		0.28	0.5		0.22	0.36	J	0.22	0.71	J	0.35
		SM-LGF-004-B	6/8/10	2	11.13		2.37	20.61		4.26	10.66		2.28	1.1	J	1	14.69		2.36
Lagoon Fingers - West																			
LGF-005		SM-LGF-005-A	6/9/10	Surface	1.41		0.65	1.19		0.57	0.64	J	0.39	0.88		0.35	1.88		0.67
		SM-LGF-005-B	6/9/10	2	0.63		0.29	0.55		0.27	0.52		0.25	0.8		0.22	1.06		0.27
LGF-006		SM-LGF-006-A	6/9/10	Surface	1.13		0.59	1.18		0.59	0.88		0.48	0.52	U	0.58	1.76	J	1.65
		SM-LGF-006-B	6/9/10	2	0.96		0.39	0.69		0.3	1.08		0.41	0.3	J	0.25	0.64	J	0.29
LGF-007		SM-LGF-007-A	6/9/10	Surface	0.69		0.32	0.95		0.39	0.65		0.3	0.51		0.21	0.96	J	0.47
		SM-LGF-007-B	6/9/10	2	0.75		0.29	0.66		0.26	0.58		0.24	0.37	J	0.36	1.11	J	0.62
LGF-008		SM-LGF-008-A	6/8/10	Surface	0.7		0.26	0.42		0.19	0.67		0.25	0.51		0.19	0.99		0.28
		SM-LGF-008-B	6/8/10	2	0.51		0.21	0.66		0.24	0.63		0.23	0.2	J	0.15	0.46	J	0.31
LGF-009		SM-LGF-009-A	6/9/10	Surface	0.57		0.27	0.62		0.28	0.9		0.34	0.35	J	0.2	0.91	J	0.37
		SM-LGF-009-B	6/9/10	2	0.79		0.29	0.47		0.2	0.69		0.26	0.31	J	0.2	0.46	J	0.29
Lagoon Fingers - East																			
LGF-010		SM-LGF-010-A	6/9/10	Surface	0.39		0.21	0.82		0.32	0.63		0.26	0.69		0.21	0.49	J	0.29
		SM-LGF-010-B	6/9/10	2	0.7		0.25	0.42		0.18	0.7		0.24	0.52		0.17	0.5	J	0.3
LGF-011		SM-LGF-011-A	6/10/10	Surface	0.92		0.34	0.56		0.24	0.56		0.24	0.31	J	0.25	0.55	U	0.59
		SM-LGF-011-B	6/10/10	2	0.75		0.31	0.72		0.3	0.7		0.29	0.43	J	0.19	0.54	J	0.42
LGF-012		SM-LGF-012-A	6/9/10	Surface	0.56		0.28	0.62		0.29	0.83		0.34	0.39		0.16	0.55	J	0.53
		SM-LGF-012-B	6/9/10	2	0.56		0.21	0.58		0.21	0.68		0.23	0.3	J	0.25	0.4	J	0.3

TABLE 2
Radionuclide Analytical Results, Solid Matrix, OID and Lagoon Areas
Halaco Site Remedial Investigation, Oxnard, California

Location ID	Duplicate (Dup)	Sample ID	Sample Date	Depth (ft, bgs)	Thorium 228			Thorium 230			Thorium 232			Radium 226			Radium 228		
					Result	Q	Uncer-tainty	Result	Q	Uncer-tainty	Result	Q	Uncer-tainty	Result	Q	Uncer-tainty	Result	Q	Uncer-tainty
Lagoon - Main																			
LGM-001		SM-LGM-001-A	6/10/10	Surface	0.79		0.3	0.75		0.28	0.76		0.29	0.64		0.32	1.33	J	0.66
		SM-LGM-001-B	6/10/10	2	0.46		0.19	0.38		0.17	0.46		0.19	0.53		0.22	0.73	J	0.37
		SM-LGM-001-C	6/10/10	4	1.82		0.56	1.91		0.58	2.15		0.64	1.9		0.43	2.24	J	0.84
LGM-002		SM-LGM-002-A	6/14/10	Surface	0.67		0.28	0.95		0.35	0.73		0.29	0.4	U	0.47	1.81		0.62
		SM-LGM-002-B	6/14/10	2	0.98		0.38	0.55		0.26	0.56		0.26	0.49	J	0.27	0.74	J	0.6
		SM-LGM-002-C	6/14/10	4	3.05		0.79	2.16		0.6	1.78		0.51	1.33	J	0.64	1.98		0.74
LGM-003		SM-LGM-003-A	6/10/10	Surface	1.07		0.35	1.51		0.44	0.69		0.26	0.64		0.29	0.59	J	0.54
	Dup	SM-LGM-103-A	6/10/10	Surface	0.75		0.25	1.03		0.3	0.92		0.28	0.54	J	0.34	0.8	J	0.49
		SM-LGM-003-B	6/10/10	2	1.25		0.41	1.38		0.44	1.2		0.4	0.73		0.21	1.36		0.39
	Dup	SM-LGM-103-B	6/10/10	2	0.94		0.28	0.8		0.25	0.69		0.23	0.58		0.22	1.14		0.34
		SM-LGM-003-C	6/10/10	4	0.77		0.28	1.7		0.48	0.69		0.26	0.32	J	0.14	0.66	J	0.41
	Dup	SM-LGM-103-C	6/10/10	4	0.78		0.26	0.56		0.21	0.58		0.21	0.54		0.2	0.6	J	0.3
LGM-004		SM-LGM-004-A	6/14/10	Surface	1.03		0.42	1.68		0.58	0.86		0.37	0.47	J	0.46	1.25		0.45
		SM-LGM-004-B	6/14/10	2	0.52		0.26	1.17		0.43	0.69		0.3	0.19	U	0.24	0.47	U	0.49
		SM-LGM-004-C	6/14/10	4	0.7		0.27	0.93		0.32	0.57		0.23	0.42	J	0.23	0.43	J	0.37
LGM-005		SM-LGM-005-A	6/10/10	Surface	1.13		0.37	1.19		0.39	0.95		0.33	0.42	J	0.32	0.59	J	0.57
		SM-LGM-005-B	6/10/10	2	1.38		0.57	3.02		1.03	1.31		0.55	1.07	J	0.49	1.28	J	0.5
		SM-LGM-005-C	6/10/10	4	0.9		0.36	1.5		0.5	0.89		0.35	0.23	U	0.25	0.77	J	0.5
LGM-006		SM-LGM-006-A	6/14/10	Surface	0.94		0.36	1.74		0.55	0.52		0.24	0.54		0.25	0.75	J	0.41
		SM-LGM-006-B	6/14/10	2	0.67		0.28	1.13		0.39	0.64		0.27	0.31	J	0.25	0.28	U	0.32
		SM-LGM-006-C	6/14/10	4	0.81		0.33	1.19		0.42	0.4		0.21	0.43	J	0.32	-0.1	U	0.41
LGM-007		SM-LGM-007-A	6/9/10	Surface	0.47		0.2	0.86		0.3	0.35		0.17	0.59		0.2	1.16		0.33
		SM-LGM-007-B	6/9/10	2	1.28		0.47	2.51		0.78	1.21		0.45	0.55		0.2	0.72		0.24
		SM-LGM-007-C	6/9/10	4	1.76		0.53	1.58		0.49	1.39		0.44	0.62	J	0.26	1.38		0.51
LGM-008		SM-LGM-008-A	6/14/10	Surface	1.06		0.49	1.4		0.58	0.6		0.33	0.79	J	0.32	1.01	J	0.45
		SM-LGM-008-B	6/14/10	2	1.38		0.49	1.32		0.47	1.2		0.44	0.42	J	0.29	0.55	J	0.5
		SM-LGM-008-C	6/14/10	4	0.78		0.28	0.79		0.28	1.08		0.34	0.37	J	0.14	0.55	J	0.29
LGM-009		SM-LGM-009-A	6/9/10	Surface	0.88		0.32	0.97		0.35	0.63		0.26	0.61	J	0.3	1.28	J	0.59
		SM-LGM-009-B	6/9/10	2	0.39		0.17	0.57		0.21	0.58		0.22	0.38	J	0.22	0.73	J	0.37
		SM-LGM-009-C	6/9/10	4	0.58		0.22	0.67		0.24	0.51		0.2	0.29	J	0.22	0.62	J	0.52
LGM-010		SM-LGM-010-A	6/14/10	Surface	0.55		0.21	0.55		0.2	0.46		0.18	0.36		0.15	0.43	J	0.24
		SM-LGM-010-B	6/14/10	2	0.74		0.26	0.96		0.31	0.9		0.3	0.22	J	0.2	0.9		0.28
		SM-LGM-010-C	6/14/10	4	0.66		0.23	0.67		0.23	0.56		0.2	0.47	J	0.35	0.2	U	0.49

Notes:
Units are in pCi/g
bgs = below ground surface
Data Qualifiers (Q):
U = The error is greater than or equal to the result.
J = The result minus the error is less than the detection limit but greater than zero.

TABLE 3
VOC Analytical Results, Solid Matrix, OID and Lagoon Areas
Halaco Site Remedial Investigation, Oxnard, California

Location ID	Duplicate (Dup)	Sample ID	CLP ID	Sample Date	Depth (ft, bgs)	2-Butanone Result	Q	Acetone Result	Q	Carbon disulfide Result	Q	Chloroform Result	Q	Ethylbenzene Result	Q	Isopropyl-benzene Result	Q	m,p-Xylene Result	Q	o-Xylene Result	Q
OID - Site																					
OID-001		SM-OID-001-A	Y5T95	6/10/10	Surface	19	U	19	U	9.4	U	9.4	U	9.4	U	9.4	U	9.4	U	9.4	U
	Dup	SM-OID-101-A	Y5T98	6/10/10	Surface	17	U	17	U	8.7	U	8.7	U	8.7	U	8.7	U	8.7	U	8.7	U
		SM-OID-001-B	Y5T96	6/10/10	2	12	U	12	U	0.96	J	5.8	U	5.8	U	5.8	U	5.8	U	5.8	U
	Dup	SM-OID-101-B	Y5T99	6/10/10	2	18	U	18	U	8.8	U	8.8	U	8.8	U	8.8	U	8.8	U	8.8	U
		SM-OID-001-C	Y5T97	6/10/10	4	15	U	15	U	1	J	7.6	U	7.6	U	7.6	U	7.6	U	7.6	U
	Dup	SM-OID-101-C	Y5TA0	6/10/10	4	18	U	34		9.1	U	9.1	U	9.1	U	9.1	U	9.1	U	9.1	U
OID-003		SM-OID-003-A	Y5TA6	6/11/10	Surface	11	U	11	U	2.4	J	5.6	U	5.6	U	5.6	U	5.6	U	5.6	U
		SM-OID-003-B	Y5TA7	6/11/10	2	11	U	11	U	2.2	J	5.6	U	5.6	U	5.6	U	5.6	U	5.6	U
		SM-OID-003-C	Y5TA8	6/11/10	4	11	U	11	U	1.1	J	5.7	U	5.7	U	5.7	U	5.7	U	5.7	U
OID-005		SM-OID-005-A	Y5TB2	6/11/10	Surface	12	U	12	U	3.4	J	6.1	U	6.1	U	6.1	U	6.1	U	6.1	U
		SM-OID-005-B	Y5TB3	6/11/10	2	12	U	12	U	1.5	J	6	U	6	U	6	U	6	U	6	U
		SM-OID-005-C	Y5TB4	6/11/10	4	18	U	18	U	9.4		8.8	U	8.8	U	8.8	U	8.8	U	8.8	U
OID-007		SM-OID-007-A	Y5TB8	6/11/10	Surface	12	U	16		1.9	J	6.1	U	6.1	U	6.1	U	6.1	U	6.1	U
OID - North of Site																					
OID-009		SM-OID-009-A	Y5TC3	6/11/10	Surface	13	U	13	U	8.5		6.7	U	6.7	U	6.7	U	6.7	U	6.7	U
		SM-OID-009-B	Y5TC4	6/11/10	2	32	U	32	U	12	J	16	U	16	U	15	J	16	U	16	U
OID-011		SM-OID-011-A	Y5TC7	6/11/10	Surface	11	U	11	U	3.7	J	5.6	U	5.6	U	5.6	U	5.6	U	5.6	U
		SM-OID-011-B	Y5TC8	6/11/10	2	19	U	19	U	4.5	J	9.6	U	9.6	U	1.3	J	9.6	U	9.6	U
OID-013		SM-OID-013-A	Y5TD1	6/11/10	Surface	12	U	12	U	6.2	J	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U
		SM-OID-013-B	Y5TD2	6/11/10	2	15	U	15	U	2.1	J	7.6	U	7.6	U	7.6	U	7.6	U	7.6	U
Lagoon Fingers - Footbridge																					
LGF-001		SM-LGF-001-A	Y5TG8	6/8/10	Surface	17	J	34		5	J	8.9	U	8.9	U	8.9	U	8.9	U	8.9	U
		SM-LGF-001-B	Y5TG9	6/8/10	2	12	U	12	U	5.8	J	6.1	U	6.1	U	6.1	U	0.23	J	6.1	U
LGF-003		SM-LGF-003-A	Y5TH2	6/8/10	Surface	11	U	11	U	1.5	J	5.6	U	5.6	U	5.6	U	5.6	U	5.6	U
	Dup	SM-LGF-103-A	Y5TH4	6/8/10	Surface	14	U	14	U	2.3	J	7	U	7	U	7	U	7	U	7	U
		SM-LGF-003-B	Y5TH3	6/8/10	2	14	U	14	U	2.5	J	7	U	0.69	J	4.2	J	0.44	J	0.23	J
	Dup	SM-LGF-103-B	Y5TH5	6/8/10	2	12	U	12	U	0.92	J	6	U	0.41	J	1.8	J	0.26	J	6	U
Lagoon Fingers - West																					
LGF-005		SM-LGF-005-A	Y5TH9	6/9/10	Surface	24	J	100		13	J	18	U	18	U	18	U	18	U	18	U
		SM-LGF-005-B	Y5TJ0	6/9/10	2	10	U	10	U	2.6	J	5.1	U	5.1	U	5.1	U	5.1	U	5.1	U
LGF-007		SM-LGF-007-A	Y5TJ3	6/9/10	Surface	12	U	12	U	0.96	J	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U
		SM-LGF-007-B	Y5TJ4	6/9/10	2	13	U	13	U	1.7	J	6.4	U	6.4	U	6.4	U	6.4	U	6.4	U
LGF-009		SM-LGF-009-A	Y5TJ7	6/9/10	Surface	13	U	13	U	2	J	6.3	U	6.3	U	6.3	U	6.3	U	6.3	U
		SM-LGF-009-B	Y5TJ8	6/9/10	2	11	U	11	U	2.5	J	5.7	U	5.7	U	5.7	U	5.7	U	5.7	U
Lagoon Fingers - East																					
LGF-011		SM-LGF-011-A	Y5TK1	6/10/10	Surface	12	U	12	U	1.3	J	0.61	J	5.8	U	5.8	U	5.8	U	5.8	U
		SM-LGF-011-B	Y5TK2	6/10/10	2	11	U	11	U	5.5	U	5.5	U	5.5	U	5.5	U	5.5	U	5.5	U
Lagoon - Main																					
LGM-001		SM-LGM-001-A	Y5TD5	6/10/10	Surface	21		45		5.6	J	9.2	U	9.2	U	9.2	U	9.2	U	9.2	U
		SM-LGM-001-B	Y5TD6	6/10/10	2	12	U	12	U	4.8	J	6.2	U	6.2	U	0.29	J	6.2	U	6.2	U
		SM-LGM-001-C	Y5TD7	6/10/10	4	17	U	17	U	7.9	J	8.5	U	8.5	U	8.5	U	8.5	U	8.5	U
LGM-003		SM-LGM-003-A	Y5TE1	6/10/10	Surface	51		96		9.7	J	18	U	7.2	J	18	U	2.2	J	18	U
	Dup	SM-LGM-103-A	Y5TE4	6/10/10	Surface	36		90		5.2	J	16	U	2.1	J	16	U	0.6	J	16	U
		SM-LGM-003-B	Y5TE2	6/10/10	2	13	U	13	U	3.5	J	6.4	U	6.4	U	6.4	U	6.4	U	6.4	U
	Dup	SM-LGM-103-B	Y5TE5	6/10/10	2	15		17		3.4	J	5.9	U	5.9	U	5.9	U	5.9	U	5.9	U
		SM-LGM-003-C	Y5TE3	6/10/10	4	13	U	13	U	2.9	J	6.4	U	6.4	U	6.4	U	6.4	U	6.4	U
	Dup	SM-LGM-103-C	Y5TE6	6/10/10	4	13		28		4.7	J	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U
LGM-005		SM-LGM-005-A	Y5TF0	6/10/10	Surface	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U
		SM-LGM-005-B	Y5TF1	6/10/10	2	19	U	19	U	3.9	J	9.7	U	9.7	U	9.7	U	9.7	U	9.7	U
		SM-LGM-005-C	Y5TF2	6/10/10	4	13	U	13	U	4.3	J	2.6	J	6.5	U	6.5	U	6.5	U	6.5	U
LGM-007		SM-LGM-007-A	Y5TF6	6/9/10	Surface	12	U	12	U	2.3	J	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U
		SM-LGM-007-B	Y5TF7	6/9/10	2	52	U	52	U	26	U	26	U	26	U	26	U	26	U	26	U
		SM-LGM-007-C	Y5TF8	6/9/10	4	13	U	13	U	0.82	J	6.7	U	6.7	U	6.7	U	6.7	U	6.7	U
LGM-009		SM-LGM-009-A	Y5TG2	6/9/10	Surface	22	U	22	U	3	J	11	U	11	U	11	U	11	U	11	U
		SM-LGM-009-B	Y5TG3	6/9/10	2	13	U	13	U	1.4	J	6.5	U	6.5	U	6.5	U	6.5	U	6.5	U
		SM-LGM-009-C	Y5TG4	6/9/10	4	12	U	12	U	2.8	J	6	U	6	U	6	U	6	U	6	U

Notes:
Units are in ug/kg
bgs = below ground surface
Data Qualifiers (Q):

U = The analyte was analyzed for, but was not detected at a level greater than or equal to the detection limit listed in the table.

J = The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (because quality control criteria were not met, or the concentration of the analyte was below the reporting limit).

UJ = The analyte was not detected at a level greater than or equal to the detection limit. However, the reported detection limit is approximate.

TABLE 4
SVOC Analytical Results, Solid Matrix, OID and Lagoon Areas
Halaco Site Remedial Investigation, Oxnard, California

Location ID	Duplicate (Dup)	Sample ID	CLP ID	Sample Date	Depth (ft, bgs)	2-Methyl-naphthalene		4-Methylphenol		Anthracene		Benzaldehyde		Benzo(a)-anthracene		Benzo(a)-pyrene		Benzo(b)-fluoranthene		Benzo(g,h,i)-perylene		Benzo(k)-fluoranthene		Bis(2-ethylhexyl)-phthalate		Butylbenzyl-phthalate		Chrysene		Diethyl-phthalate		Dimethyl-phthalate		Di-n-butyl-phthalate		Fluoranthene		Fluorene		Indeno-(1,2,3-cd)-pyrene		Naphthalene		Phenanthrene		Phenol		Pyrene	
						Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
OID - Site																																																	
OID-001		SM-OID-001-A	Y5T95	6/10/10	Surface	280	U	280	U	280	U	88	J	280	U	280	U	280	U	280	U	280	U	92	J	8.4	J	280	U	280	U	280	U	12	J	280	U	280	U	280	U	280	U	280	U	14	J	280	U
	Dup	SM-OID-101-A	Y5T98	6/10/10	Surface	260	U	260	U	260	U	71	J	260	U	260	U	260	U	260	U	260	U	160	J	18	J	260	U	260	U	260	U	7.7	J	260	U	260	U	260	U	260	U	260	U	11	J	260	U
		SM-OID-001-B	Y5T96	6/10/10	2	220	U	220	U	220	U	92	J	220	U	220	U	220	U	220	U	220	U	97	J	220	U	220	U	220	U	220	U	7.7	J	220	U	220	U	220	U	220	U	220	U	14	J	220	U
	Dup	SM-OID-101-B	Y5T99	6/10/10	2	270	U	270	U	270	U	82	J	270	U	270	U	270	U	270	U	270	U	110	J	270	U	270	U	270	U	270	U	270	U	270	U	270	U	270	U	270	U	270	U	14	J	270	U
		SM-OID-001-C	Y5T97	6/10/10	4	220	U	220	U	220	U	79	J	220	U	220	U	220	U	220	U	220	U	58	J	220	U	220	U	220	U	220	U	7	J	220	U	220	U	220	U	220	U	220	U	9	J	220	U
	Dup	SM-OID-101-C	Y5TA0	6/10/10	4	260	U	260	U	260	U	40	J	260	U	260	U	260	U	260	U	260	U	110	J	260	U	260	U	260	U	260	U	260	U	260	U	260	U	260	U	260	U	260	U	260	U	260	U
OID-003		SM-OID-003-A	Y5TA6	6/11/10	Surface	2200	U	2200	U	2200	U	83	J	2200	U	2200	U	2200	U	2200	UJ	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U
		SM-OID-003-B	Y5TA7	6/11/10	2	1100	U	1100	U	1100	U	79	J	1100	U	1100	U	1100	U	1100	UJ	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U
		SM-OID-003-C	Y5TA8	6/11/10	4	14	J	220	U	220	U	49	J	220	U	220	U	220	U	220	UJ	220	U	59	J	220	U	220	U	220	U	220	U	12	J	6.7	J	8.2	J	220	U	12	J	22	J	11	J	11	J
OID-005		SM-OID-005-A	Y5TB2	6/11/10	Surface	2200	U	2200	U	2200	U	92	J	2200	U	2200	U	2200	U	2200	UJ	2200	U	340	J	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U
		SM-OID-005-B	Y5TB3	6/11/10	2	220	U	220	U	220	U	84	J	220	U	220	U	220	U	220	UJ	220	U	43	J	220	U	220	U	220	U	220	U	13	J	220	U	220	U	220	U	220	U	7.3	J	13	J	220	U
		SM-OID-005-C	Y5TB4	6/11/10	4	260	U	260	U	260	U	72	J	260	U	260	U	260	U	260	UJ	260	U	53	J	260	U	260	U	260	U	260	U	260	U	260	U	260	U	260	U	260	U	260	U	15	J	260	U
OID-007		SM-OID-007-A	Y5TB8	6/11/10	Surface	2100	U	2100	U	2100	U	2100	U	69	J	2100	U	2100	U	2100	U	2100	U	120	J	2100	U	2100	U	2100	U	2100	U	2100	U	2100	U	2100	U	2100	U	2100	U	2100	U	2100	U	2100	U
		SM-OID-007-B	Y5TB9	6/11/10	2	2000	U	2000	U	2000	U	2000	U	2000	U	2000	U	2000	U	2000	UJ	2000	U	2000	U	2000	U	2000	U	2000	U	2000	U	2000	U	2000	U	2000	U	2000	U	2000	U	2000	U	2000	U	2000	U
OID - North of Site																																																	
OID-009		SM-OID-009-A	Y5TC3	6/11/10	Surface	2300	U	2300	U	75	J	100	J	230	J	190	J	240	J	120	J	100	J	240	J	2300	U	180	J	2300	U	2300	U	2300	U	480	J	2300	U	2300	U	2300	U	240	J	2300	U	470	J
		SM-OID-009-B	Y5TC4	6/11/10	2	3800	U	3800	U	3800	U	130	J	3800	U	3800	U	3800	U	3800	UJ	3800	U	3800	U	3800	U	3800	U	3800	U	3800	U	3800	U	3800	U	3800	U	3800	U	3800	U	3800	U	3800	U	3800	U
OID-011		SM-OID-011-A	Y5TC7	6/11/10	Surface	2100	U	2100	U	2100	U	95	J	2100	U	2100	U	2100	U	2100	UJ	2100	U	300	J	2100	U	2100	U	2100	U	2100	U	2100	U	2100	U	2100	U	2100	U	2100	U	2100	U	2100	U	2100	U
		SM-OID-011-B	Y5TC8	6/11/10	2	3000	U	3000	U	3000	U	120	J	90	J	3000	U	3000	U	3000	UJ	3000	U	1000	J	3000	U	3000	U	3000	U	3000	U	3000	U	95	J	3000	U	3000	U	3000	U	3000	U	3000	U	110	J
OID-013		SM-OID-013-A	Y5TD1	6/11/10	Surface	2200	U	2200	U	2200	U	93	J	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U	2200	U
		SM-OID-013-B	Y5TD2	6/11/10	2	260	U	260	U	260	U	48	J	260	U	260	U	260	U	260	UJ	260	U	99	J	260	U	260	U	260	U	260	U	8.4	J	260	U	260	U	260	U	260	U	260	U	11	J	9.9	J
Lagoon Fingers - Footbridge																																																	
LGF-001		SM-LGF-001-A	Y5TG8	6/8/10	Surface	180	U	180	U	180	U	91	J	180	U	180	U	180	U	180	UJ	180	U	39	J	180	U	180	U	180	U	180	U	7.8	J	180	U	180	UJ	180	U	180	U	180	U	11	J	180	U
		SM-LGF-001-B	Y5TG9	6/8/10	2	180	U	180	U	180	U	100	J	7.2	J	180	U	180	U	180	U	180	U	110	J	180	U	180	U	180	U	180	U	11	J	12	J	180	U	180	U	180	U	8.4	J	18	J	21	J
LGF-003		SM-LGF-003-A	Y5TH2	6/8/10	Surface	180	U	180	U	180	U	63	J	180	UJ	180	UJ	180	UJ	180	UJ	180	UJ	28	J	180	UJ	180	UJ	180	UJ	180	UJ	6.8	J	180	UJ	180	UJ	180	UJ	180	U	180	U	6.2	J	180	UJ
	Dup	SM-LGF-103-A	Y5TH4	6/8/10	Surface	180	U	180	U	180	U	76	J	180	UJ	180	U	180	U	180	U	180	U	55	J	180	UJ	180	UJ	180	UJ	180	UJ	10	J	18	J	180	UJ	180	U	180	U	180	U	10	J	15	J
		SM-LGF-003-B	Y5TH3	6/8/10	2	170	U	170	U	170	U	85	J	170	UJ	170	U	170	U	170	UJ	170	U	39	J	170	UJ	170	UJ	170	UJ	170	UJ	10	J	5.2	J	170	U	170	U	170	U	6	J	12	J	6.8	J
	Dup	SM-LGF-103-B	Y5TH5	6/8/10	2	180	U	180	U	180	U	81	J	5.4	J	180	U	180	U	180	U	180	U	92	J	180	UJ	6	J	180	UJ	180	UJ	10	J	8	J	180	U	180	U	180	U	12	J	16	J	14	J
Lagoon Fingers - West																																																	
LGF-005		SM-LGF-005-A	Y5TH9	6/9/10	Surface	420	U	21	J	420	U	150	J	20	J	20	J	32	J	27	J	13	J	370	J	18	J	22	J	420	U	420	U	420	U	31	J	420	U	25	J	420	U	17	J	29	J	41	J
		SM-LGF-005-B	Y5TJ0	6/9/10	2	210	U	210	U	210	U	110	J	210	U	210	U	210	U	210	U	210	U	37	J	210	U	210	U	210	U	210	U	210	U	6.3	J	210	U	210	U	210	U	210	U	19	J	10	J
LGF-007		SM-LGF-007-A	Y5TJ3	6/9/10	Surface	220	U	220	U	220	U	100	J	220	U	220	U	9.6	J	220	U	220	U	200	J	220	U	8.1	J	220	U	220	U	220	U	11	J	220	U	220	U	220	U	11	J	16	J	16	J
		SM-LGF-007-B	Y5TJ4	6/9/10	2	220	U	220	U	220	U	78	J	220	U	220	U	220	U	220	U	220	U	180	J	220	U	220	U	220	U	220	U	9.8	J	220	U	220	U	220	U	220	U	12	J	10	J	220	U
LGF-009		SM-LGF-009-A	Y5TJ7	6/9/10	Surface	230	U	230	U	230	U	89	J	230	U	230	U	230	U	230	U	230	U	180	J	230	U	230	U	230	U	230	U	230	U	230	U	230	U	230	U	230	U	7.5	J	13	J	12	J
		SM-LGF-009-B	Y5TJ8	6/9/10	2	210	U	210	U	210	U	120	J	210	U	210	U	210	U	210	U	210	U	350		210	U	210	U	210	U	210	U	210	U	210	U	210	U	210	U	210	U	6.5	J	15	J	210	U
Lagoon Fingers - East																																																	
LGF-011		SM-LGF-011-A	Y5TK1	6/10/10	Surface	1100	U	1100	U	1100	U	59	J	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	UJ	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U
		SM-LGF-011-B	Y5TK2	6/10/10	2	210	U	210	U	210	U	65	J	210	U	210	U	210	U	210	UJ	210	U	35	J	210	U	210	U	210	U	210	U	210	U	210	U	210	U	210	U	210	U	210	U	9.7	J	210	U
Lagoon - Main																																																	
LGM-001		SM-LGM-001-A	Y5TD5	6/10/10	Surface	240	U	240	U	240	U	52	J	240	U	240	U	10	J	240	U	11	J	220	J	12	J	240	U	240	U	8.4	J	240	U	10	J	240	U	240	U	240	U	240	U	11	J	13	J
		SM-LGM-001-B	Y5TD6	6/10/10	2	210	U	210	U	210	U	42	J	210	U	210	U	210	U	210	U	210	U	80	J	210	U	210	U	210	U	210	U	210	U	210	U	210	U	210	U	210	U	210	U	6.9	J	210	U
		SM-LGM-001-C	Y5TD7	6/10/10	4	280	U	280	U	280	U	82	J	280	U	280	U	280	U	280	U	280	U	130	J	280	U	280	U	280	U	280	U	280	U	280	U	280	U	280	U	280	U	280	U	13	J	280	U
LGM-003		SM-LGM-003-A	Y5TE1	6/10/10	Surface	350	U	99	J	350	U	96	J	23	J	24	J	39	J	33	J	17	J	540		22	J	34	J	350	U	350	U	19	J	63	J	350	U	31	J	350	U	53	J	22	J	75	J
	Dup	SM-LGM-103-A	Y5TE4	6/10/10	Surface	420	U	140	J	420	U	97	J	19	J	18	J	33	J	29	J	420	U	480		420	U	29	J	420	U	420	U	23	J	46	J	420	U	420	U	420	U	420	U	23	J	49	J
		SM-LGM-003-B	Y5TE2	6/10/10	2	1100	U	1100	U	1100	U	57	J	1100	U	1100	U	32	J	1100	U	1100	U	170	J	1100	U	1100	UJ	220	J	1100	U	1100	U	35	J	1100	U	1100	U	1100	U	1100	U	1100	U	34	J
	Dup	SM-LGM-103-B	Y5TE5	6/10/10	2	1100	U	1100	U	1100	U	52	J	1100	U	1100	U	1100	U	1100	U	1100	U	220	J	1100	U	1100	UJ	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U
		SM-LGM-003-C	Y5TE3	6/10/10	4	1000	U	1000	U	1000	U	83	J	1000	U	1000	U	1000	U	1000	U	1000	U	120	J	1000	U	1000	UJ	53	J	1000	U	1000	U	1000	U	1000	U	1000	U	1000	U	1000	U	1000	U	33	J
	Dup	SM-LGM-103-C	Y5TE6	6/10/10	4	1100	U	1100	U	1100	U	50	J	1100	U	1100	U	1100	U	1100	U	1100	U	120	J	1100	U	1100	UJ	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U
LGM-005		SM-LGM-005-A	Y5TF0	6/10/10	Surface	210	U	210	U	210	U	56	J	210	U	210	U	210	U	210	U	210	U	85	J	210	U	210	U	210	U	210	U	6.9	J	210	U	210	U	210	U	210	U	210	U	7.2	J	210	U
		SM-LGM-005-B	Y5TF1	6/10/10	2	250	U	250	U	250	U	33	J	7.5	J	250	U	250	U	250	U	250	U	230	J	15	J	250	U	250	U	250	U	9.9	J	7.6	J	250	U	250	U	250	U	250	U	8.7	J	13	J
		SM-LGM-005-C	Y5TF2	6/10/10	4	1100	U	1100	U	1100	U	60	J	1100	U	1100	U	1100	U	1100	U	1100	U	94	J	1100	U	1100	UJ	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U	1100	U
LGM-007		SM-LGM-007-A	Y5TF6	6/9/10	Surface	230	U	230	U	230	U	86	J	230	U	230	U	230	U	230	U	230	U	250		230	U	230	U	230	U	230	U	230	U	230	U	230	U	230	U	230	U	230	U	11	J	230	U
		SM-LGM-007-B	Y5TF7	6/9/10	2	180	U	180	U	180	U	58	J	180	U	180	U	180	U	180	U	180	U	75	J	180	U	180	U	180	U	180	U	180	U	180	U	180	U	180	U	180	U	180	U	9.4	J	180	U
		SM-LGM-007-C	Y5TF8	6/9/10	4	180	U	180	U	180	U	49	J	180	U	180	U	180	U	180	U	180	U	110	J	180	U	180	U	180	U	180	U	180	U	180	U	180	U	180	U	180	U	180	U	10	J	180	U
LGM-009		SM-LGM-009-A	Y5TG2	6/9/10	Surface	390	U	39	J	390	U	130	J	34	J	38	J	50	J	45	J	21	J	870		390	U	32	J	390	U	390	U	47	J	42	J	390	U	41	J	390	U	22	J	27	J	63	J
		SM-LGM-009-B	Y5TG3	6/9/10	2	220	U	220	U	220	U	90	J	220	U	220	U	220	U	220	U	220	U	110	J	220	U	220	U	220	U	220	U	220	U	220	U	220	U	220	U	220	U	220	U	11	J	220	U
		SM-LGM-009-C	Y5TG4	6/9/10	4	220	U	220	U	220	U	58	J	8.3	J	15	J	12	J	12	J	220	U	140	J	220	U	220	U	220	U	220	U	220	U	220	U	220	U	9.8	J	220	U	220	U	9.3	J	11	J

Notes:
Units are in ug/kg
bgs = below ground surface
Data Qualifiers (Q):
U = The analyte was analyzed for, but was not detected at a level greater than or equal to the detection limit listed in the table.
J = The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (because quality control criteria were not met, or the concentration of the analyte was below the reporting limit).
UJ = The analyte was not detected at a level greater than or equal to the detection limit. However, the reported detection limit is approximate.

TABLE 5
PCB Aroclor Analytical Results, Solid Matrix, OID and Lagoon Areas
Halaco Site Remedial Investigation, Oxnard, California

Location ID	Duplicate (Dup)	Sample Sample ID	CLP ID	Sample Date	Depth (ft, bgs)	Aroclor-1016 Result	Q	Aroclor-1221 Result	Q	Aroclor-1232 Result	Q	Aroclor-1242 Result	Q	Aroclor-1248 Result	Q	Aroclor-1254 Result	Q	Aroclor-1260 Result	Q	Aroclor-1262 Result	Q	Aroclor-1268 Result	Q
OID - Site																							
OID-001		SM-OID-001-A	Y5T95	6/10/10	Surface	5.5	UJ	5.5	UJ	5.5	UJ	5.5	UJ	5.5	UJ	5.5	UJ	5.5	UJ	5.5	UJ	5.5	UJ
	Dup	SM-OID-101-A	Y5T98	6/10/10	Surface	5.1	UJ	5.1	UJ	5.1	UJ	5.1	UJ	5.1	UJ	5.1	UJ	5.1	UJ	5.1	UJ	5.1	UJ
		SM-OID-001-B	Y5T96	6/10/10	2	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ
	Dup	SM-OID-101-B	Y5T99	6/10/10	2	5.4	UJ	5.4	UJ	5.4	UJ	5.4	UJ	5.4	UJ	5.4	UJ	5.4	UJ	5.4	UJ	5.4	UJ
		SM-OID-001-C	Y5T97	6/10/10	4	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ
	Dup	SM-OID-101-C	Y5TA0	6/10/10	4	5.1	UJ	5.1	UJ	5.1	UJ	5.1	UJ	5.1	UJ	5.1	UJ	5.1	UJ	5.1	UJ	5.1	UJ
OID-003		SM-OID-003-A	Y5TA6	6/11/10	Surface	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U
		SM-OID-003-B	Y5TA7	6/11/10	2	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U	4.4	U
		SM-OID-003-C	Y5TA8	6/11/10	4	4.3	U	4.3	U	4.3	U	4.3	U	4.3	U	4.3	U	4.3	U	4.3	U	4.3	U
OID-005		SM-OID-005-A	Y5TB2	6/11/10	Surface	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ
		SM-OID-005-B	Y5TB3	6/11/10	2	4.3	U	4.3	U	4.3	U	4.3	U	4.3	U	4.3	U	4.3	U	4.3	U	4.3	U
		SM-OID-005-C	Y5TB4	6/11/10	4	5.1	U	5.1	U	5.1	U	5.1	U	5.1	U	5.1	U	5.1	U	5.1	U	5.1	U
OID-007		SM-OID-007-A	Y5TB8	6/11/10	Surface	4.1	U	4.1	U	4.1	U	4.1	U	4.1	U	4.1	U	4.1	U	4.1	U	4.1	U
		SM-OID-007-B	Y5TB9	6/11/10	2	3.9	U	3.9	U	3.9	U	3.9	U	3.9	U	3.9	U	3.9	U	3.9	U	3.9	U
OID - North of Site																							
OID-009		SM-OID-009-A	Y5TC3	6/11/10	Surface	4.5	U	4.5	U	4.5	U	4.5	U	4.5	U	4.5	U	4.5	U	4.5	U	4.5	U
		SM-OID-009-B	Y5TC4	6/11/10	2	7.6	U	7.6	U	7.6	U	7.6	U	7.6	U	7.6	U	7.6	U	7.6	U	7.6	U
OID-011		SM-OID-011-A	Y5TC7	6/11/10	Surface	4.2	U	4.2	U	4.2	U	4.2	U	4.2	U	4.2	U	4.2	U	4.2	U	4.2	U
		SM-OID-011-B	Y5TC8	6/11/10	2	5.8	U	5.8	U	5.8	U	5.8	U	5.8	U	5.8	U	5.8	U	5.8	U	5.8	U
OID-013		SM-OID-013-A	Y5TD1	6/11/10	Surface	4.3	U	4.3	U	4.3	U	4.3	U	4.3	U	4.3	U	4.3	U	4.3	U	4.3	U
		SM-OID-013-B	Y5TD2	6/11/10	2	5.1	UR	5.1	UR	5.1	UR	5.1	UR	5.1	UR	5.1	UR	5.1	UR	5.1	UR	5.1	UR
Lagoon Fingers - Footbridge																							
LGF-001		SM-LGF-001-A	Y5TG8	6/8/10	Surface	3.6	U	3.6	U	3.6	U	3.6	U	3.6	U	3.6	U	3.6	U	3.6	U	3.6	U
		SM-LGF-001-B	Y5TG9	6/8/10	2	3.5	U	3.5	U	3.5	U	3.5	U	17		3.5	U	3.5	U	3.5	U	3.5	U
LGF-003		SM-LGF-003-A	Y5TH2	6/8/10	Surface	3.4	U	3.4	U	3.4	U	3.4	U	3.4	U	3.4	U	3.4	U	3.4	U	3.4	U
	Dup	SM-LGF-103-A	Y5TH4	6/8/10	Surface	3.5	U	3.5	U	3.5	U	3.5	U	3.5	U	3.5	U	3.5	U	3.5	U	3.5	U
		SM-LGF-003-B	Y5TH3	6/8/10	2	3.5	U	3.5	U	3.5	U	3.5	U	16		3.5	U	3.5	U	3.5	U	3.5	U
	Dup	SM-LGF-103-B	Y5TH5	6/8/10	2	3.5	U	3.5	U	3.5	U	3.5	U	11	J	3.5	U	3.5	U	3.5	U	3.5	U
Lagoon Fingers - West																							
LGF-005		SM-LGF-005-A	Y5TH9	6/9/10	Surface	8.2	UJ	8.2	UJ	8.2	UJ	8.2	UJ	8.2	UJ	8.2	UJ	8.2	UJ	8.2	UJ	8.2	UJ
		SM-LGF-005-B	Y5TJ0	6/9/10	2	4	U	4	U	4	U	4	U	4	U	4	U	4	U	4	U	4	U
LGF-007		SM-LGF-007-A	Y5TJ3	6/9/10	Surface	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ
		SM-LGF-007-B	Y5TJ4	6/9/10	2	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ
LGF-009		SM-LGF-009-A	Y5TJ7	6/9/10	Surface	4.5	UJ	4.5	UJ	4.5	UJ	4.5	UJ	4.5	UJ	4.5	UJ	4.5	UJ	4.5	UJ	4.5	UJ
		SM-LGF-009-B	Y5TJ8	6/9/10	2	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ
Lagoon Fingers - East																							
LGF-011		SM-LGF-011-A	Y5TK1	6/10/10	Surface	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ
		SM-LGF-011-B	Y5TK2	6/10/10	2	4.1	U	4.1	U	4.1	U	4.1	U	4.1	U	4.1	U	4.1	U	4.1	U	4.1	U
Lagoon - Main																							
LGM-001		SM-LGM-001-A	Y5TD5	6/10/10	Surface	4.8	UJ	4.8	UJ	4.8	UJ	4.8	UJ	4.8	UJ	4.8	UJ	4.8	UJ	4.8	UJ	4.8	UJ
		SM-LGM-001-B	Y5TD6	6/10/10	2	4.1	UJ	4.1	UJ	4.1	UJ	4.1	UJ	4.1	UJ	4.1	UJ	4.1	UJ	4.1	UJ	4.1	UJ
		SM-LGM-001-C	Y5TD7	6/10/10	4	5.4	UJ	5.4	UJ	5.4	UJ	5.4	UJ	5.4	UJ	5.4	UJ	5.4	UJ	5.4	UJ	5.4	UJ
LGM-003		SM-LGM-003-A	Y5TE1	6/10/10	Surface	6.9	UJ	6.9	UJ	6.9	UJ	6.9	UJ	6.9	UJ	6.9	UJ	6.9	UJ	6.9	UJ	6.9	UJ
	Dup	SM-LGM-103-A	Y5TE4	6/10/10	Surface	8.1	UJ	8.1	UJ	8.1	UJ	8.1	UJ	8.1	UJ	8.1	UJ	8.1	UJ	8.1	UJ	8.1	UJ
		SM-LGM-003-B	Y5TE2	6/10/10	2	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ
	Dup	SM-LGM-103-B	Y5TE5	6/10/10	2	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ
		SM-LGM-003-C	Y5TE3	6/10/10	4	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ
	Dup	SM-LGM-103-C	Y5TE6	6/10/10	4	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ
LGM-005		SM-LGM-005-A	Y5TF0	6/10/10	Surface	4.1	UJ	4.1	UJ	4.1	UJ	4.1	UJ	4.1	UJ	4.1	UJ	4.1	UJ	4.1	UJ	4.1	UJ
		SM-LGM-005-B	Y5TF1	6/10/10	2	4.9	UJ	4.9	UJ	4.9	UJ	4.9	UJ	4.9	UJ	4.9	UJ	4.9	UJ	4.9	UJ	4.9	UJ
		SM-LGM-005-C	Y5TF2	6/10/10	4	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ
LGM-007		SM-LGM-007-A	Y5TF6	6/9/10	Surface	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ	4.4	UJ
		SM-LGM-007-B	Y5TF7	6/9/10	2	3.5	UJ	3.5	UJ	3.5	UJ	3.5	UJ	3.5	UJ	3.5	UJ	3.5	UJ	3.5	UJ	3.5	UJ
		SM-LGM-007-C	Y5TF8	6/9/10	4	3.5	UJ	3.5	UJ	3.5	UJ	3.5	UJ	3.5	UJ	3.5	UJ	3.5	UJ	3.5	UJ	3.5	UJ
LGM-009		SM-LGM-009-A	Y5TG2	6/9/10	Surface	7.7	UJ	7.7	UJ	7.7	UJ	7.7	UJ	7.7	UJ	7.7	UJ	7.7	UJ	7.7	UJ	7.7	UJ
		SM-LGM-009-B	Y5TG3	6/9/10	2	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ	4.3	UJ
		SM-LGM-009-C	Y5TG4	6/9/10	4	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ	4.2	UJ

Notes:
Units are in ug/kg
bgs = below ground surface
Data Qualifiers (Q):

U = The analyte was analyzed for, but was not detected at a level greater than or equal to the detection limit listed in this table.

J = The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (because quality control criteria were not met, or the concentration of the analyte was below the reporting limit).

UJ = The analyte was not detected at a level greater than or equal to the detection limit. The reported detection limit is approximate.

R = The data did not meet quality control criteria and are rejected as unusable. The analyte may or may not be present in the sample.

TABLE 6
Dioxin and Furan Analytical Results, Solid Matrix, OID and Lagoon Areas
Halaco Site Remedial Investigation, Oxnard, California

Location ID	Duplicate (Dup)	Sample ID	Sample Date	Depth (ft, bgs)	2,3,7,8-TCDD Result	Q	2,3,7,8-TCDF Result	Q	1,2,3,7,8-PeCDF Result	Q	1,2,3,7,8-PeCDD Result	Q	2,3,4,7,8-PeCDF Result	Q	1,2,3,4,7,8-HxCDF Result	Q	1,2,3,6,7,8-HxCDF Result	Q	1,2,3,4,7,8-HxCDD Result	Q	1,2,3,6,7,8-HxCDD Result	Q	1,2,3,7,8,9-HxCDD Result	Q	2,3,4,6,7,8-HxCDF Result	Q	1,2,3,7,8,9-HxCDF Result	Q	1,2,3,4,6,7,8-HpCDF Result	Q	1,2,3,4,6,7,8-HpCDD Result	Q	1,2,3,4,7,8,9-HpCDF Result	Q	OCDD Result	Q	OCDF Result	Q	Effective 2,3,7,8-TCDD Conccen-tration
WHO 2005 TEF					1		0.1		0.03		1		0.3		0.1		0.1		0.1		0.1		0.1		0.1		0.1		0.01		0.01		0.01		0.0003		0.0003		
OID - Site																																							
OID-001		SM-OID-001-A	35:00.0	Surface	0.22	UJ	0.27	UJ	0.21	UJ	0.22	UJ	0.17	UJ	0.37	UJ	0.32	UJ	0.27	UJ	0.3	UJ	0.29	UJ	0.36	UJ	0.49	UJ	1.13	UJ	1.48	UJ	0.89	UJ	17.5	J	0.31	UJ	0.01
	Dup	SM-OID-101-A	35:00.0	Surface	0.154	J	0.305	J	0.054	UJ	0.066	UJ	0.052	UJ	0.251	J	0.189	UJ	0.068	UJ	0.255	J	0.261	J	0.197	UJ	0.166	J	0.054	UJ	0.074	UJ	0.11	J	17.3	J	1.32	J	0.28
		SM-OID-001-B	35:00.0	2	0.38	UJ	0.38	UJ	0.26	UJ	0.27	UJ	0.23	UJ	0.17	UJ	0.17	UJ	0.19	UJ	0.2	UJ	0.19	UJ	0.19	UJ	0.27	UJ	0.19	UJ	0.19	UJ	0.25	UJ	4.23	UJ	0.62	UJ	-
	Dup	SM-OID-101-B	35:00.0	2	0.217	UJ	0.846	J	0.062	UJ	0.243	UJ	0.061	UJ	0.256	J	0.042	UJ	0.065	UJ	0.201	UJ	0.285	UJ	0.202	UJ	0.233	J	0.049	UJ	0.059	UJ	0.11	UJ	14.5	J	0.579	J	0.14
		SM-OID-001-C	35:00.0	4	0.073	UJ	0.088	UJ	0.078	UJ	0.12	UJ	0.061	UJ	0.1	UJ	0.106	UJ	0.11	UJ	0.11	UJ	0.11	UJ	0.045	UJ	0.15	UJ	0.21	UJ	0.078	UJ	0.31	UJ	0.12	UJ	0.19	UJ	-
	Dup	SM-OID-101-C	35:00.0	4	0.171	J	0.251	UJ	0.047	UJ	0.053	UJ	0.045	UJ	0.17	J	0.105	UJ	0.064	UJ	0.132	UJ	0.176	J	0.157	UJ	0.156	J	0.067	UJ	0.069	UJ	0.101	UJ	0.14	UJ	0.292	J	0.22
OID-003		SM-OID-003-A	20:00.0	Surface	0.24	UJ	0.28	UJ	0.33	UJ	0.25	UJ	0.28	UJ	0.14	UJ	0.13	UJ	0.29	UJ	0.33	UJ	0.31	UJ	0.13	UJ	0.22	UJ	0.39	UJ	0.3	UJ	0.61	UJ	0.63	UJ	0.33	UJ	-
		SM-OID-003-B	20:00.0	2	0.46	UJ	0.7	UJ	0.28	UJ	0.23	UJ	0.22	UJ	0.19	UJ	0.19	UJ	0.21	UJ	0.24	UJ	0.23	UJ	0.19	UJ	0.25	UJ	0.44	UJ	0.36	UJ	0.54	UJ	10.9	J	0.38	UJ	0.00
		SM-OID-003-C	20:00.0	4	0.27	UJ	0.43	UJ	0.35	UJ	0.32	UJ	0.32	UJ	0.16	UJ	0.16	UJ	0.32	UJ	0.31	UJ	0.31	UJ	0.17	UJ	0.24	UJ	0.27	UJ	0.28	UJ	0.36	UJ	0.57	UJ	0.55	UJ	-
OID-005		SM-OID-005-A	05:00.0	Surface	0.23	UJ	0.571	J	0.45	UJ	0.29	UJ	1.25	J	1.16	J	1.09	J	0.6	UJ	0.68	UJ	0.64	UJ	0.71	UJ	0.9	UJ	4.53	J	14.1	J	2.2	UJ	129	J	9.76	J	0.89
		SM-OID-005-B	05:00.0	2	0.32	UJ	0.54	UJ	0.28	UJ	0.37	UJ	0.508	UJ	0.26	UJ	0.2	UJ	0.25	UJ	0.27	UJ	0.26	UJ	0.25	UJ	0.33	UJ	0.24	UJ	0.35	UJ	0.3	UJ	2.05	J	0.53	UJ	0.00
		SM-OID-005-C	05:00.0	4	0.227	J	0.314	J	0.042	UJ	0.039	UJ	0.041	UJ	0.22	J	0.028	UJ	0.041	UJ	0.174	J	0.211	J	0.027	UJ	0.185	J	0.036	UJ	0.039	UJ	0.193	J	0.06	UJ	0.24	J	0.34
OID-007		SM-OID-007-A	35:00.0	Surface	0.265	J	0.761	J	0.044	UJ	0.053	UJ	0.042	UJ	1.82	J	0.047	UJ	0.06	UJ	1.88	J	1.51	J	0.047	UJ	0.313	J	9.54	J	35.3	J	1.02	J	382	J	22.3	J	1.47
		SM-OID-007-B	35:00.0	2	0.266	J	0.877	J	0.042	UJ	0.047	UJ	0.041	UJ	2.48	J	0.052	UJ	0.067	UJ	2.35	J	1.66	J	0.052	UJ	0.261	J	10.9	J	45.5	J	1.15	J	516	J	25.9	J	1.77
OID - North of Site																																							
OID-009		SM-OID-009-A	16:00.0	Surface	0.254	J	0.56	J	0.038	UJ	0.419	UJ	0.036	UJ	0.461	J	0.031	UJ	0.036	UJ	0.648	J	0.56	J	0.033	UJ	0.176	UJ	0.051	UJ	10.9	J	0.298	UJ	97.9	J	4.9	J	0.62
		SM-OID-009-B	16:00.0	2	0.251	J	0.491	J	0.048	UJ	0.334	UJ	0.046	UJ	1.14	J	0.044	UJ	0.054	UJ	0.714	J	0.67	J	0.041	UJ	0.207	UJ	5.27	J	11.5	J	0.324	UJ	142	J	6.58	J	0.76
OID-011		SM-OID-011-A	50:00.0	Surface	0.175	J	0.337	J	0.056	UJ	0.053	UJ	0.052	UJ	0.465	J	0.043	UJ	0.05	UJ	0.852	J	0.739	J	0.041	UJ	0.178	UJ	0.053	UJ	11.9	J	0.28	J	98.8	J	2.6	J	0.57
		SM-OID-011-B	50:00.0	2	1.4	J	1.27	J	0.053	UJ	0.06	UJ	0.054	UJ	4.42	J	0.078	UJ	0.12	UJ	16.3	J	18.7	J	0.081	UJ	0.333	UJ	62.6	J	430	J	12.4	UJ	5030	J	364	J	12.01
OID-013		SM-OID-013-A	15:00.0	Surface	0.167	J	0.423	J	0.045	UJ	0.07	UJ	0.042	UJ	0.444	J	0.04	UJ	0.051	UJ	0.575	J	0.57	J	0.038	UJ	0.236	J	0.084	UJ	6.78	J	0.263	J	56.5	J	3.75	J	0.48
		SM-OID-013-B	15:00.0	2	0.137	J	0.379	J	0.073	UJ	0.432	UJ	0.07	UJ	0.317	J	0.05	UJ	0.079	UJ	0.253	UJ	0.243	J	0.047	UJ	0.17	J	0.071	UJ	0.088	UJ	0.163	J	58.5	J	2.58	J	0.27
Lagoon Fingers - Footbridge																																							
LGF-001		SM-LGF-001-A	40:00.0	Surface	0.262	J	2.1	J	1.96	J	1.65	J	3.66	J	9.51	J	5.34	J	0.26	UJ	6.75	J	6.7	J	5.8	J	0.795	J	47.1	J	165	J	3.82	J	1240	J	104	J	9.33
		SM-LGF-001-B	40:00.0	2	1.95	J	97	J	71.7	J	9.31	J	120	J	346	J	134	J	11.6	J	28.2	J	34	J	169	J	8.1	J	747	J	284	J	96.5	J	2180	J	763	J	144.36
LGF-003		SM-LGF-003-A	30:00.0	Surface	0.372	J	2.47	J	3.23	J	1.95	J	6.31	J	0.43	UJ	0.37	UJ	0.24	UJ	5.99	J	6.7	J	1.78	J	0.512	J	53.7	J	109	J	5.5	J	875	J	73.8	J	8.02
	Dup	SM-LGF-103-A	30:00.0	Surface	0.12	UJ	3.85	J	5.81	J	3.24	J	12.6	J	31.8	J	15.8	J	4.89	J	10.5	J	12.2	J	17.5	J	0.703	J	88.7	J	184	J	9.57	J	1500	J	136	J	20.23
		SM-LGF-003-B	30:00.0	2	0.406	J	16.1	J	10.5	J	2.09	J	18.3	J	47.7	J	18.4	J	0.41	UJ	9.08	J	6.76	J	22.5	J	1.04	J	101	J	89.2	J	13.4	J	685	J	106	J	22.73
	Dup	SM-LGF-103-B	30:00.0	2	0.14	UJ	0.906	J	1.08	J	0.575	UJ	2.31	J	5.15	J	2.71	J	0.3	UJ	0.32	UJ	0.31	UJ	2.81	J	0.225	J	13.5	J	29.6	J	1.8	J	306	J	21.9	J	2.45
Lagoon Fingers - West																																							
LGF-005		SM-LGF-005-A	20:00.0	Surface	0.44	J	1.28	J	1.2	J	3.29	J	1.81	J	4.97	J	3.67	J	0.38	UJ	12.1	J	10.7	J	3.91	J	0.27	UJ	59.8	J	298	J	4.25	J	2770	J	158	J	12.47
		SM-LGF-005-B	20:00.0	2	0.419	J	4.1	J	6.13	J	1.38	J	8.16	J	30.8	J	10.4	J	0.43	UJ	15.2	J	5.06	J	10.4	J	0.718	J	100	J	459	J	9.45	J	5770	J	108	J	19.55
LGF-007		SM-LGF-007-A	28:00.0	Surface	0.058	UJ	0.15	UJ	0.17	J	0.11	UJ	0.257	J	0.27	UJ	0.23	UJ	0.219	UJ	0.19	UJ	0.18	UJ	0.25	UJ	0.35	UJ	0.17	UJ	6.82	J	0.27	UJ	79	J	0.15	UJ	0.17
		SM-LGF-007-B	28:00.0	2	0.085	UJ	0.12	UJ	0.146	J	0.078	UJ	0.195	UJ	0.177	UJ	0.166	UJ	0.157	UJ	0.12	UJ	0.11	UJ	0.135	UJ	0.189	UJ	0.079	UJ	0.412	J	0.214	UJ	0.18	UJ	0.14	UJ	0.01
LGF-009		SM-LGF-009-A	06:00.0	Surface	0.069	UJ	0.11	UJ	0.12	UJ	0.254	UJ	0.118	UJ	0.211	UJ	0.158	UJ	0.205	UJ	0.167	UJ	0.18	UJ	0.0916	UJ	0.113	UJ	0.11	UJ	4.07	J	0.165	UJ	33.7	J	2.44	UJ	0.05
		SM-LGF-009-B	06:00.0	2	0.058	UJ	0.084	UJ	0.096	UJ	0.096	UJ	0.067	UJ	0.172	J	0.169	J	0.085	UJ	0.098	UJ	0.092	UJ	0.1	UJ	0.15	UJ	0.055	UJ	1.1	J	0.154	UJ	0.081	UJ	0.088	UJ	0.05
Lagoon Fingers - East																																							
LGF-011		SM-LGF-011-A	30:00.0	Surface	0.067	UJ	0.11	UJ	0.12	UJ	0.12	UJ	0.09	UJ	0.11	UJ	0.1	UJ	0.312	UJ	0.398	UJ	0.12	UJ	0.1	UJ	0.14	UJ	0.19	UJ	8.81	J	0.28	UJ	72	J	9.01	J	0.11
		SM-LGF-011-B	30:00.0	2	0.13	UJ	0.16	UJ	0.095	J	0.086	J	0.06	J	0.07	UJ	0.062	UJ	0.11	UJ	0.11	J	0.11	J	0.055	UJ	0.089	UJ	0.099	J	0.348	UJ	0.14	UJ	0.23	UJ	0.13	UJ	0.13
Lagoon - Main																																							
LGM-001		SM-LGM-001-A	20:00.0	Surface	0.12	UJ	1.05	J	0.24	UJ	0.24	UJ	2.85	J	7.24	J	4.02	UJ	0.38	UJ	5.34	J	5.75	J	4.16	J	0.574	UJ	33.3	J	137	J	0.76	UJ	1340	J	88.4	J	5.34
		SM-LGM-001-B	20:00.0	2	0.097	UJ	0.648	J	0.15	UJ	0.16	UJ	0.348	UJ	1.09	UJ	0.335	J	0.22	UJ	0.24	UJ	0.23	UJ	0.613	J	0.34	UJ	0.29	UJ	2.18	J	0.616	J	17.8	J	0.42	UJ	0.19
		SM-LGM-001-C	20:00.0	4	0.15	J	0.0723	UJ	0.14	UJ	0.12	J	0.081	UJ	0.16	UJ	0.08	UJ	0.15	UJ	0.16	J	0.506	UJ	0.13	J	0.2	UJ	0.253	UJ	0.633	J	0.27	UJ	0.16	UJ	0.64	UJ	0.31
LGM-003		SM-LGM-003-A	24:00.0	Surface	0.1	UJ	0.514	UJ	0.936	J	1.22	J	0.99	J	3.5	J	2	J	0.37	UJ	6.79	J	5.54	J	2.36	J	0.73	UJ	27.8	J	265	J	2.05	J	2030	J	90.8	J	7.15
	Dup	SM-LGM-103-A	24:00.0	Surface	0.32	UJ	1.01	J	1.2	J	2.01	J	1.98	J	5.18	J	1.98	J	0.78	UJ	5.94	J	5.22	J	3.21	J	0.87	UJ	40.2	J	138	J	0.999	UJ	1380	J	132	J	7.13
		SM-LGM-003-B	24:00.0	2	0.1	J	0.49	J	0.721	UJ	0.41	UJ	1.3	J	2.24	J	1.15	J	0.54	J	1.06	J	0.794	J	1.69	J	0.52	UJ	6.6	J	13.8	J	0.33	UJ	113	J	9.75	J	1.53
	Dup	SM-LGM-103-B	24:00.0	2	2.43	J	77	J	52.1	J	8.47	J	94.6	J	267	J	105	J	10.3	J	27.9	J	32.4	J	128	J	41.1	J	566	J	359	J	62.4	J	3300	J	522	J	120.73
		SM-LGM-003-C	24:00.0	4	0.2	UJ	3.23	J	3.73	J	1.6	J	8.02	J	24.3	J	9.81	J	0.27	UJ	0.32	UJ	0.3	UJ	11.5	J	1.2	J	50.1	J	46.9	J	7.12	J	405	J	69.4	J	10.31
	Dup	SM-LGM-103-C	24:00.0	4	0.11	UJ	0.16	UJ	0.26	UJ	0.15	UJ	0.22	UJ	0.689	UJ	0.425	J	0.21	UJ	0.24	UJ	0.22	UJ	0.15	UJ	0.19	UJ	0.39	UJ	0.24	UJ	0.58	UJ	26.9	J	0.2	UJ	0.05
LGM-005		SM-LGM-005-A	30:00.0	Surface	0.59	UJ	0.63	UJ	0.43	UJ	0.61	UJ	0.38	UJ	0.38	UJ	0.41	UJ	0.34	UJ	0.4	UJ	0.37	UJ	0.45	UJ	0.72	UJ	0.42	UJ	2.29	J	0.59	UJ	8.65	UJ	0.62	UJ	0.02
		SM-LGM-005-B	30:00.0	2	0.83	UJ	4.95	J	7.19	J	5.32	J	14.1	J	34.3	J	16.3	J	8.39	J	15.9	J	20.1	J	18.1	J	4.9	UJ	93.1	J	322	J	2.8	UJ	2930	J	211	J	26.66
		SM-LGM-005-C	30:00.0	4	0.055	UJ	0.094	UJ	0.324	UJ	0.055	UJ	0.07	UJ	0.13	UJ	0.325	J	0.205	J	0.14	UJ	0.364	UJ	0.11	UJ	0.145	UJ	0.11	UJ	1.11	UJ	0.21	UJ	0.13	UJ	1.33	UJ	0.05
LGM-007		SM-LGM-007-A	18:00.0	Surface	0.053	UJ	0.144	UJ	0.116	UJ	0.07	UJ	0.142	UJ	0.179	UJ	0.126	J	0.231	UJ	0.097	UJ	0.19	UJ	0.12	UJ	0.15	UJ	0.068	UJ	0.14	UJ	0.1	UJ	24.9	J	1.83	UJ	0.02
		SM-LGM-007-B	18:00.0	2	0.54	UJ	0.57	UJ	0.47	UJ	0.34	UJ	0.38	UJ	0.29	UJ	0.24	UJ	0.24	UJ	0.25	UJ	0.24	UJ	0.29	UJ	0.45	UJ	0.28	UJ	0.72	UJ	0.37	UJ	0.43	UJ	0.63	UJ	-
		SM-LGM-007-C	18:00.0	4	0.05	UJ	0.064	UJ	0.113	UJ	0.063	UJ	0.108	UJ	0.121	UJ	0.0322	UJ	0.0947	J	0.0543	UJ	0.052	UJ	0.056	UJ	0.078	UJ	0.205	UJ	0.12	UJ	0.107	UJ	0.26	UJ	0.17	UJ	0.01
LGM-009		SM-LGM-009-A	45:00.0	Surface	0.26	UJ	1.38	J	1	UJ	2.5	UJ	2.21	J	4.39	J	2.85	J	6.49	J	9	J	8.32	J	3.63	J	1.1	UJ	55.6	J	277	J	1.9	UJ	3020	J	199	J	8.56
		SM-LGM-009-B	45:00.0	2	0.147	UJ	0.085	UJ	0.098	UJ	0.212	UJ	0.073	UJ	0.215	UJ	0.182	UJ	0.13	UJ	0.205	UJ	0.311	UJ	0.161	UJ	0.137	UJ	1.5	UJ	0.11	UJ	0.38	UJ	45.9	J	0.5	UJ	0.01
		SM-LGM-009-C	45:00.0	4	0.048	UJ	0.3	UJ	0.11	UJ	0.073	UJ	0.079	UJ	0.331	UJ	0.229	J	0.0735	UJ	0.075	UJ	0.072	UJ	0.181	UJ	0.0784	UJ	0.2	UJ	0.2	UJ	0.27	UJ	0.18	UJ	0.16	UJ	0.02

Notes:
Units are in ng/kg
bgs = below ground surface
WHO 2005 TEF = Word Health Organization 2005 Toxicity Equivalency Factor
Data Qualifiers (Q):
U = The analyte was analyzed for, but was not detected at a level greater than or equal to the detection limit listed in this table.
J = The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (because quality control criteria were not met, or the concentration of the analyte was below the reporting limit).
UJ = The analyte was not detected at a level greater than or equal to the detection limit. However, the reported detection limit is approximate.

TABLE 7
TPH Analytical Results, Solid Matrix, OID and Lagoon Areas
Halaco Site Remedial Investigation, Oxnard, California

Location ID	Duplicate (Dup)	Sample ID	Sample Date	Depth (ft, bgs)	TPH as Gasoline Result	Q	TPH as Diesel Result	Q	TPH as Motor Oil Result	Q
OID - Site										
OID-001		SM-OID-001-A	6/10/10	0-0.5	9.8	U	24	U	97	U
	Dup	SM-OID-101-A	6/10/10	0-0.5	10	U	24	U	95	U
		SM-OID-001-B	6/10/10	2-2.5	7	U	20	U	80	U
	Dup	SM-OID-101-B	6/10/10	2-2.5	11	U	23		1000	
		SM-OID-001-C	6/10/10	4-4.5	6.2	U	19	U	78	U
	Dup	SM-OID-101-C	6/10/10	4-4.5	9.4	U	21	U	84	U
OID-003		SM-OID-003-A	6/11/10	0-0.5	7.9	U	20	U	78	U
		SM-OID-003-B	6/11/10	2-2.5	6.5	U	6.4	U	26	U
		SM-OID-003-C	6/11/10	4-4.5	6.6	U	20	U	79	U
OID-005		SM-OID-005-A	6/11/10	0-0.5	5.9	U	63		830	
		SM-OID-005-B	6/11/10	2-2.5	6.9	U	6.6	U	25	
		SM-OID-005-C	6/11/10	4-4.5	9.3	U	7.4	U	29	U
OID-007		SM-OID-007-A	6/11/10	0-0.5	5.1	U	5.9	U	24	U
		SM-OID-007-B	6/11/10	2-2.5	5.9	U	9.8	U	220	
OID - North of Site										
OID-009		SM-OID-009-A	6/11/10	0-0.5	6.6	U	19	U	640	
		SM-OID-009-B	6/11/10	2-2.5	13	U	9.4	U	38	U
OID-011		SM-OID-011-A	6/11/10	0-0.5	5.9	U	19	U	470	
		SM-OID-011-B	6/11/10	2-2.5	13	U	20		200	
OID-013		SM-OID-013-A	6/11/10	0-0.5	6.7	U	35		400	
		SM-OID-013-B	6/11/10	2-2.5	10	U	7.8	U	31	U
Lagoon Fingers - Footbridge										
LGF-001		SM-LGF-001-A	6/8/10	0-0.5	62	U	50		270	
		SM-LGF-001-B	6/8/10	2-2.5	13	U	28	U	60	
LGF-003		SM-LGF-003-A	6/8/10	0-0.5	14	U	26	U	63	
	Dup	SM-LGF-103-A	6/8/10	0-0.5	16	U	30	U	68	
		SM-LGF-003-B	6/8/10	2-2.5	18	U	31	U	65	
	Dup	SM-LGF-103-B	6/8/10	2-2.5	8.7		30	U	120	U
Lagoon Fingers - West										
LGF-005		SM-LGF-005-A	6/9/10	0-0.5	27	U	42		640	
		SM-LGF-005-B	6/9/10	2-2.5	5.8	U	19		380	
LGF-007		SM-LGF-007-A	6/9/10	0-0.5	6	U	6.2	U	37	
		SM-LGF-007-B	6/9/10	2-2.5	6.5	U	6.1	U	24	U
LGF-009		SM-LGF-009-A	6/9/10	0-0.5	5.3		6.2	U	60	
		SM-LGF-009-B	6/9/10	2-2.5	3.4		18	U	71	U
Lagoon Fingers - East										
LGF-011		SM-LGF-011-A	6/10/10	0-0.5	6	U	19	U	65	
		SM-LGF-011-B	6/10/10	2-2.5	6.2	U	19	U	75	U
Lagoon - Main										
LGM-001		SM-LGM-001-A	6/10/10	0-0.5	12	U	27		300	
		SM-LGM-001-B	6/10/10	2-2.5	6	U	18	U	68	
		SM-LGM-001-C	6/10/10	4-4.5	9.6	U	25	U	99	U
LGM-003		SM-LGM-003-A	6/10/10	0-0.5	18	U	110		490	
	Dup	SM-LGM-103-A	6/10/10	0-0.5	28	U	22		150	
		SM-LGM-003-B	6/10/10	2-2.5	6.7	U	17		330	
	Dup	SM-LGM-103-B	6/10/10	2-2.5	6.7	U	29		480	
		SM-LGM-003-C	6/10/10	4-4.5	6.1	U	23	U	470	
	Dup	SM-LGM-103-C	6/10/10	4-4.5	5.8	U	19	U	76	
LGM-005		SM-LGM-005-A	6/10/10	0-0.5	6.6	U	18	U	74	U
		SM-LGM-005-B	6/10/10	2-2.5	17	U	35	U	230	
		SM-LGM-005-C	6/10/10	4-4.5	6.7	U	18	U	73	U
LGM-007		SM-LGM-007-A	6/9/10	0-0.5	3.6		19	U	76	U
		SM-LGM-007-B	6/9/10	2-2.5	4.1		16	U	65	U
		SM-LGM-007-C	6/9/10	4-4.5	5.5		16	U	120	
LGM-009		SM-LGM-009-A	6/9/10	0-0.5	15	U	110		870	
		SM-LGM-009-B	6/9/10	2-2.5	3.5		19	U	45	
		SM-LGM-009-C	6/9/10	4-4.5	3.3		18	U	71	U

Notes:
Units are in mg/kg
bgs = below ground surface
Data Qualifiers (Q):

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

TABLE 8

Sediment Sample Water Depths and Elevations, OID and Lagoon Areas

Halaco Site Remedial Investigation, Oxnard, California

Sample Area	Sample Location	Water Depth (feet)	Sample Elevation (feet)
Oxnard Industrial Drain	OID-1	8	0.4
	OID-2	8.33	0.1
	OID-3	8.92	-0.5
	OID-4	9	-0.6
	OID-5	7.75	0.7
	OID-6	8.33	0.1
	OID-7	6	2.4
	OID-8	5.17	3.3
	OID-9	6	2.4
	OID-10	6.33	2.1
	OID-11	4.42	4
	OID-12	5.42	3
	OID-13	6.5	1.9
	OID-14	5.83	2.6
Lagoon Fingers	LGF-1	5.25	3.2
	LGF-2	3.67	4.8
	LFG-3	3.42	5
	LGF-4	3.42	5
	LGF-5	4.42	4
	LGF-6	4.25	4.2
	LGF-7	4.75	3.7
	LGF-8	4.58	3.8
	LGF-9	4.17	4.3
	LGF-10	5.25	3.2
	LGF-11	6.67	1.8
	LGF-12	6.58	1.8
Lagoon Main	LGM-1	5.17	3.3
	LGM-2	5.42	3
	LGM-3	3.08	5.3
	LGM-4	4.17	4.3
	LGM-5	2.5	5.9
	LGM-6	5	3.4
	LGM-7	4	4.4
	LGM-8	3.83	4.6
	LGM-9	4.42	4
	LGM-10	4.5	3.9

Note:

Surface Water Elevation = 8.42 feet, 1988 NAVD

TABLE 9

Range of Metals Concentrations Detected in WMU Process Waste and Potential Background Soils

Halaco Site Remedial Investigation, Oxnard, California

Area (samples)	Material	Depth (bgs)	Locations	Samples	Value	Magnesium	Aluminum	Iron	Calcium	Sodium	Barium	Potassium	Manganese	Copper	Zinc	Lead	Chromium	Nickel	Vanadium	Beryllium	Antimony	Arsenic	Cadmium	Cobalt	Silver	Selenium	Mercury	Thallium
Waste Management Unit																												
WMU	Waste	0, 5, 30, and	9	36	High	248,000	214,000	10,300	16,500	14,500	15,500	12,300	14,400	10,100	7,100	577	891	515	114	151	76.9	28.0	26.5	16.6	26.2	3.6	0.093	0.094
(WMU A/B/C/D)		35 feet			Median	119,500	94,850	6,685	4,775	4,425	4,145	3,790	3,245	2,530	2,120	297	244	116	59.3	20.5	11.8	5.9	5.7	5.6	5.1	2.4	0.040	0.031
					Average	125,211	110,592	6,902	5,753	4,925	4,485	4,162	3,607	3,037	2,308	299	285	138	60.1	28.6	13.5	8.7	6.1	5.8	8.2	2.2	0.045	0.039
					Low	12,700	6,120	3,770	1,580	145	537	353	340	97.6	138	23.7	13.7	11.6	12.5	4.6	1.3	1.3	0.57	1.0	0.38	0.35	0.019	0.015
Potential Background Soil Concentrations																												
Beach Dunes	Sand	Surface, 2 feet	14	14	High	1,780	1,790	6,200	10,100	482	148	433	92	3.7	12.1	3.4	14.5	4.3	32.8	0.11	0.16	2.2	0.11	1.5	ND	ND	0.060	0.090
and Wetlands					Median	1,040	1,460	4,020	5,130	188	33	356	49	2.3	8.9	1.8	4.2	3.7	5.7	0.08	0.08	1.6	0.08	1.1	ND	ND	0.026	0.031
(BBG-1A --> -6A)					Average	1,149	1,486	4,212	5,697	204	46	351	61	2.3	9.0	1.9	5.5	3.4	10.6	0.08	0.10	1.5	0.08	1.1	ND	ND	0.028	0.043
(WLE-1B--> -8B)					Low	643	965	2,570	2,650	62	10	238	35	1.4	6.0	0.9	2.1	2.3	3.4	0.06	0.08	0.9	0.04	0.7	ND	ND	0.011	0.019
NCL North	Silt and	Surface, 0.1 foot	9	12	High	4,910	8,640	16,100	6,220	1,100	137	3,540	282	18.6	64.2	12.2	15.4	15.9	28.8	0.49	0.33	2.9	0.76	6.0	8.3	0.80	0.051	0.210
(NNB-1A --> -6A)	clay				Median	4,350	7,165	14,550	5,480	261	112	3,340	248	15.3	57.7	10.5	13.3	14.1	24.0	0.40	0.24	2.5	0.69	5.3	8.3	0.58	0.035	0.150
(NNL-1A-->3A)					Average	4,337	7,273	14,383	5,398	402	115	3,303	232	15.6	57.7	10.1	13.0	13.8	23.6	0.39	0.23	2.5	0.68	5.2	8.3	0.58	0.031	0.139
(NNL-1B-->3B)					Low	3,550	6,080	12,700	4,590	153	102	2,980	131	13.7	52.0	7.5	10.9	11.3	20.0	0.33	0.15	2.2	0.62	4.3	8.3	0.44	0.015	0.087
NCL North/East	Silt and	2 feet	8	8	High	8,140	12,800	23,000	27,200	6,470	146	3,880	399	19.5	59.2	8.1	15.4	20.6	30.3	0.59	0.30	3.9	0.87	8.2	0.2	0.76	0.052	0.230
(NNL-1C --> -4C)	clay				Median	6,595	8,990	17,900	13,700	3,760	124	3,285	272	15.2	47.5	5.7	14.3	17.3	27.6	0.46	0.21	3.4	0.66	6.7	0.2	0.48	0.022	0.200
(NEL-53C --> 54C)					Average	6,679	9,331	18,350	15,159	3,705	123	3,326	298	15.2	49.0	6.0	14.2	17.1	27.3	0.47	0.20	3.3	0.71	6.5	0.2	0.52	0.029	0.200
(NEL-60C --> -61C)					Low	5,780	7,390	15,200	8,470	1,220	96	2,920	249	12.1	43.3	4.9	12.7	13.9	24.2	0.37	0.11	2.6	0.60	5.3	0.2	0.45	0.016	0.170
Sand[a]				20	95% UTL	1,900	2,000	6,500	11,000	1,100	135	510	104	3.4	13.3	3.4	14.0	4.3	32.8	0.13	0.79	2.7	0.14	1.6	NA	NA	0.11	0.10
Soil (Silt and Clay)[b]				20	95% UTL	8,430	12,100	22,300	27,200	9,550	149	3,910	399	20.2	69.7	14.4	17.0	21.2	32.5	0.60	0.37	4.0	0.87	8.1	NA	0.80	0.05	0.27
Ratio Between WMU Process Waste and Potential Background Soil Concentrations																												
Beach Dunes	Sand	Surface, 2 feet	14	14	Median	115	65	1.7	0.93	24	124	11	67	1100	238	165	58	31	10	247	142	3.7	71	5.0	NA	NA	1.6	1.0
NCL North	Silt/Clay	Surface, 0.1 foot	9	12	Median	27	13	0.5	0.87	17	37	1.1	13	166	37	28	18	8.2	2.5	51	50	2.4	8.3	1.0	0.61	4.1	1.1	0.21
NCL North/East	Silt/Clay	2 feet	8	8	Median	18	11	0.4	0.35	1.2	33	1.2	12	167	45	52	17	6.7	2.2	45	58	1.7	8.6	0.83	26	5.0	1.8	0.16

Notes:

Units are in mg/kg.

95% UTL = 95 Percent Upper Tolerance Limit

NA = not applicable

ND = not detected

[a]Sand 95% UTL calculated from the 14 samples listed in this table and also the following 6 samples from the Integrated Assessment: SDB31 through SDB36.

[b]Soil 95% UTL calculated from the 20 samples listed in this table.

Figures

Aerial image © Google Earth, 2007. Annotation by CH2M HILL, 2008.

FIGURE 1a
Halaco Superfund Site Areas
Halaco Site Remedial Investigation
Oxnard, California

CH2MHILL

WB012009003SCO385135.FI.01 Halaco_site_v4.ai 2/11

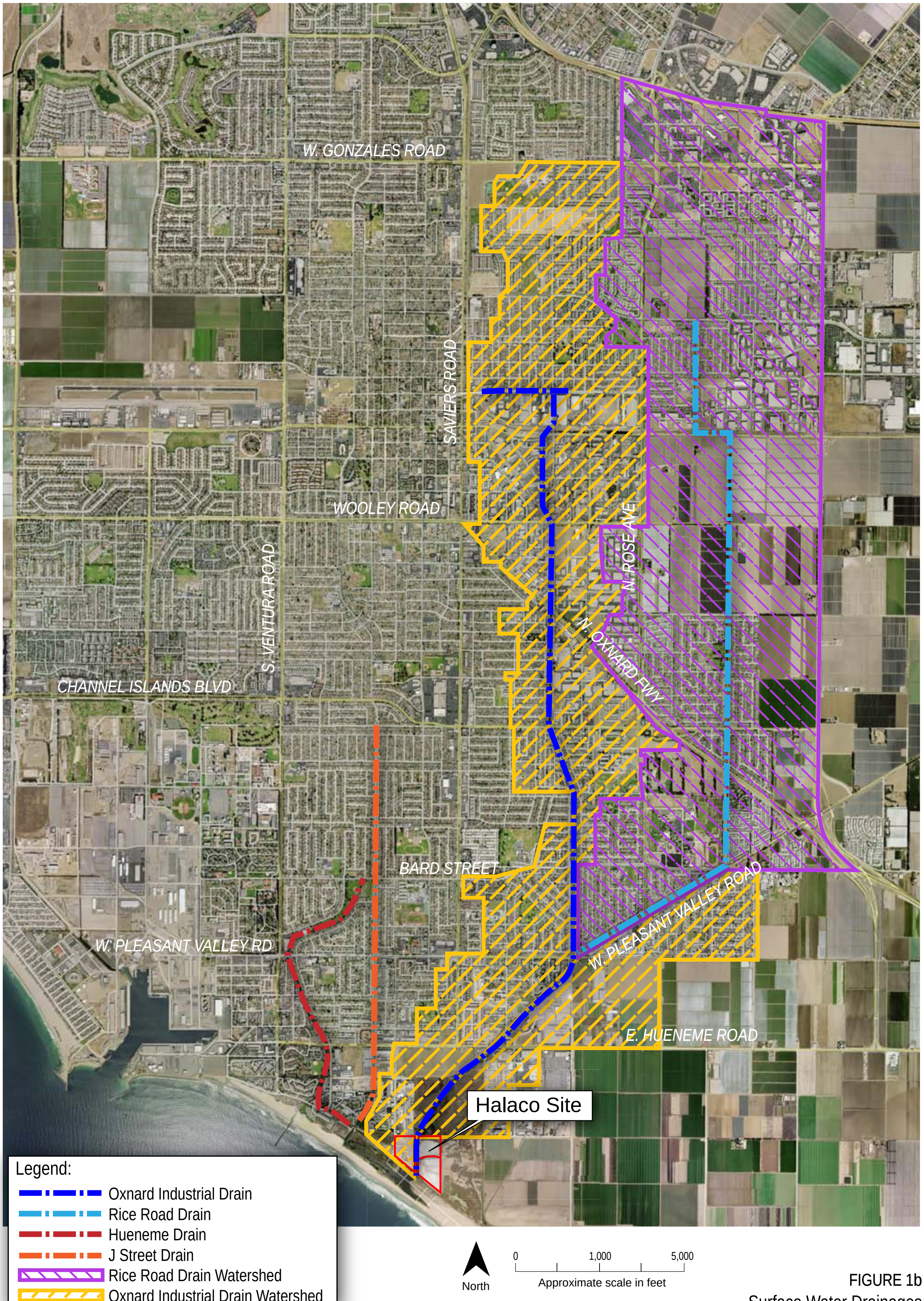
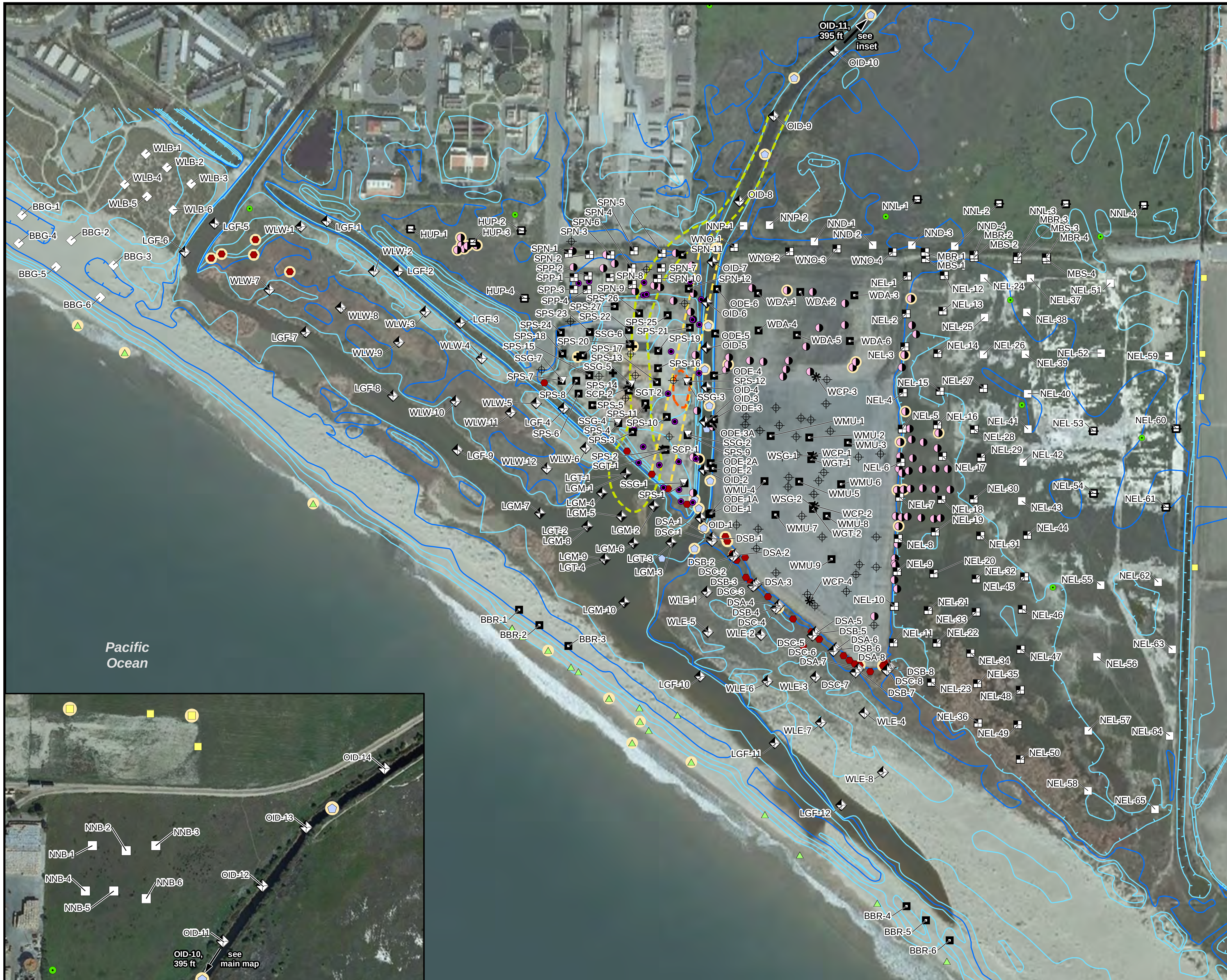


FIGURE 1b
Surface Water Drainages
Halaco Site, Oxnard, California

Source: Modified from TetraTech, 2006
Aerial image © Google Earth, 2008. Annotation by CH2M HILL, 2011.

CH2MHILL



LEGEND

2010 Remedial Investigation Locations

Matrix	Sample Depth (ft bgs)
Soil	0
Sediment	0
Soil	0,2
Sediment	0,2
Soil	0,0,2
Soil	Deep
Sediment	0,2,4
Soil Gas	5
Soil Gas	5,15,30
CPT	Continuous

Historical Sample Locations

Integrated Assessment Report Investigation (Weston, 2007)

- Surface Sediment Sample (SDF)
- Residential Sample (SSR)
- Agricultural Sample (SSA)
- Soil Sample (SSN)
- Soil Boring (SSN)
- Soil Boring (SW)
- Wetlands Sediment Sample (SWL)
- Beach Sediment Sample (SDB)
- Waste Samples from Smelter Area (SWF)
- Surface Sample analyzed by lab

Southeast Smelter Investigation (EPA, 2007)

- SE Smelter Sample Location

Ormand Beach Wetlands Restoration Investigation (AMEC, 2006)

- AMEC Sample Location

Historical OID Alignment

- 1929 OID
- 1959 OID
- 1969 Pond

Ground Elevation Contours (ft msl) (AMEC, 2006)

- 2 ft Contour
- 10 ft Contour

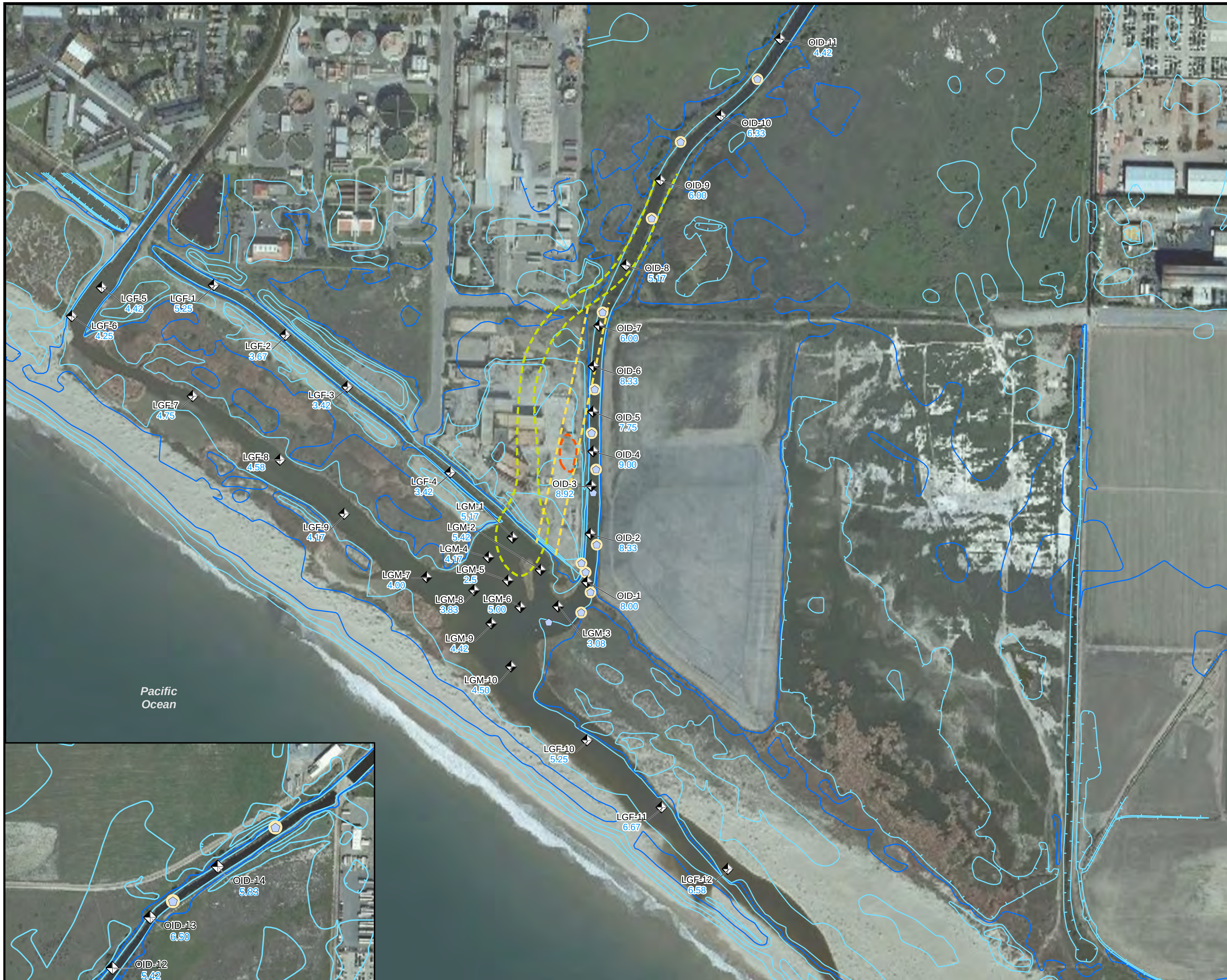
N

0 200 400
Feet
1 inch = 400 feet

FIGURE 2
Solid Matrix and Soil Gas Sample Locations, All RI Locations

HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

\\ICONIA\GROUPS\EMS\PROJECTS\HALACO\MAPFILES\REPORTS\HALACO_FIG2_SOILSAMPLES.MXD SWOLFSKI 1/11/2011 16:20:16



LEGEND

2010 Remedial Investigation Locations

Matrix	Sample Depth (ft bgs)
Sediment	0,2
Sediment	0,2,4

Historical Sample Locations
Integrated Assessment Report Investigation (Weston, 2007)

Surface Sediment Sample (SDF)

Surface Sample analyzed by lab

Historical OID Alignment

1929 OID

1959 OID

1969 Pond

Ground Elevation Contours (ft msl) (AMEC, 2006)

2 ft Contour

10 ft Contour

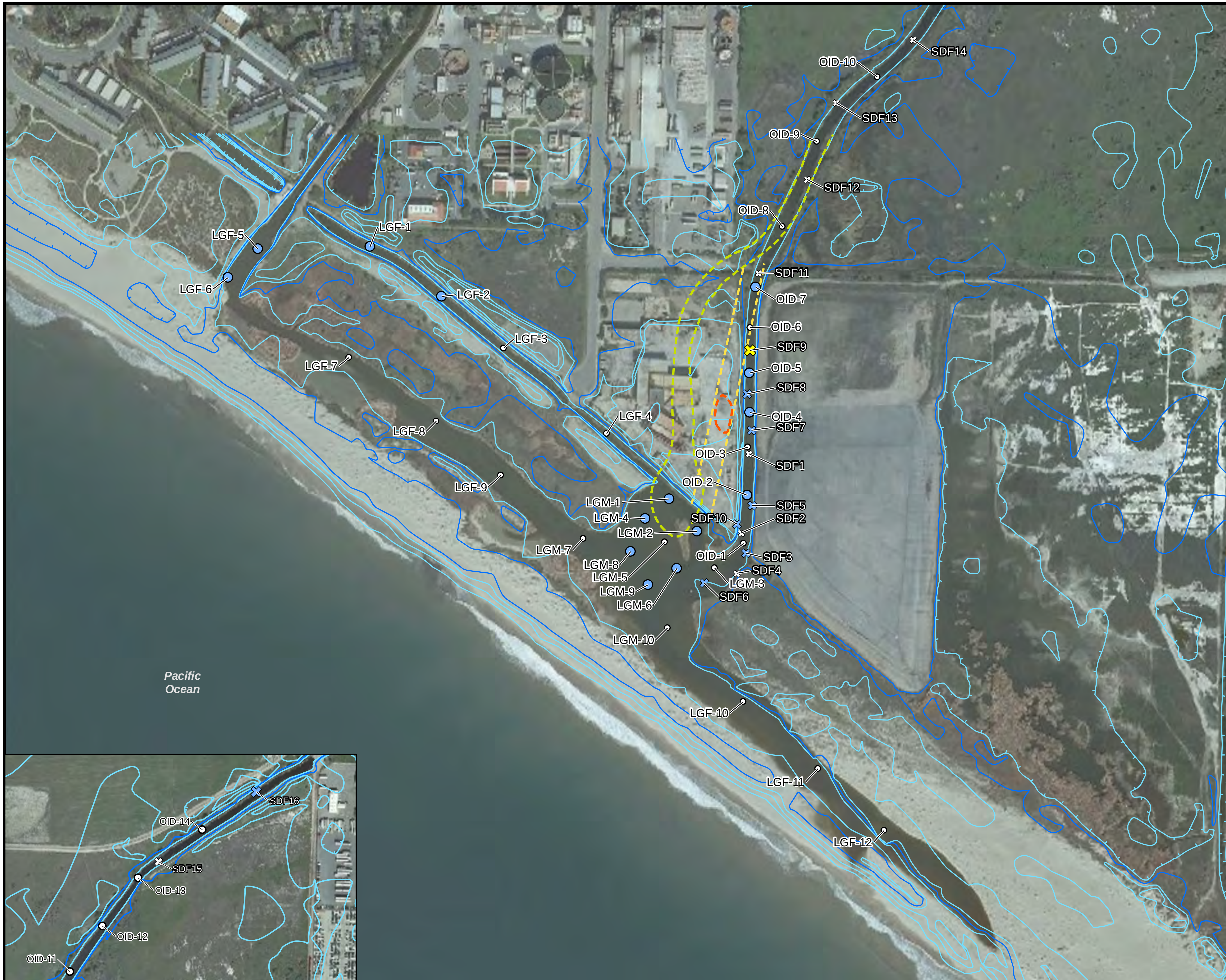
LGM-1 — Sample Location ID
5.17 — Water Depth during Sample Collection (ft)

N

0 200 400
Feet
1 inch = 400 feet

FIGURE 3
Solid Matrix Sample Locations, OID and Lagoon Areas
HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

\\MNSDOLXP322579\DOCUMENTS AND SETTINGS\SWOLFSKI\MY DOCUMENTS\GIS_PROJECTS\HALACO\MAPFILES\REPORTS\OID\HALACO_FIG3_OID_WATERDEPTH.MXD SWOLFSKI 1/25/2011 07:11:51



LEGEND

Lead Concentrations (mg/kg)

2010 RI Sample Locations

- <14
- 14 - 100
- 100 - 400
- 400 - 800
- >800

Historical Sample Locations

- <14
- 14 - 100
- 100 - 400
- 400 - 800
- >800

Historical OID Alignment

- 1929 OID
- 1959 OID
- 1969 Pond

Ground Elevation Contours (ft msl) (AMEC, 2006)

- 2 ft Contour
- 10 ft Contour

N

0 200 400

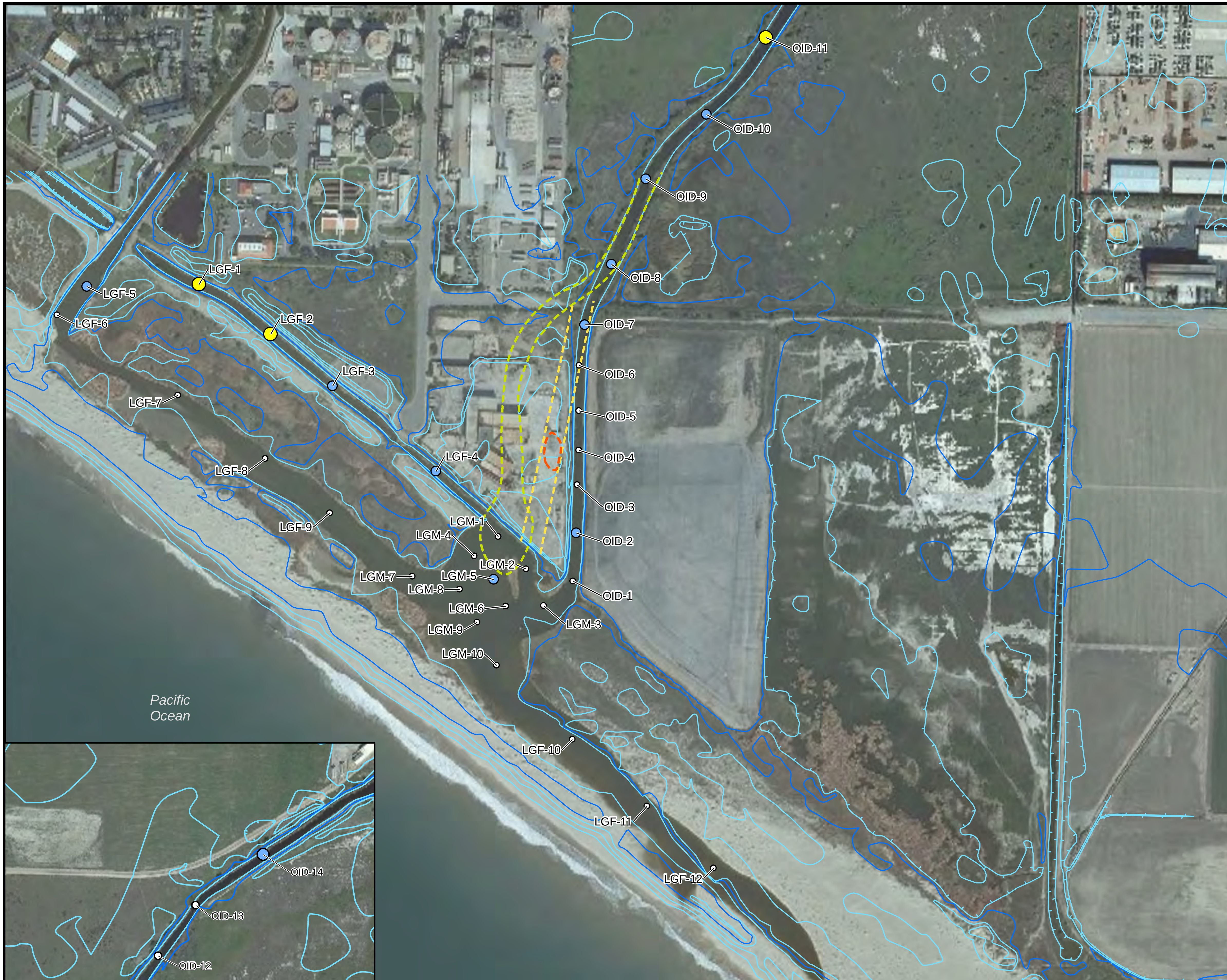
Feet

1 inch = 400 feet

FIGURE 4a
Lead Solid Matrix Concentrations, OID and Lagoon Areas, Surface Samples

HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

\\MNSDOLXP322579\DOCUMENTS AND SETTINGS\SWOLFSKI\MY DOCUMENTS\GIS_PROJECTS\HALACO\MAPFILES\REPORTS\OID\HALACO_FIG4A_OID_LEADSURFACE.MXD SWOLFSKI 2/16/2011 10:20:00



LEGEND

Lead Concentrations (mg/kg)

2010 RI Sample Locations

- <14
- 14 - 100
- 100 - 400
- 400 - 800
- >800

Historical OID Alignment

- 1929 OID
- 1959 OID
- 1969 Pond

Ground Elevation Contours (ft msl) (AMEC, 2006)

- 2 ft Contour
- 10 ft Contour

Note:
- Subsurface samples collected at 2 ft bgs

N

0 200 400
Feet
1 inch = 400 feet

FIGURE 4b
Lead Solid Matrix Concentrations, OID and Lagoon Areas, B Interval

HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

\\MNSDOLXP322579\DOCUMENTS AND SETTINGS\SWOLFSKI\MY DOCUMENTS\GIS_PROJECTS\HALACO\MAPFILES\REPORTS\OID\HALACO_FIG4B_OID_LEADB.MXD SWOLFSKI 2/16/2011 10:30:24

LEGEND

Lead Concentrations (mg/kg)

2010 RI Sample Locations

- <14
- 14 - 100
- 100 - 400
- 400 - 800
- >800

Historical OID Alignment

- 1929 OID
- 1959 OID
- 1969 Pond

Ground Elevation Contours (ft msl) (AMEC, 2006)

- 2 ft Contour
- 10 ft Contour

Note:
- Subsurface samples collected at 4 ft bgs

N

0 200 400
Feet
1 inch = 400 feet

FIGURE 4c
Lead Solid Matrix Concentrations, OID and Lagoon Areas, C Interval

HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

\\MNSDOLXP322579\DOCUMENTS AND SETTINGS\SWOLFSKI\MY DOCUMENTS\GIS_PROJECTS\HALACO\MAPFILES\REPORTS\OID\HALACO_FIG4C_OID_LEADC.MXD SWOLFSKI 2/16/2011 10:37:54

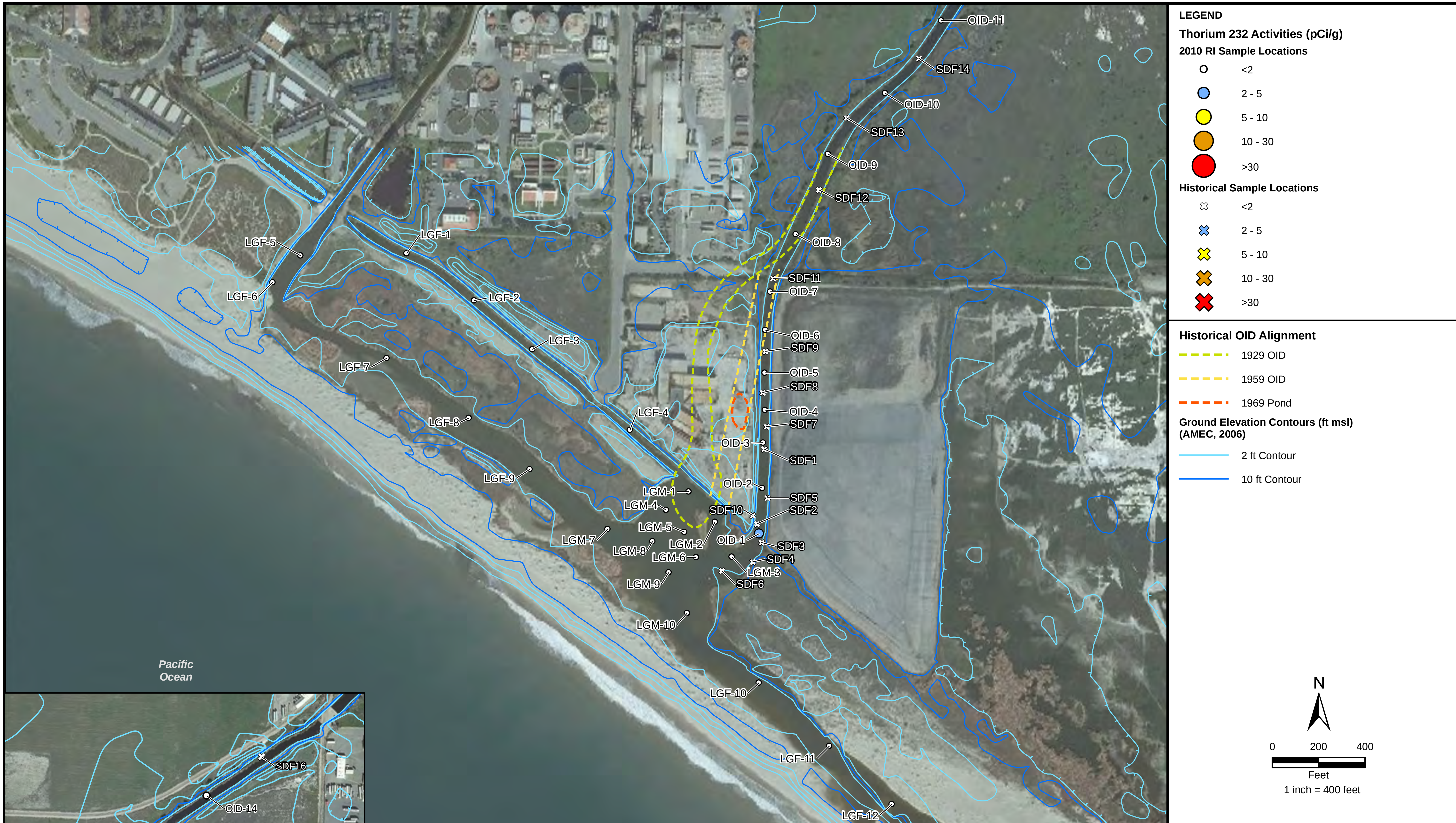
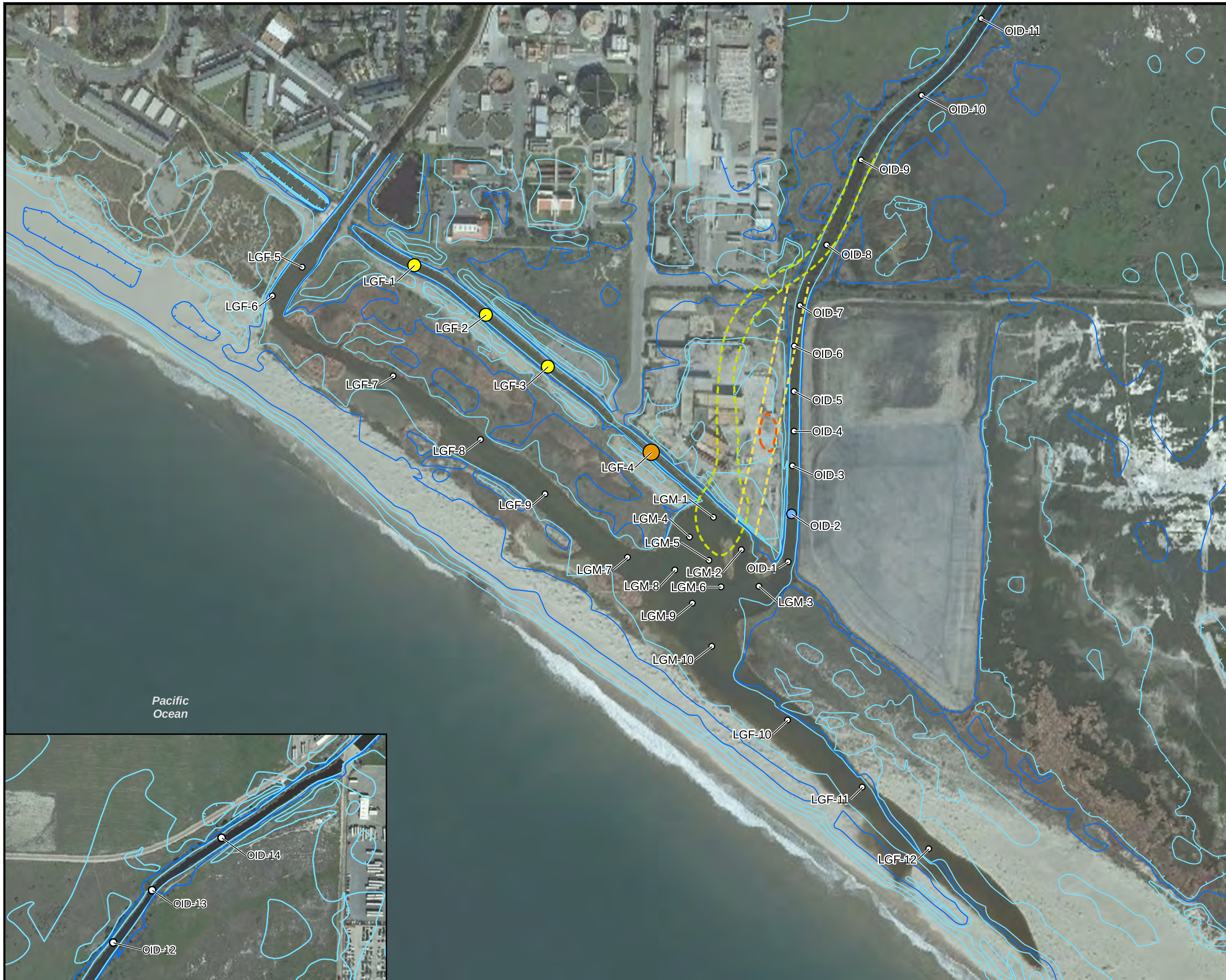


FIGURE 5a
Thorium 232 Solid Matrix Activities, OID and Lagoon Areas, Surface Samples
HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

\\MNSDOLXP322579\DOCUMENTS AND SETTINGS\SWOLFSKI\MY DOCUMENTS\GIS_PROJECTS\HALACO\MAPFILES\REPORTS\OID\HALACO_FIG5A_OID_RADSURFACE.MXD SWOLFSKI 1/25/2011 08:54:11



LEGEND

Thorium 232 Activities (pCi/g)

2010 RI Sample Locations

- <2
- 2 - 5
- 5 - 10
- 10 - 30
- >30

Historical OID Alignment

- 1929 OID
- 1959 OID
- 1969 Pond

Ground Elevation Contours (ft msl) (AMEC, 2006)

- 2 ft Contour
- 10 ft Contour

Note:
- Subsurface samples collected at 2 ft bgs

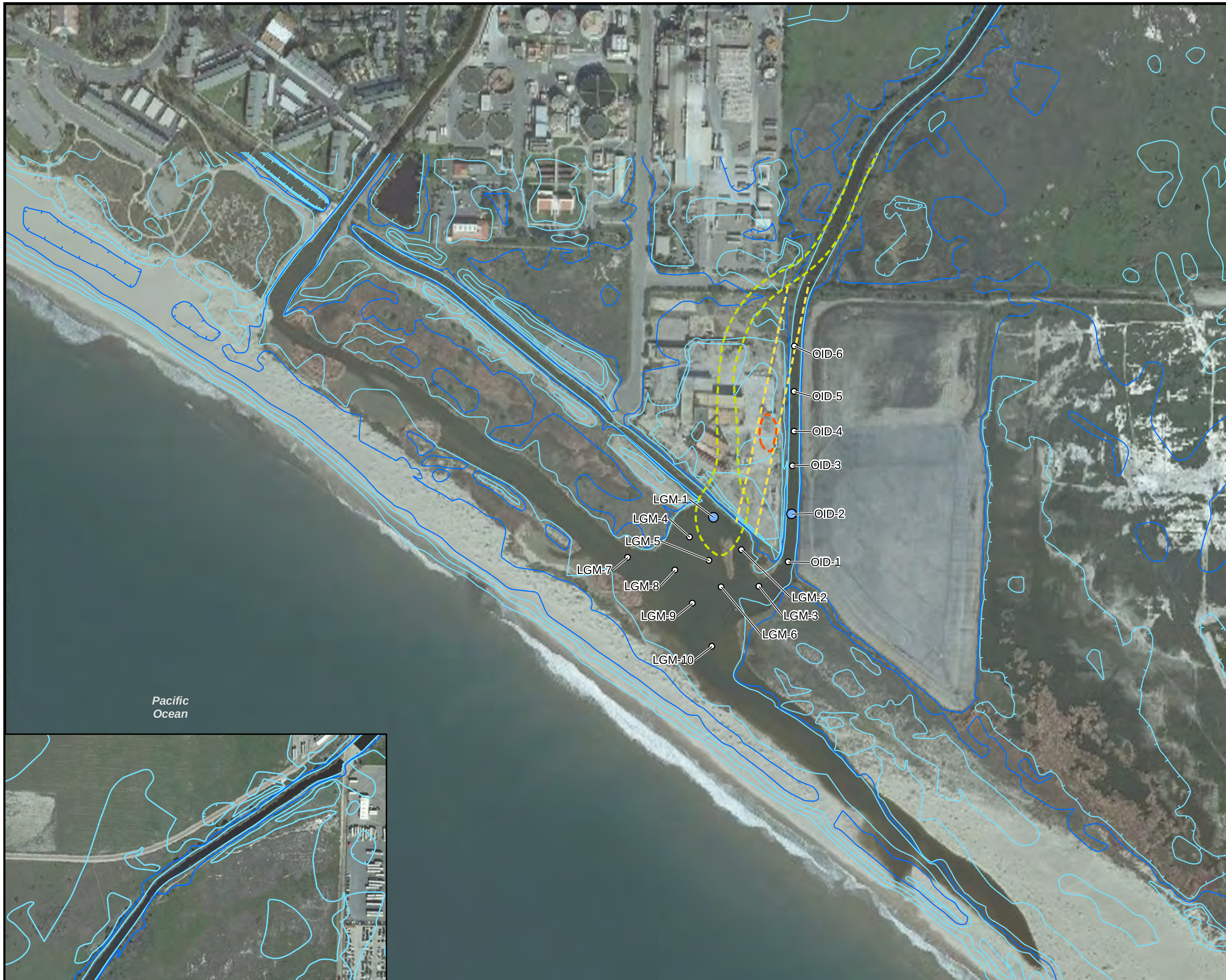
N

0 200 400
Feet
1 inch = 400 feet

FIGURE 5b
Thorium 232 Solid Matrix Activities, OID and Lagoon Areas, B Interval

HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

\\MNSDOLXP322579\DOCUMENTS AND SETTINGS\SWOLFSKI\MY DOCUMENTS\GIS_PROJECTS\HALACO\MAPFILES\REPORTS\OID\HALACO_FIG5B_OID_RADB.MXD SWOLFSKI 2/16/2011 11:07:57



LEGEND

Thorium 232 Activities (pCi/g)

2010 RI Sample Locations

- <2
- 2 - 5
- 5 - 10
- 10 - 30
- >30

Historical OID Alignment

- 1929 OID
- 1959 OID
- 1969 Pond

Ground Elevation Contours (ft msl) (AMEC, 2006)

- 2 ft Contour
- 10 ft Contour

Note:
- Subsurface samples collected at 4 ft bgs

N

0 200 400
Feet
1 inch = 400 feet

FIGURE 5c
Thorium 232 Solid Matrix Activities, OID and Lagoon Areas, C Interval

HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

\\MNSDOLXP322579\DOCUMENTS AND SETTINGS\SWOLFSKI\MY DOCUMENTS\GIS_PROJECTS\HALACO\MAPFILES\REPORTS\OID\HALACO_FIG5C_OID_RADC.MXD SWOLFSKI 2/16/2011 11:12:14

Attachment A
Historical Aerial Photographs

TS-AMD-82043
May 1982

PHOTOGRAPHIC ANALYSIS OF A WASTE DISPOSAL SITE

Ventura County, California

by

D. R. Williams
Environmental Programs
Lockheed Engineering and Management Services Company, Inc.
Las Vegas, Nevada 89114

Contract No. 68-03-3049

Project Officer

C. E. Lake
Advanced Monitoring Systems Division
Environmental Monitoring Systems Laboratory
Las Vegas, Nevada 89114

ENVIRONMENTAL MONITORING SYSTEMS LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY
LAS VEGAS, NEVADA 89114

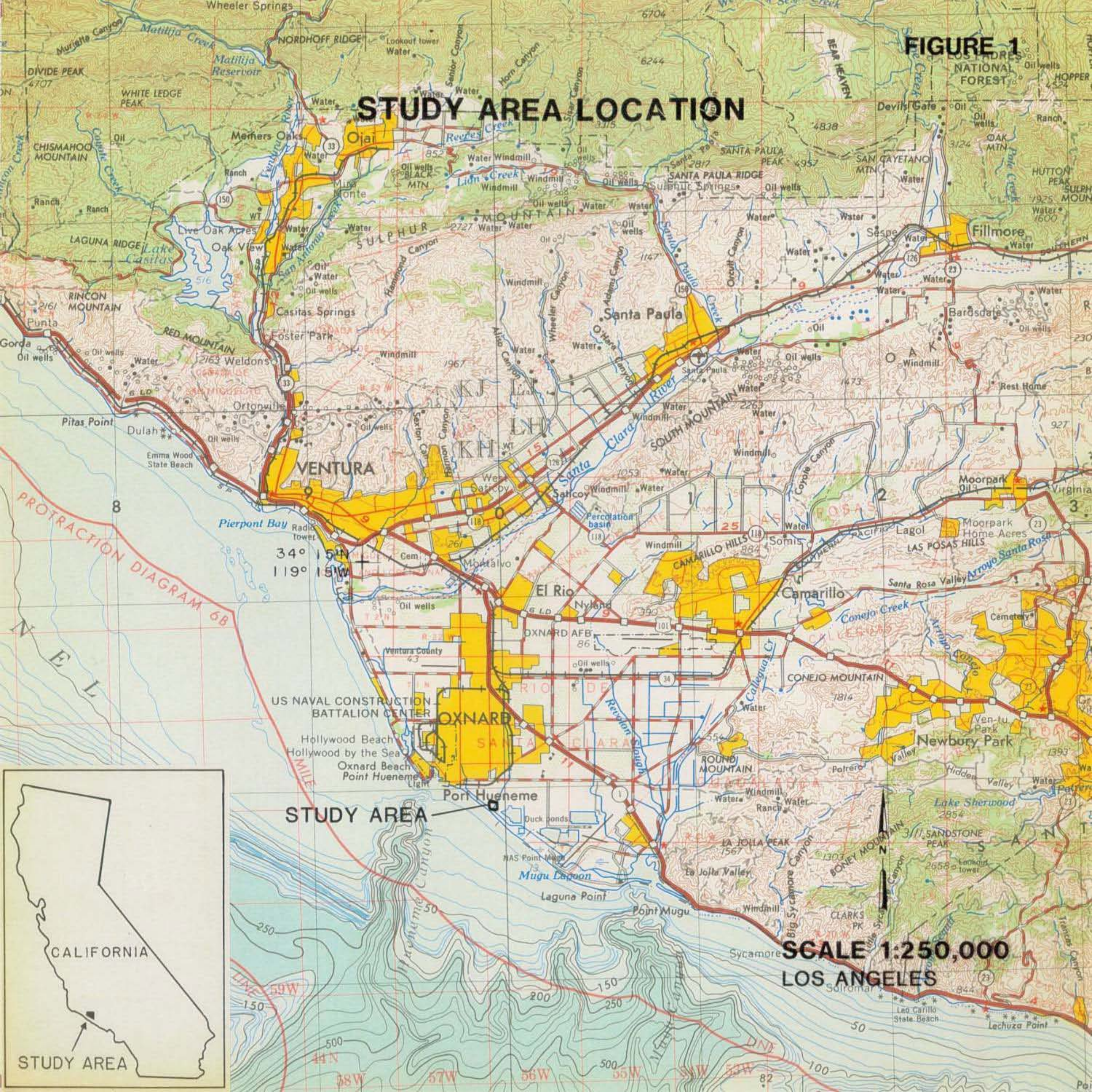


FIGURE 1

STUDY AREA LOCATION

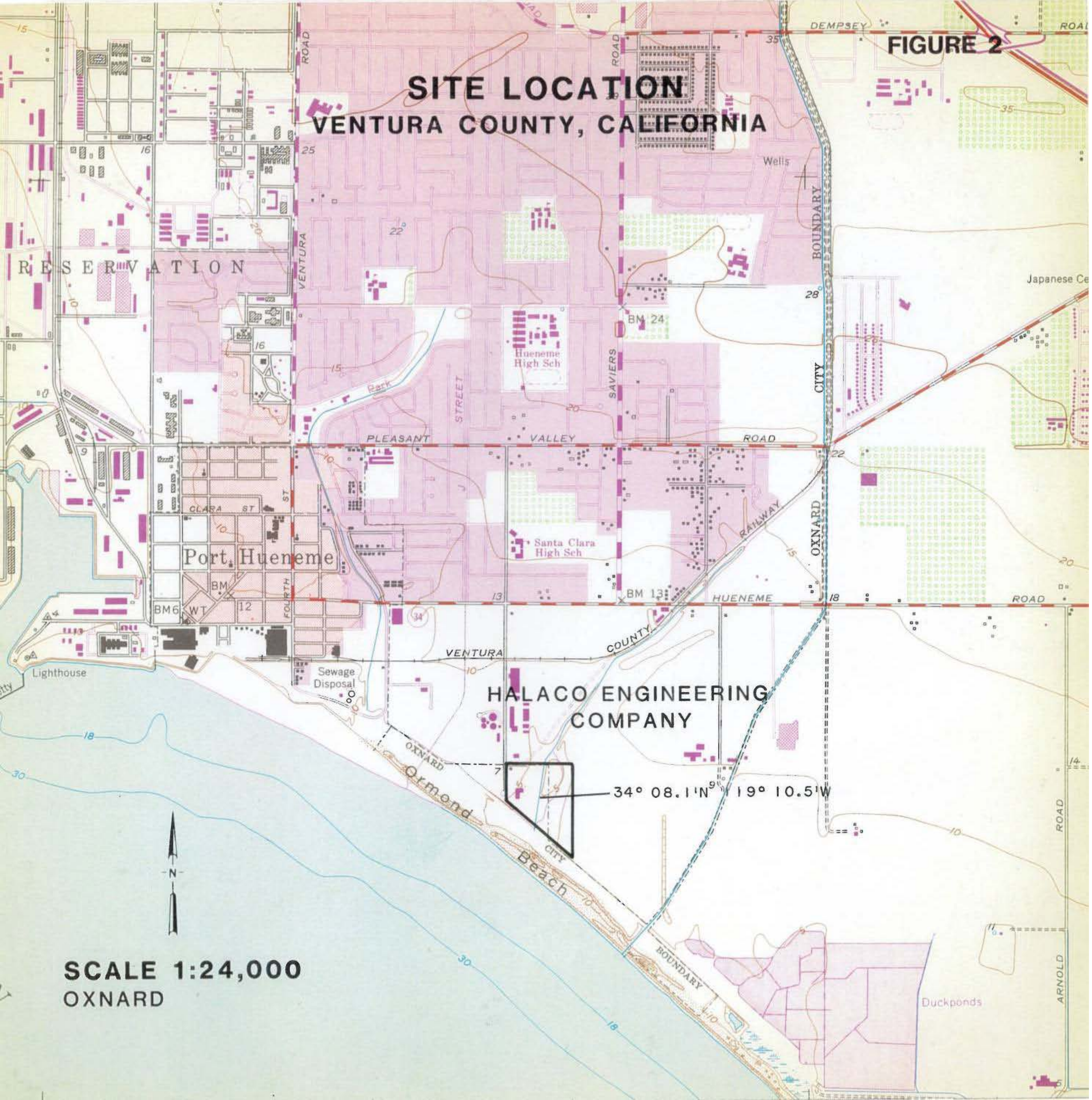


FIGURE 2
SITE LOCATION
VENTURA COUNTY, CALIFORNIA

1929

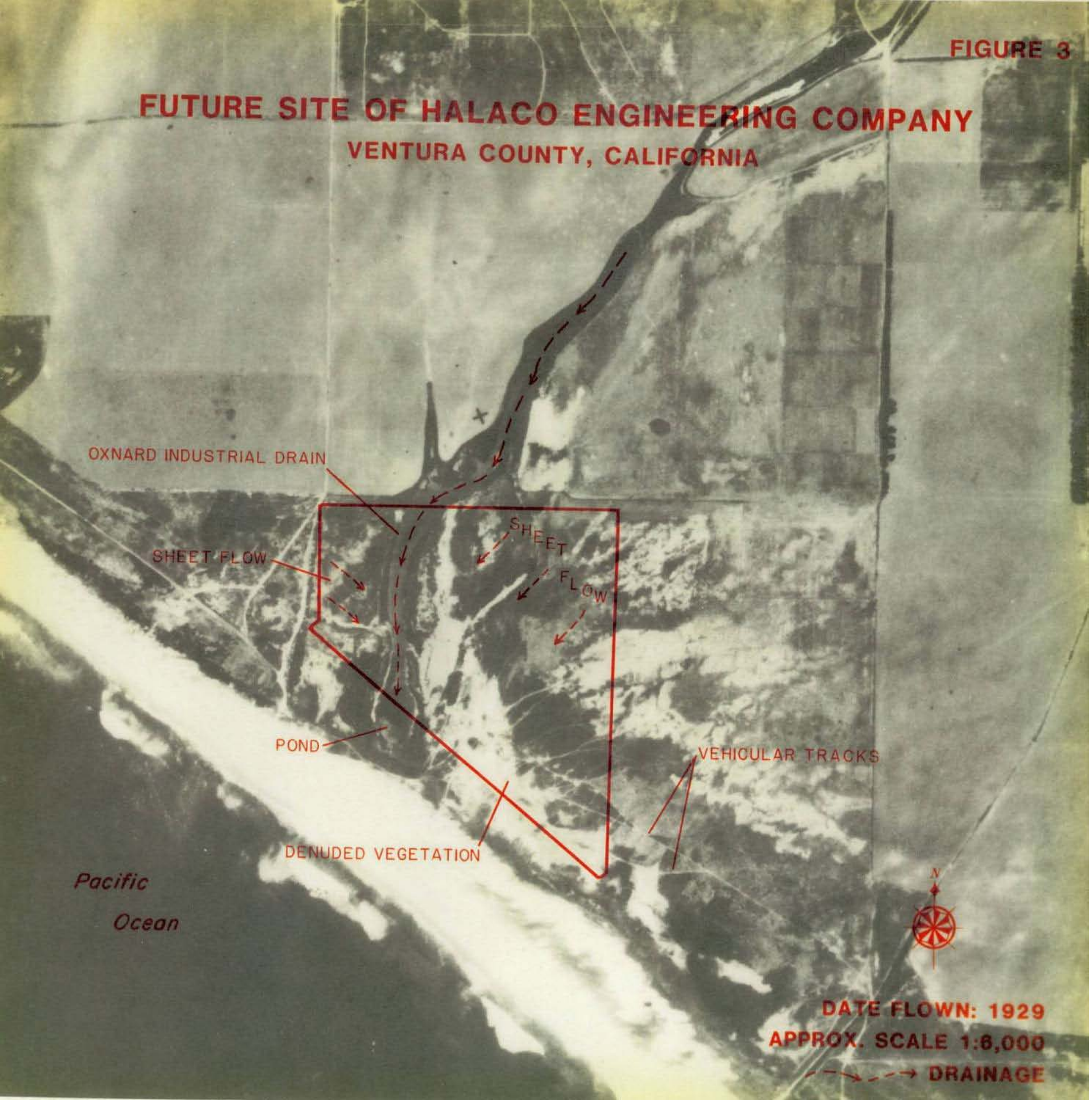
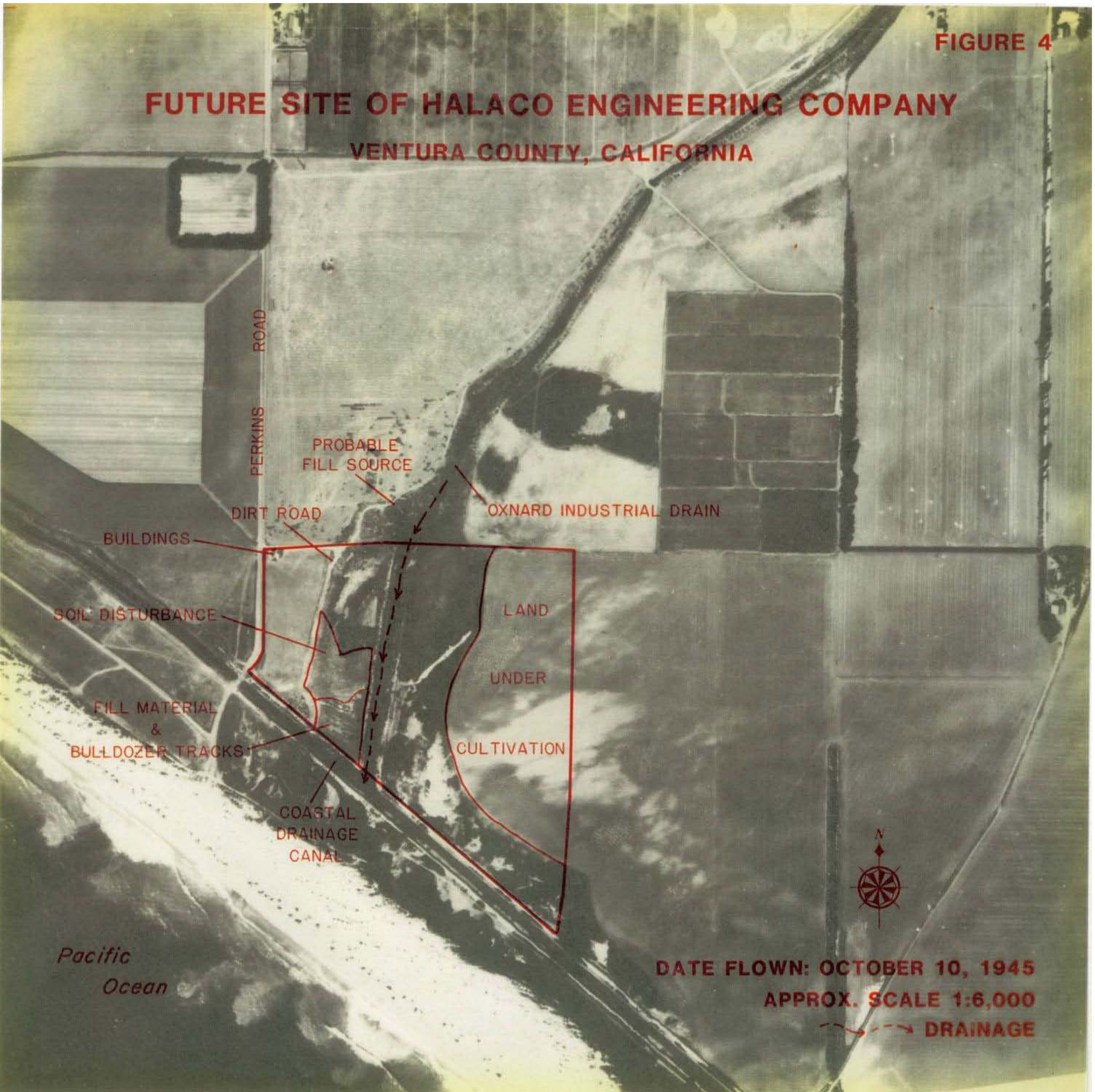


FIGURE 3
FUTURE SITE OF HALACO ENGINEERING COMPANY
VENTURA COUNTY, CALIFORNIA
OXNARD INDUSTRIAL DRAIN
SHEET FLOW
SHEET FLOW
POND
VEHICULAR TRACKS
DENUDED VEGETATION
Pacific Ocean
N
DATE FLOWN: 1929
APPROX. SCALE 1:6,000
DRAINAGE



October 10, 1945

May 4, 1951

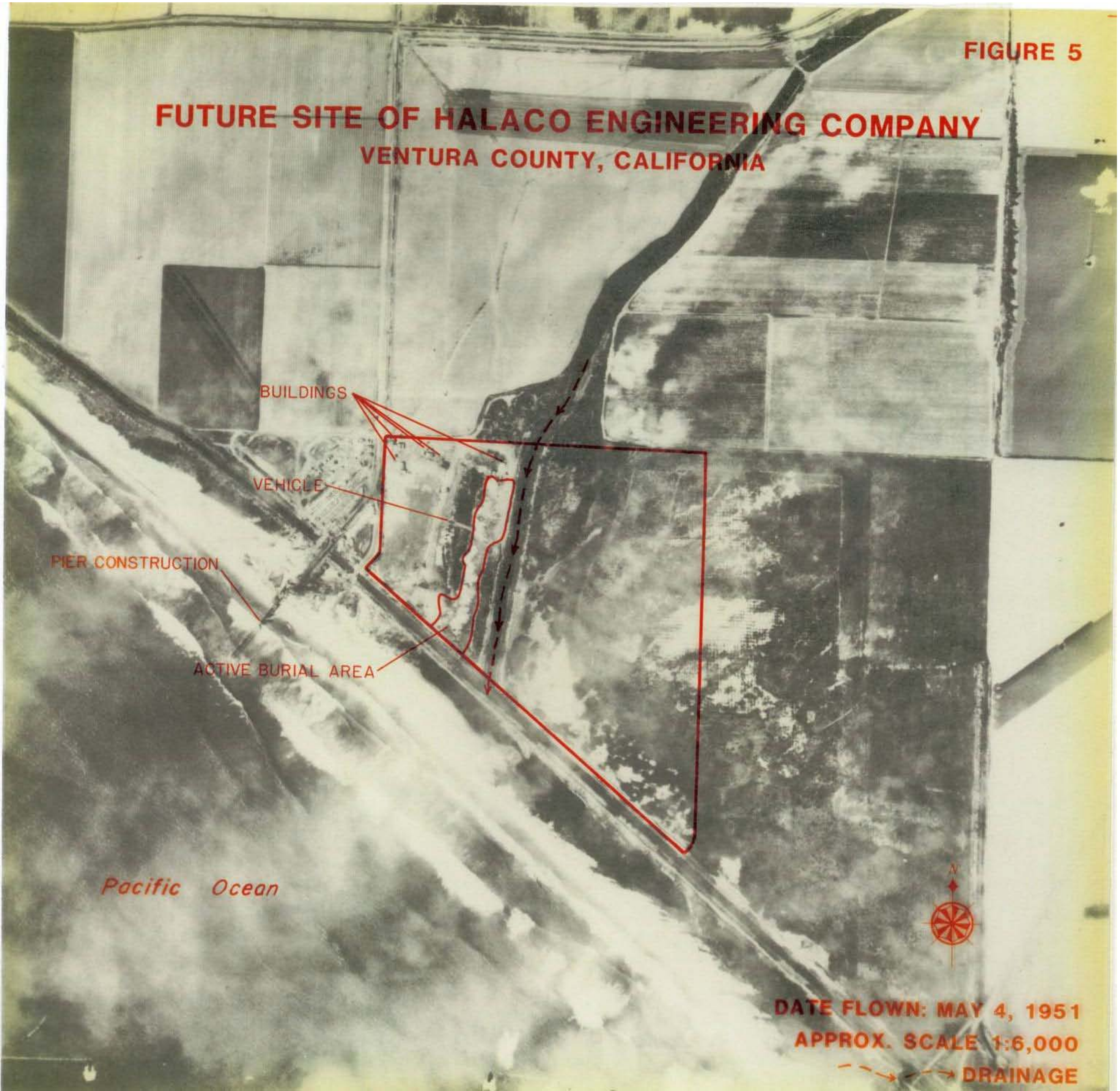
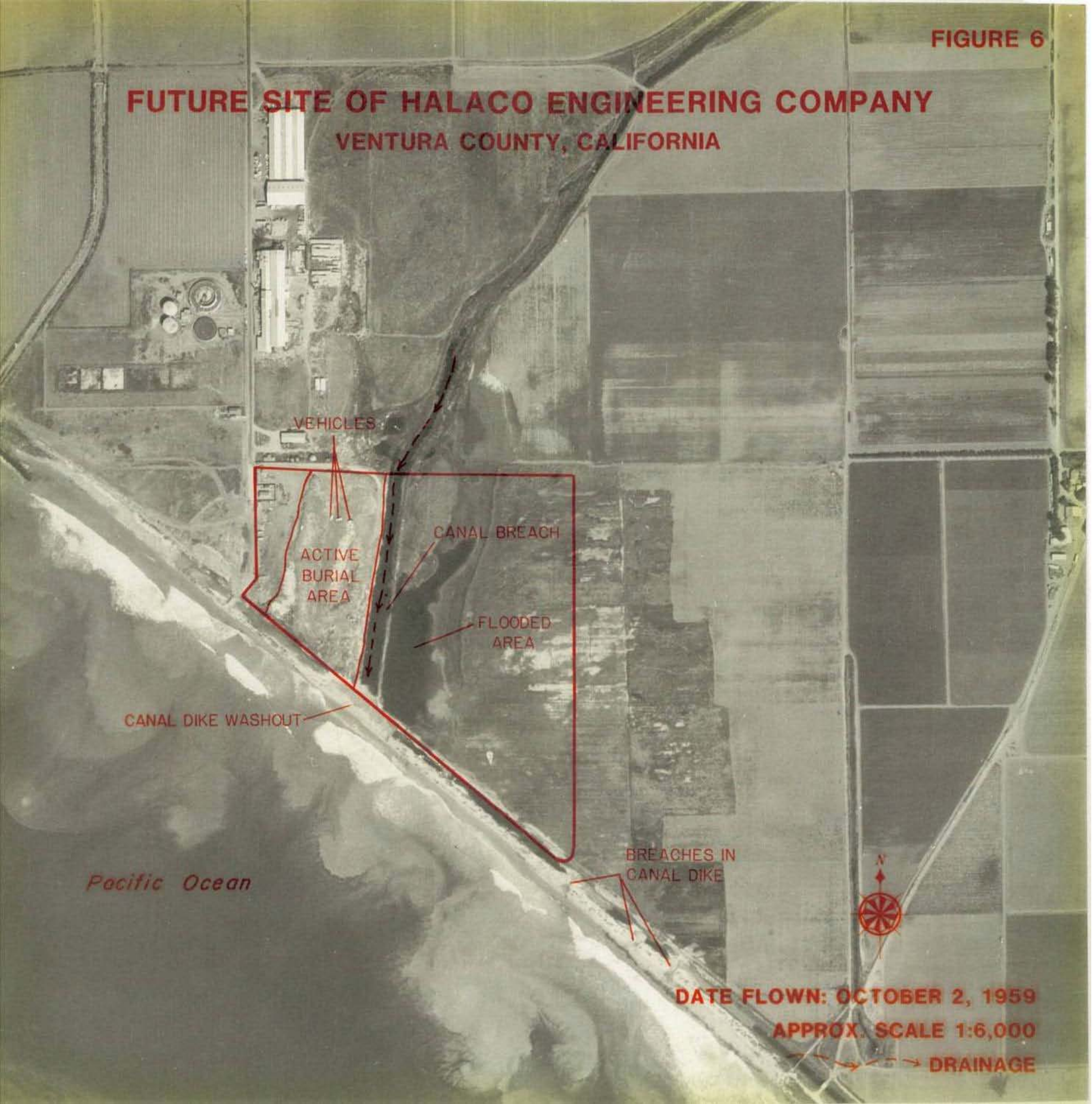
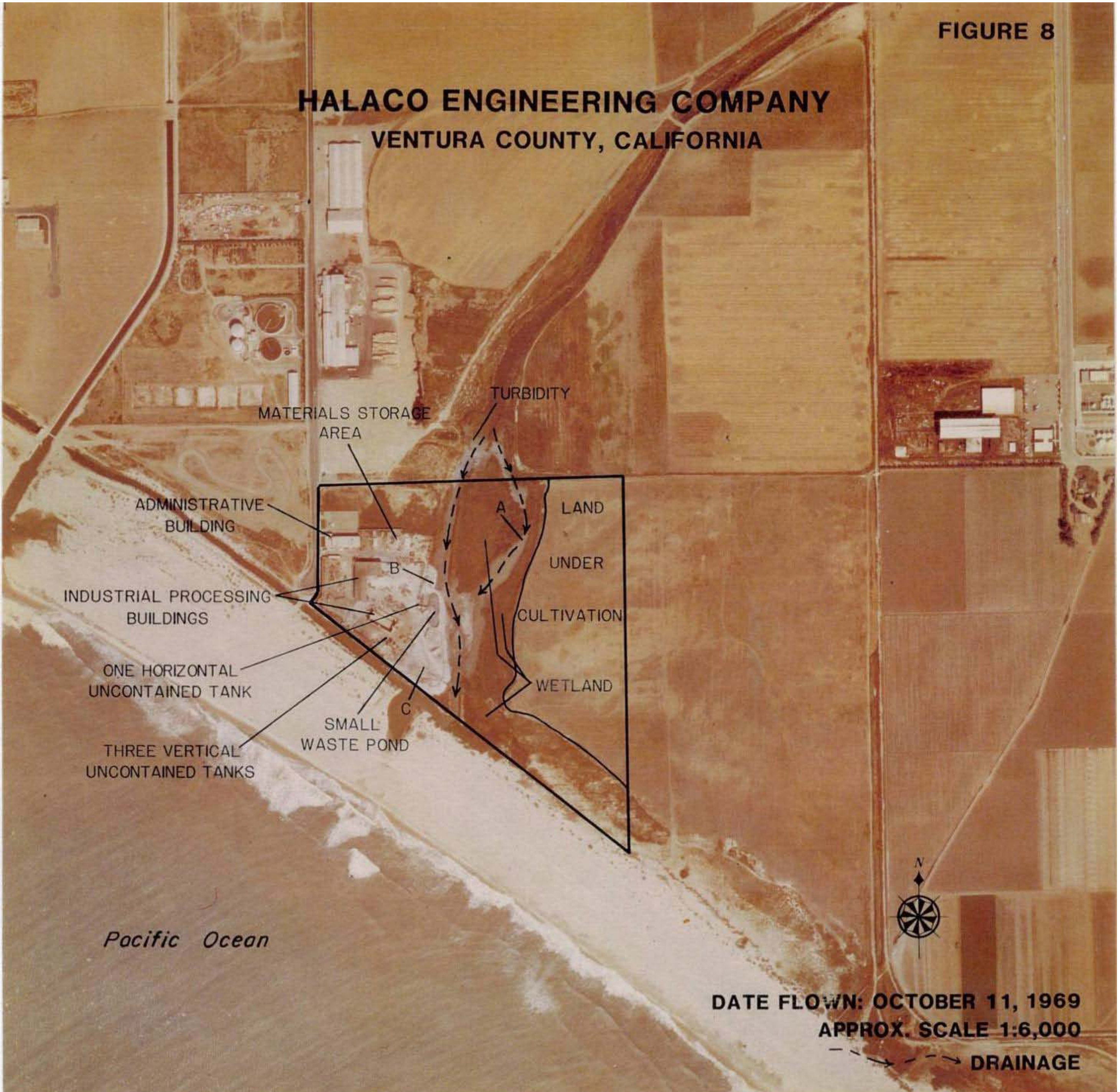


FIGURE 5
FUTURE SITE OF HALACO ENGINEERING COMPANY
VENTURA COUNTY, CALIFORNIA
BUILDINGS
VEHICLE
PIER CONSTRUCTION
ACTIVE BURIAL AREA
Pacific Ocean
N
DATE FLOWN: MAY 4, 1951
APPROX. SCALE 1:6,000
DRAINAGE

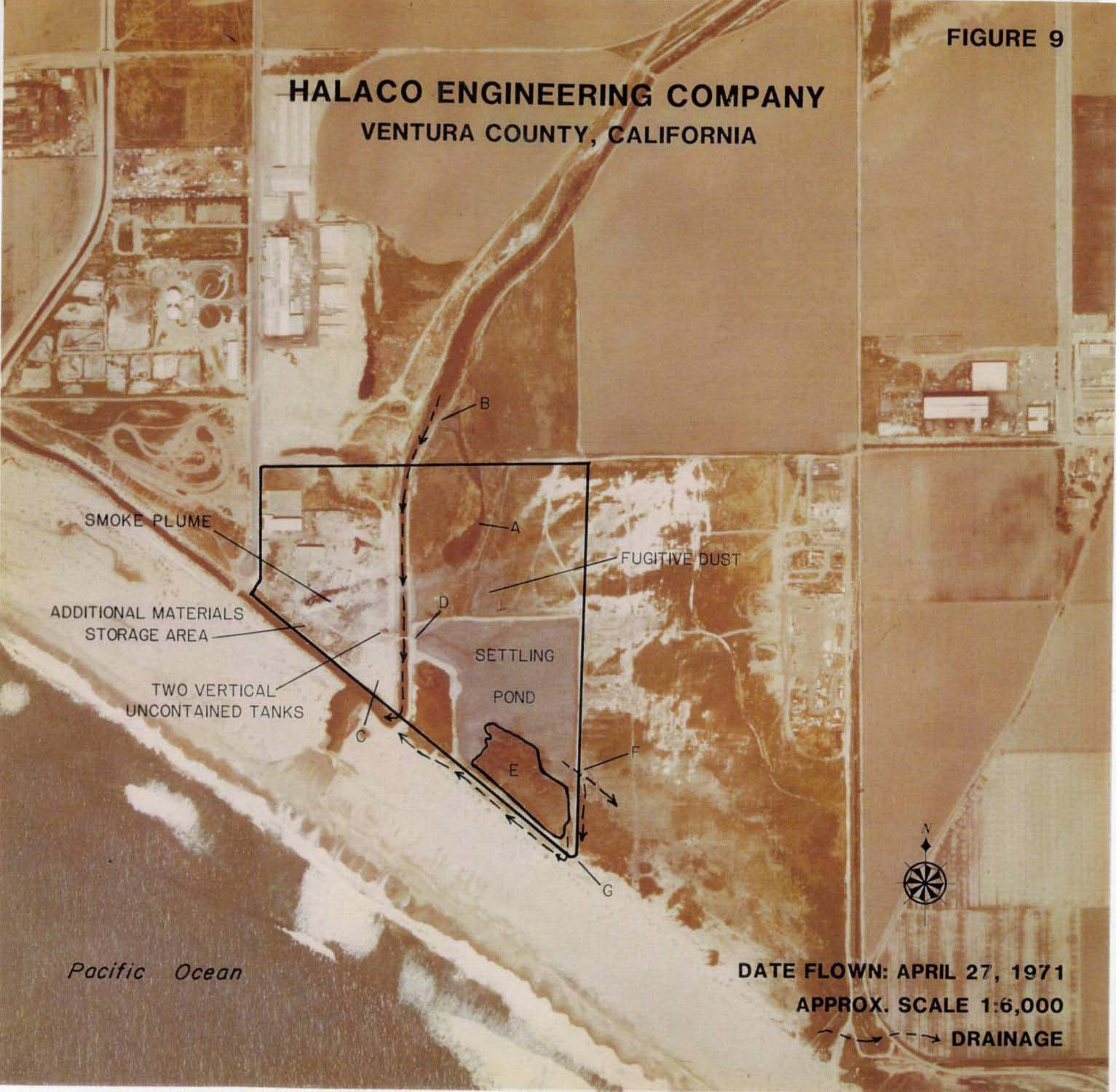


October 2, 1959

September 20, 1965



October 11, 1969



April 27, 1971

March 26, 1972

August 23, 1973

FIGURE 12
HALACO ENGINEERING COMPANY
VENTURA COUNTY, CALIFORNIA
STANDING WATER
ONE VERTICAL
CONTAINED TANK
ADDITIONAL WASTE MATERIAL
FOUR VERTICAL
UNCONTAINED TANKS
A
B
STANDING
WATER
N
DATE FLOWN: MARCH 4, 1974
APPROX. SCALE 1:6,000
DRAINAGE

March 4, 1974

October 7, 1975

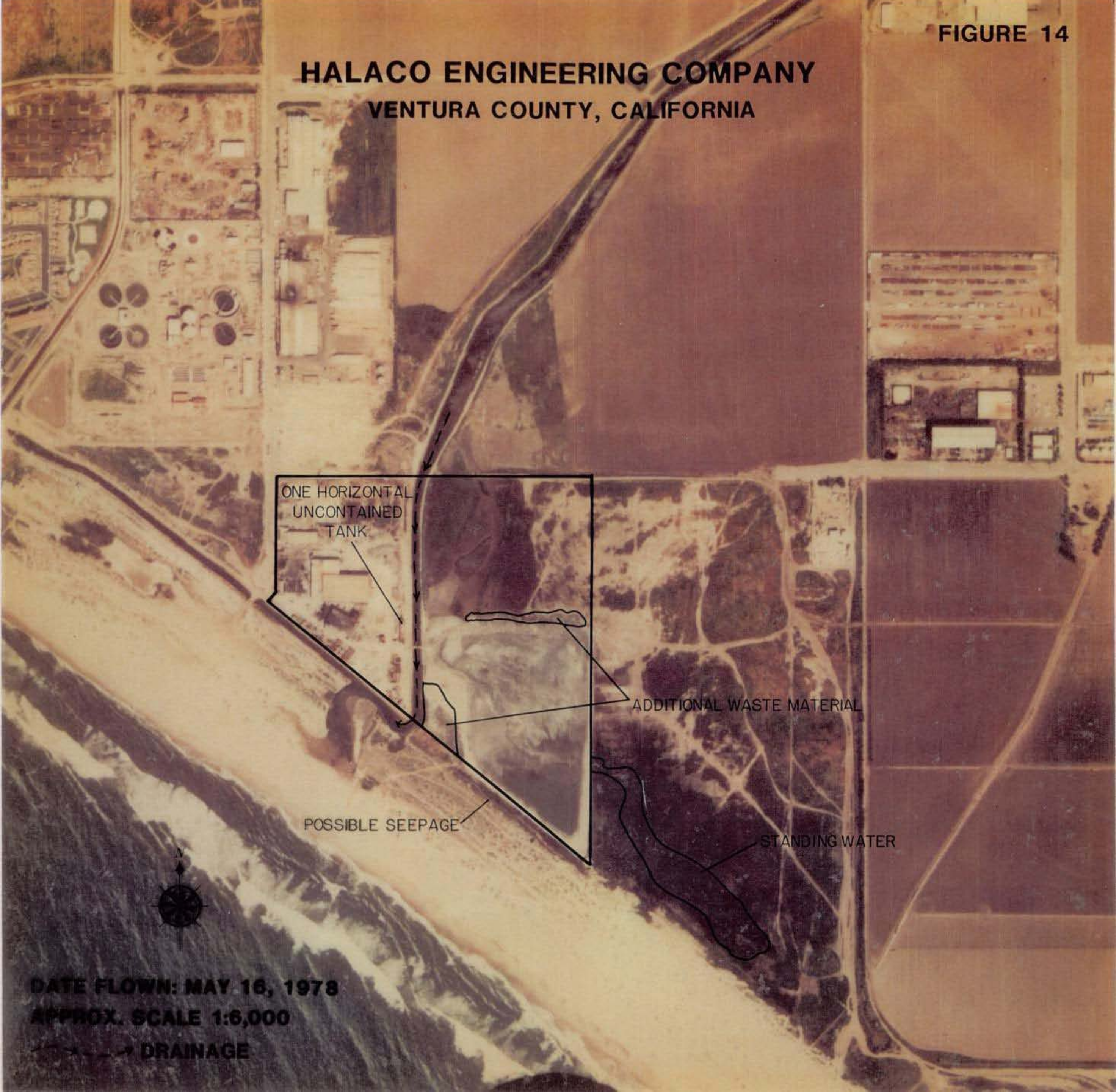


FIGURE 14
HALACO ENGINEERING COMPANY
VENTURA COUNTY, CALIFORNIA
ONE HORIZONTAL UNCONTAINED TANK
ADDITIONAL WASTE MATERIAL
POSSIBLE SEEPAGE
STANDING WATER
N
DATE FLOWN: MAY 16, 1978
APPROX. SCALE 1:6,000
DRAINAGE

May 16, 1978

June 22, 1981


FIGURE 15
HALACO ENGINEERING COMPANY
VENTURA COUNTY, CALIFORNIA
BULLDOZER TRACKS
ADDITIONAL WASTE MATERIAL
DRUM STORAGE
STANDING WATER
ONE HORIZONTAL CONTAINED TANK
WASTEWATER OUTFALL
WATER TREATMENT EQUIPMENT
FIVE VERTICAL UNCONTAINED TANKS
FORMER FILL AREA
Ocean
DATE FLOWN: JUNE 22, 1981

TS-PIC-91730
February 1991

AERIAL PHOTOGRAPHIC ANALYSIS OF THE HALACO ENGINEERING FACILITY

Oxnard, California

by

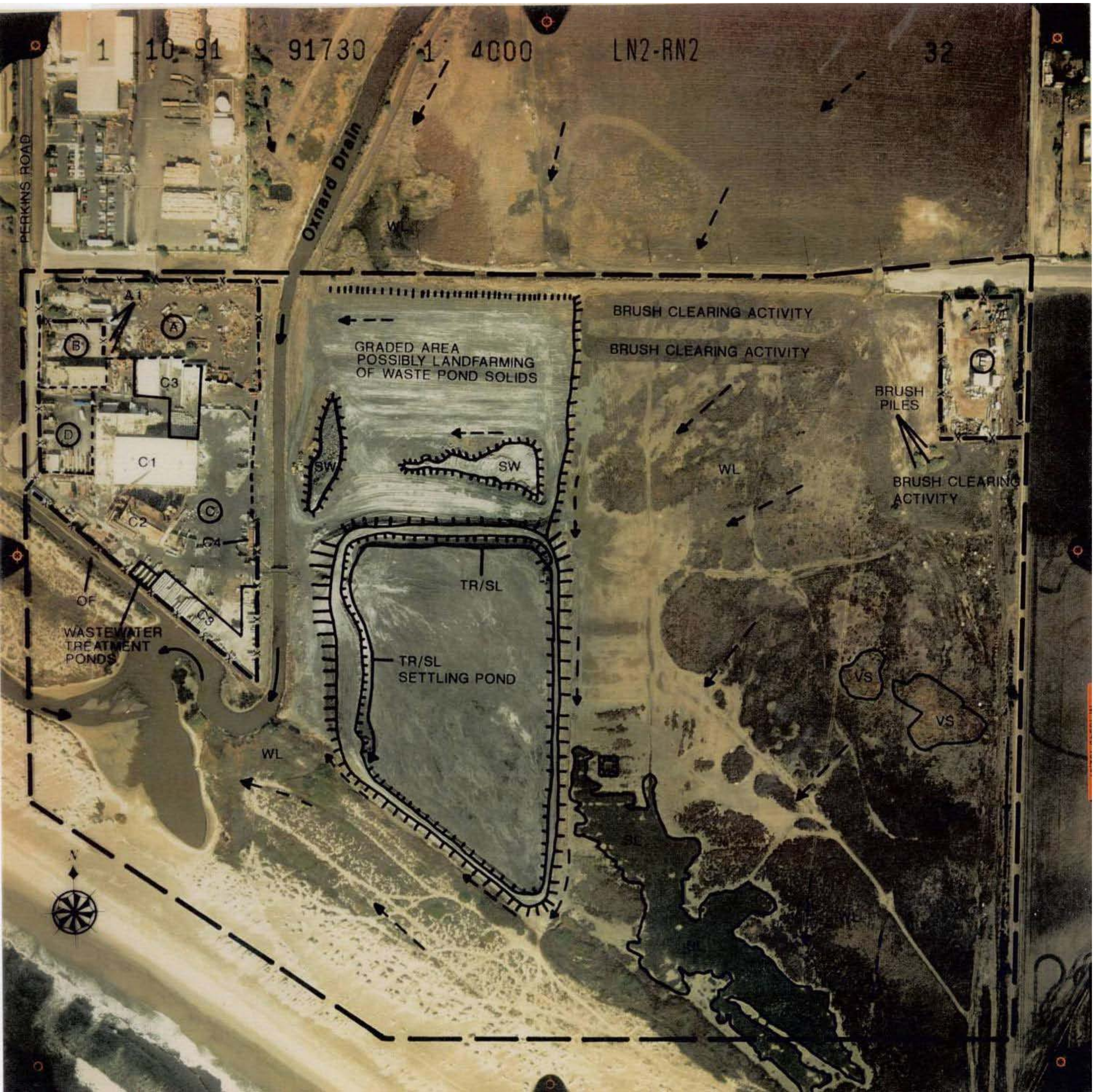
A. B. Divers
Environmental Programs
Lockheed Engineering and Sciences Company
Las Vegas, Nevada 89193-3478

Contract No. 68-C0-0050

Project Officer

P. A. Arberg
Advanced Monitoring Systems Division
Environmental Monitoring Systems Laboratory
Las Vegas, Nevada 89193-3478

ENVIRONMENTAL MONITORING SYSTEMS LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY
LAS VEGAS, NEVADA 89193-3478



January 10, 1991

Attachment B
Photographs of Vibracore Sediment Sampling in OID and Lagoon Areas

PHOTO 1
Vibracore barge deployment using crane near footbridge at end of Perkins Road.

PHOTO 2
Support boat that tows vibracore barge and ferries samples.

PHOTO 3
Vibracore barge in lagoon finger near footbridge.

PHOTO 4
Vibracore being pushed into sediments.

PHOTO 5
Vibracore barge in OID next to Waste Management Area.

PHOTO 6
Vibracore barge in ditch south of Waste Management Area.

PHOTO 7
Vibracore barge in lagoon next to Smelter Parcel.

PHOTO 8
Vibracore barge in lagoon next to Smelter Parcel.

PHOTO 9
Vibracore barge in lagoon.

PHOTO 10
Core being retrieved from vibracore liner.

PHOTO 11
Core being retrieved from vibracore liner.

Attachment C
Photographs of Radiation Sediment Surveying in OID and Lagoon Areas

PHOTO 1
Submersible 2” x 2” sodium iodide crystal detector encased in a protective PVC housing used to scan the sediments in the OID and lagoon for gamma radiation.

PHOTO 2
Boat towing submersible 2” x 2” sodium iodide crystal detector fixed to an expandable pole and weighted to reach the sediment in the lagoon (June 2010).

Attachment D
Lithologic Descriptions of Solid Matrix Samples for OID and Lagoon Areas

ATTACHMENT D
Lithologic Descriptions of Solid Matrix Samples for OID and Lagoon Areas
Halaco Site Remedial Investigation, Oxnard, California

Area	Subarea	Sample ID	Depth (ft bgs)	Lithologic Description
Lagoon	Fingers	LGF-001-A	0	Silt (ML), very dark greenish gray (Gley1 3/10Y), wet, 100% fines, low plasticity, somewhat fluid/watery
		LGF-001-B	2	Sandy Silt (ML), very dark gray (Gley1 3/N), wet, 30% fine sand, 70% low plasticity fines, a fragment of plant root
		LGF-002-A	0	Clay (CL), very dark greenish gray (Gley1 3/10Y), wet, fluid, med plasticity
		LGF-002-B	2	Clay (CL), black (Gley1 2.5/N), wet, medium plasticity, sulphurous odor
		LGF-003-A	0	Clayey Silt (ML), very dark greenish gray (Gley1 1/10Y), wet, watery, low plasticity
		LGF-003-B	2	Sandy Silt (ML), black (Gley1 2.5/N), wet, 30% fine sand, 70% low plasticity fines, some plant roots
		LGF-004-A	0	Silty Sand (SM), black (Gley1 2.5/N), wet, 80% fine to medium sand, 20% nonplastic fines, a few wood/plant remnants
		LGF-004-B	2	Clay (CL), black (Gley1 2.5/N), wet, 100% fines, medium plasticity, locally gray patches of possible slag material
		LGF-005-A	0	Silt (ML), black (Gley1 2.5/N), wet, 100% fines, low plasticity
		LGF-005-B	2	Sand with Gravel (SP), very dark greenish gray (Gley1 3/5G), wet, 90% fine to medium sand, 10% gravel up to 2", subangular
		LGF-006-A	0	Clayey Silt (ML), black (Gley1 2.5/N), wet, 100% fines, medium plasticity
		LGF-006-B	2	Poorly Graded Sand (SP), very dark greenish gray (Gley1 3/10Y), wet, 80% medium sand, 20% fine sand
		LGF-007-A	0	Poorly Graded Sand (SP), very dark greenish gray (Gley1 3/5GY), wet, 80% fine sand, 20% medium sand
		LGF-007-B	2	Well Graded Sand (SW), pale olive (5Y 6/3), wet, 20% fine sand, 60% medium sand, 20% coarse sand
		LGF-008-A	0	Poorly Graded Sand (SP), very dark greenish gray (Gley1 3/10Y), wet, 80% fine sand, 20% medium sand
		LGF-008-B	2	Well Graded Sand (SW), light yellowish brown (2.5Y 6/2), wet, 30% fine sand, 50% medium sand, 20% coarse sand
		LGF-009-A	0	Poorly Graded Sand (SP), black (Gley1 2.5/N), wet, 70% fine sand, 30% medium sand, trace coarse sand
		LGF-009-B	2	Well Graded Sand (SW), greenish gray (Gley1 5/10Y), wet, 20% fine sand, 50% medium sand, 30% coarse sand
		LGF-010-A	0	Poorly Graded Sand (SP), dark gray (2.5Y 4/1), wet, 100% fine sand, some moss/algae at top surface
		LGF-010-B	2	Poorly Graded Sand (SP), very dark greenish gray (Gley1 3/10Y), wet, 100% fine to medium sand, contact with coarse sand at 2.5'
		LGF-011-A	0	Silty Sand (SM), very dark greenish gray (Gley1 3/10Y), wet, 70% medium sand, 10% coarse sand, 20% fines as silt
		LGF-011-B	2	Well Graded Sand (SW), grayish brown (2.5Y 5/2), wet, 20% fine sand, 50% medium sand, 30% coarse sand, trace fine gravel, quartz grains
		LGF-012-A	0	Well Graded Sand (SW), very dark greenish gray (Gley1 3/10Y, wet, 30% fine sand, 40% medium sand, 30% coarse sand, trace nonplastic fines at top
		LGF-012-B	2	Poorly Graded Sand (SP), light yellowish brown (2.5Y 6/3), wet, 90% fine sand, 10% medium sand

ATTACHMENT D
Lithologic Descriptions of Solid Matrix Samples for OID and Lagoon Areas
Halaco Site Remedial Investigation, Oxnard, California

Area	Subarea	Sample ID	Depth (ft bgs)	Lithologic Description
	Main	LGM-001-A	0	Organic Silt (ML), black (Gley1 2.5/N), wet, 90% fines, low plasticity, 10% organics as plant remnants
		LGM-001-B	2	Poorly Graded Sand (SP), very dark greenish gray (Gley1 3/10Y), wet, 70% medium sand, 30% coarse sand
		LGM-001-C	4	Fat Clay (CH), greenish gray (Gley1 5/2), wet, 100% fines, high plasticity, contact with sand at 4'
		LGM-002-A	0	Organic Silt (OL), black (Gley1 2.5/N), wet, watery, bad odor from decomposing organic matters
		LGM-002-B	2	Poorly Graded Sand (SP), black (Gley1 2.5/N), wet, 80% fine sand, 15% medium sand, 5% coarse sand
		LGM-002-C	4	Clay (CL), dark olive gray (5Y 3/2), wet, 100% fines, medium plasticity
		LGM-003-A	0	Organic Clay (OH), black (Gley1 2.5/N), wet, 70% medium plasticity fines, 30% organic material including leaves and decaying plant remnants
		LGM-003-B	2	Poorly Graded Sand (SP), greenish black (Gley1 2.5/10Y), wet, 70% fine sand, 30% medium sand
		LGM-003-C	4	Well Graded Sand (SW), greenish black (Gley1 2.5/10Y), wet, 30% fine sand, 40% medium sand, 30% coarse sand
		LGM-004-A	0	Organic Silt (OL), black (Gley1 2.5/N), wet, watery, bad odor from decomposing organic matters
		LGM-004-B	2	Poorly Graded Sand (SP), very dark gray (Gley1 3/N), wet, 40% fine sand, 60% medium sand
		LGM-004-C	4	Poorly Graded Sand (SP), same as at LGM-004-B
		LGM-005-A	0	Sand with Silt (SP-SM), light olive brown (2.5Y 5/3), wet, 90% fine sand, 10% nonplastic fines
		LGM-005-B	2	Clayey Silt (ML), black (2.5Y 2.5/1), wet, 100% fines, medium plasticity, strong decaying organics odor, contact with sand at 2.5'
		LGM-005-C	4	Poorly Graded Sand (SP), very dark gray (Gley1 3/N), wet, 70% medium sand, 30% coarse sand
		LGM-006-A	0	Organic Silt (OL), black (Gley1 2.5/N), wet, watery, bad odor from decomposing organic matters
		LGM-006-B	2	Poorly Graded Sand (SP), very dark gray (Gley1 3/N), wet, 20% fine sand, 80% medium sand
		LGM-006-C	4	Well Graded Sand (SW), dark greenish gray (Gley1 4/10Y), wet, 20% fine sand, 40% medium sand, 40% coarse sand
		LGM-007-A	0	Poorly Graded Sand (SP), very dark greenish gray (Gley1 3/10GY), wet, 80% fine sand, 20% medium sand
		LGM-007-B	2	Sandy Gravel (GW), light olive gray (5Y 6/2), wet, 70% fine to coarse gravel, 30% coarse sand, subrounded, up to 2"
		LGM-007-C	4	Sandy Gravel (GW), light olive gray (5Y 6/2), wet, 80% fine to coarse gravel, 20% coarse sand, subrounded, up to 2"
		LGM-008-A	0	Organic Silt (OL), black (Gley1 2.5/N), wet, watery, bad odor from decomposing organic matters, etc.
		LGM-008-B	2	Clayey Silt (ML), black (5Y 2.5/1) to olive gray (5Y 4/2), wet, 100% fines, low plasticity
		LGM-008-C	4	Well Graded Sand (SW), very dark greenish gray (Gley1 3/10Y, wet, 20% fine sand, 40% medium sand, 40% coarse sand
		LGM-009-A	0	Clayey Silt (ML) to Silty Sand (SM), black (Gley1 2.5/N), wet, low plasticity, transitions to silty sand at 5'

Area	Subarea	Sample ID	Depth (ft bgs)	Lithologic Description
		LGM-009-B	2	Poorly Graded Sand (SP), very dark greenish gray (Gley 1 3/10GY), wet, 80% fine sand, 20% medium sand
		LGM-009-C	4	Poorly Graded Sand with Gravel (SP), greenish gray (Gley1 5/5GY), wet, 90% medium to coarse sand, 10% gravel up to 1/2"
		LGM-010-A	0	Poorly Graded Sand (SP), very dark greenish gray (Gley 1 3/10GY), wet, 30% fine sand, 70% medium sand
		LGM-010-B	2	Well Graded Sand (SW), greenish gray (Gley1 5/10Y), wet, 30% fine sand, 40% medium sand, 30% coarse sand
		LGM-010-C	4	Poorly Graded Sand (SP), light greenish brown (2.5Y 6/2), wet, 100% fine sand
OID	East Bank	ODE-001A-A	0	Sand with Silt (SP-SM), grayish brown (2.5Y 5/2), wet, 20% fine sand, 70% medium sand, 10% nonplastic fines
		ODE-001A-B	5	Silt (ML), light olive brown (2.5Y 5/3), wet, 95% nonplastic fines, 5% fine sand as thin lenses, trace mica, locally iron oxide stringers
		ODE-001A-C	10	Clay (CL), olive gray (5Y 5/2), wet, 100% fines, medium plasticity
		ODE-001A-D	16	Poorly Graded Sand (SP), dark olive gray (5Y 3/2), wet, 40% fine sand, 60% medium sand, contact with silt above at 15.9', total advanced depth = 16'
		ODE-002A-A	0	Silty Sand (SM), dark grayish brown (2.5Y 4/2), wet, 40% fines, 60% fine to medium sand, a few small fragments of gray material resembling slag from smelter waste
		ODE-002A-B	5	Silt with Sand (ML), olive gray (5Y 4/2), wet, 80% nonplastic fines, 20% fine sand as thin lenses, some iron oxide spots
		ODE-002A-C	10	Lean Clay (CL), olive gray (5Y 4/2), wet, 100% fines, low plasticity, some organic matter as decayed plants, etc.
		ODE-002A-D	14	Sandy Silt (ML), dark olive gray (5Y 3/2), wet, 70% nonplastic fines, 30% fine sand, trace fine mica
		ODE-003A-A	0	Gravelly Silt (ML), dark grayish brown (2.5Y 4/2), wet, 70% low plasticity fines, 30% fine to coarse gravel, subangular
		ODE-003A-B	5	Clayey Silt (ML), olive gray (5Y 4/2), wet, 100% fines, trace fine mica, locally brownish organic spots, low plasticity
		ODE-003A-C	10	Lean Clay (CL), dark greenish gray (Gley1 4/10Y), wet, 100% fines, locally olive spots of possibly organic matters, medium plasticity
		ODE-003A-D	13	Fat Clay (CH), very dark greenish gray (Gley1 3/10Y), wet, 100% fines, high plasticity
	Site	OID-001-A	0	Fat Clay (CH), dark grayish brown (2.5Y 4/2), wet, 100% fines, high plasticity
		OID-001-B	2	Fat Clay (CH), olive gray (5Y 5/2), wet, mottled, 100% fines, high plasticity
		OID-001-C	4	Silty Clay (CL), olive (5Y 4/3), wet, 100% fines, medium plasticity
		OID-002-A	0	Fat Clay (CH), black (5Y 2.5/1) to olive gray (5Y 5/2), wet, 100% fines, high plasticity
		OID-002-B	2	Fat Clay (CH), olive gray (5Y 5/2), wet, mottled, 100% fines, high plasticity
		OID-002-C	4	Silty Clay (CL), olive (5Y 2.5/1), wet, 100% fines, medium plasticity
		OID-003-A	0	Fill, black (Gley1 2.5/N), wet, concrete and glass fragments, transitions to clay at 3"

ATTACHMENT D
Lithologic Descriptions of Solid Matrix Samples for OID and Lagoon Areas
Halaco Site Remedial Investigation, Oxnard, California

Area	Subarea	Sample ID	Depth (ft bgs)	Lithologic Description
		OID-003-B	2	Silty Sand (SM), dark olive gray (5Y 3/2), wet, 70% fine sand, 30% nonplastic fines, trace fine mica
		OID-003-C	4	Silty Sand (SM), same as at OID-003-B
		OID-004-A	0	Fat Clay (CH), light brownish gray (2.5Y 6/2), wet, 100% fines, high plasticity
		OID-004-B	2	Silt with Sand (ML), greenish gray (Gley1 5/10Y), wet, 80% low plasticity fines, 20% fine sand as lenses
		OID-004-C	4	Clay (CL), greenish gray (Gley1 5/2), wet, 100% fines, low plasticity, thin laminations of possible organic horizons
		OID-005-A	0	Fill, black (Gley1 2.5/N), wet, concrete fragment, gravel, some coarse sand, subangular
		OID-005-B	2	Silty Sand (SM), greenish gray (Gley1 5/10Y), wet, 70% fine sand, 30% nonplastic fines, trace mica
		OID-005-C	4	Fat Clay (CH), greenish gray (Gley1 5/10Y), wet, 100% fines, high plasticity, locally thin sand lenses below
		OID-006-A	0	Silt (ML), very dark greenish gray (Gley1 3/10Y), wet, 100% fines, nonplastic
		OID-006-B	2	Poorly Graded Sand (SP), gray (5Y 6/1), wet, 30% fine sand, 70% medium sand, trace coarse sand
		OID-006-C	4	Poorly Graded Sand (SP), gray (5Y 5/1), wet, 100% fine sand, trace mica
		OID-007-A	0	Fill, black, fragments of glass, asphalt and rocks
		OID-007-B	2	Fill, black, fragments of glass, asphalt and rocks
		OID-007-C	4	Poor recovery, refusal at 1.5'
	North of Site	OID-008-A	0	Poorly Graded Sand (SP), greenish black (Gley1 2.5/10Y), wet, 30% fine sand, 70% medium sand
		OID-008-B	2	Fat Clay (CH), very dark greenish gray (Gley1 3/10Y), wet, 100% fines, high plasticity
		OID-009-A	0	Poorly Graded Sand (SP), black (Gley1 2.5/N), wet, 70% coarse sand, 30% medium sand
		OID-009-B	2	Clayey Silt (ML), light olive gray (5Y 6/2), wet, 100% fines, medium plasticity, some laminations
		OID-010-A	0	Poorly Graded Sand (SP), greenish black (Gley1 2.5Y/10Y), wet, 30% fine sand, 70% medium sand
		OID-010-B	2	Fat Clay (CH), greenish gray (Gley1 5/10Y), wet, 100% fines, high plasticity
		OID-011-A	0	Poorly Graded Sand (SP), black (2.5Y 2.5/1), wet, 80% coarse sand, 15% medium sand, 5% fines
		OID-011-B	2	Fat Clay (CH), olive gray (5Y 5/2), wet, 100% fines, high plasticity
		OID-012-A	0	Fill, black (Gley1 2.5Y/N), wet, asphalt fragments, angular gravel, some coarse sand
		OID-012-B	2	Fat Clay (CH), light greenish gray (Gley1 7/10Y), wet, high plasticity, thin laminations of organic rich soil
		OID-013-A	0	Fill, black (Gley1 2.5/N), wet, glass fragments coarse sand
		OID-013-B	2	Fat Clay (CH), dark olive gray (5Y 3/2), wet, 100% fines, high plasticity, slight odor of decaying organic matter
		OID-014-A	0	Fill, black (Gley1 2.5/N), wet, coarse sand, some wood fragments
		OID-014-B	2	Silty Sand (SM), very dark greenish gray (Gley1 3/10Y), wet, 80% fine to medium sand, 20% low plasticity fines, contact with clay (CH) at 2.4'

Attachment E
Analyte List and CRQLs for Metals, VOCs, SVOCs, PCBs, and Dioxins/Furans

ATTACHMENT E-1

Contract Required Quantitation Limit for Total Metals in Soil

No.	Parameter	ICP AES	ICP MS
1	Aluminum	20.0	NA
2	Antimony	6.0	2.0
3	Arsenic	1.0	1.0
4	Barium	20.0	10.0
5	Beryllium	0.50	1.0
6	Cadmium	0.50	1.0
7	Calcium	500	NA
8	Chromium	1.0	2.0
9	Cobalt	5.0	1.0
10	Copper	2.5	2.0
11	Iron	10.0	NA
12	Lead	1.0	1.0
13	Magneseum	500	NA
14	Manganese	1.5	1.0
15	Mercury	0.10	
16	Nickel	4.0	1.0
17	Potassium	500	NA
18	Selenium	3.5	5.0
19	Silver	1.0	1.0
20	Sodium	500	NA
21	Thallium	2.5	1.0
22	Vanadium	5.0	1.0
23	Zinc	6.0	2.0

Notes:

ICP AES = Inductively Coupled Plasma Atomic Emission Spectroscopy
ICP MS = Inductively Coupled Plasma Mass Spectrometer

ATTACHMENT E-2

Contract Required Quantitation Limit for VOCs in Soil

No.	Volatiles	CRQL	No.	Volatiles	CRQL
1	Dichlorodifluoromethane	5.0	27	Methylcyclohexane	5.0
2	Chloromethane	5.0	28	1,2-Dichloropropane	5.0
3	Vinyl chloride	5.0	29	Bromodichloromethane	5.0
4	Bromomethane	5.0	30	cis-1,3-Dichloropropene	5.0
5	Chloroethane	5.0	31	4-Methyl-2-Pentanone	10
6	Trichlorofluoromethane	5.0	32	Toluene	5.0
7	1,1-Dichloroethene	5.0	33	trans-1,3-Dichloropropene	5.0
8	1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	34	1,1,2-Trichloroethane	5.0
9	Acetone	10	35	Tetrachloroethene	5.0
10	Carbon disulfide	5.0	36	2-Hexanone	10
11	Methyl acetate	5.0	37	Dibromochloromethane	5.0
12	Methylene chloride	5.0	38	1,2-Dibromoethane	5.0
13	trans-1,2-Dichloroethene	5.0	39	Chlorobenzene	5.0
14	Methyl tert-butyl ether	5.0	40	Ethylbenzene	5.0
15	1,1-Dichloroethane	5.0	41	o-Xylene	5.0
16	cis-1,2-Dichloroethene	5.0	42	m,p-Xylene	5.0
17	2-Butanone	10	43	Styrene	5.0
18	Bromochloromethane	5.0	44	Bromoform	5.0
19	Chloroform	5.0	45	Isopropylbenzene	5.0
20	1,1,1-Trichloroethane	5.0	46	1,1,2,2-Tetrachloroethane	5.0
21	Cyclohexane	5.0	47	1,3-Dichlorobenzene	5.0
22	Carbon tetrachloride	5.0	48	1,4-Dichlorobenzene	5.0
23	Benzene	5.0	49	1,2-Dichlorobenzene	5.0
24	1,2-Dichloroethane	5.0	50	1,2-Dibromo-3-chloropropane	5.0
25	1,4-Dioxane	100	51	1,2,4-Trichlorobenzene	5.0
26	Trichloroethene	5.0	52	1,2,3-Trichlorobenzene	5.0

ATTACHMENT E-3

Contract Required Quantitation Limit for SVOCs in Soil

No.	Semivolatiles	CRQL	No.	Semivolatiles	CRQL
1	Benzaldehyde	170	35	4-Nitrophenol	330
2	Phenol	170	36	Dibenzofuran	170
3	Bis(2-chloroethyl)ether	170	37	2,4-Dinitrotoluene	170
4	2-Chlorophenol	170	38	Diethylphthalate	170
5	2-Methylphenol	170	39	Fluorene	170
6	2,2'-Oxybis(1-chloropropane)	170	40	4-Chlorophenyl-phenylether	170
7	Acetophenone	170	41	4-Nitroaniline	330
8	4-Methylphenol	170	42	4,6-Dinitro-2-methylphenol	330
9	N-Nitroso-di-n-propylamine	170	43	N-Nitrosodiphenylamine	170
10	Hexachloroethane	170	44	1,2,4,5-Tetrachlorobenzene	170
11	Nitrobenzene	170	45	4-Bromophenyl-phenylether	170
12	Isophorone	170	46	Hexachlorobenzene	170
13	2-Nitrophenol	170	47	Atrazine	170
14	2,4-Dimethylphenol	170	48	Pentachlorophenol	330
15	Bis(2-chloroethoxy)methane	170	49	Phenanthrene	170
16	2,4-Dichlorophenol	170	50	Anthracene	170
17	Naphthalene	170	51	Carbazole	170
18	4-Chloroaniline	170	52	Di-n-butylphthalate	170
19	Hexachlorobutadiene	170	53	Fluoranthene	170
20	Caprolactam	170	54	Pyrene	170
21	4-Chloro-3-methylphenol	170	55	Butylbenzylphthalate	170
22	2-Methylnaphthalene	170	56	3,3'-Dichlorobenzidine	170
23	Hexachlorocyclopentadiene	170	57	Benzo(a)anthracene	170
24	2,4,6-Trichlorophenol	170	58	Chrysene	170
25	2,4,5-Trichlorophenol	170	59	Bis(2-ethylhexyl)phthalate	170
26	1,1'-Biphenyl	170	60	Di-n-octylphthalate	170
27	2-Chloronaphthalene	170	61	Benzo(b)fluoranthene	170
28	2-Nitroaniline	330	62	Benzo(k)fluoranthene	170
29	Dimethylphthalate	170	63	Benzo(a)pyrene	170
30	2,6-Dinitrotoluene	170	64	Indeno(1,2,3-cd)pyrene	170
31	Acenaphthylene	170	65	Dibenzo(a,h)anthracene	170
32	3-Nitroaniline	330	66	Benzo(g,h,i)perylene	170
33	Acenaphthene	170	67	2,3,4,6-Tetrachlorophenol	170
34	2,4-Dinitrophenol	330			

ATTACHMENT E-4
Contract Required Quantitation Limit for PCB Aroclors in Soil

No.	Aroclors	CRQL
1	Aroclor-1016	3.3
2	Aroclor-1221	3.3
3	Aroclor-1232	3.3
4	Aroclor-1242	3.3
5	Aroclor-1248	3.3
6	Aroclor-1254	3.3
7	Aroclor-1260	3.3
8	Aroclor-1262	3.3
9	Aroclor-1268	3.3

ATTACHMENT E-5

Contract Required Quantitation Limit for Dioxins/Furans in Soil

No.	Analyte	CRQL
1	2,3,7,8-TCDD	0.910
2	2,3,7,8-TCDF	0.910
3	1,2,3,7,8-PeCDF	4.60
4	1,2,3,7,8-PeCDD	4.60
5	2,3,4,7,8-PeCDF	4.60
6	1,2,3,4,7,8-HxCDF	4.60
7	1,2,3,6,7,8-HxCDF	4.60
8	1,2,3,4,7,8-HxCDD	4.60
9	1,2,3,6,7,8-HxCDD	4.60
10	1,2,3,7,8,9-HxCDD	4.60
11	2,3,4,6,7,8-HxCDF	4.60
12	1,2,3,7,8,9-HxCDF	4.60
13	1,2,3,4,6,7,8-HpCDF	4.60
14	1,2,3,4,6,7,8-HpCDD	4.60
15	1,2,3,4,7,8,9-HpCDF	4.60

Attachment F
Radiation Sediment Surveying Results for OID and Lagoon Areas

Halaco - Lagoon Radiation Data - August 2010

Attachment G
Geotechnical Sediment Sample Laboratory Results for OID Area

PTS Laboratories, Inc.

8100 Secura Way • Santa Fe Springs, CA 90670
Telephone (562) 347-2500 • Fax (562) 907-3610

July 26, 2010

Mark Wuttig
CH2M Hill
325 East Hillcrest Drive, Suite 125
Thousand Oaks, CA 91360

Re: PTS File No: 40462
Physical Properties Data
Halaco Superfund Site; 385135-FI-01

Dear Mr. Wuttig:

Please find enclosed report for Physical Properties analyses conducted upon samples received from your Halaco Superfund Site; 385135-FI-01 project. All analyses were performed by applicable ASTM, EPA, or API methodologies. An electronic version of the report has previously been sent to your attention via the internet. The samples are currently in storage and will be retained for thirty days past completion of testing at no charge. Please note that the samples will be disposed of at that time. You may contact me regarding storage, disposal, or return of the samples.

PTS Laboratories appreciates the opportunity to be of service. If you have any questions or require additional information, please give me a call at (562) 347-2504.

Sincerely,
PTS Laboratories

Rachel Spitz
Project Manager

Encl.

PTS Laboratories

Project Name:	**Halaco Superfund Site**	**PTS File No:**	**40462**
Project Number:	**385135-FI-01**	**Client:**	**CH2M Hill**

TEST PROGRAM

CORE ID	Depth ft.	Core Recovery ft.	Grain Size Analysis ASTM D4464M	Atterberg Limits ASTM D4318				Notes
		Plugs:	Grab	Grab				
Date Received: 6/30/10								
SM-LGT1-A	0-0.5	N/A	X	X				
SM-LGT2-A	0-0.5	N/A	X	X				
SM-LGT3-A	0-0.5	N/A	X	X				
SM-LGT4-A	0-0.5	N/A	X	X				
TOTALS:	8 jars		4	4				

Laboratory Test Program Notes

Ok to discard samples per M. Wuttig/CH2M Hill 7/1/10.

PTS File No: 40462
Client: CH2M Hill

ATTERBERG LIMITS DATA - FINE FRACTION < No. 40 SIEVE

(METHODOLOGY: ASTM D4318)

PROJECT NAME: Halaco Superfund Site
PROJECT NO: 385135-FI-01

SAMPLE ID.	DEPTH, ft.	ATTERBERG LIMITS			USCS / PLASTICITY CHART SYMBOL (Fines: <#40 Sieve)
		LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
SM-LGT1-A	0-0.5	111.2	52.3	58.9	MH
SM-LGT2-A	0-0.5	86.7	47.2	39.5	MH
SM-LGT3-A	0-0.5	71.8	43.5	28.3	MH
SM-LGT4-A	0-0.5	23.1	N/A	NON-PLASTIC	ML

PTS Laboratories, Inc.

CH2M Hill
PTS File No: 40462

PARTICLE SIZE SUMMARY

(METHODOLOGY: ASTM D422/D4464M)

PROJECT NAME: Halaco Superfund Site
PROJECT NO: 385135-FI-01

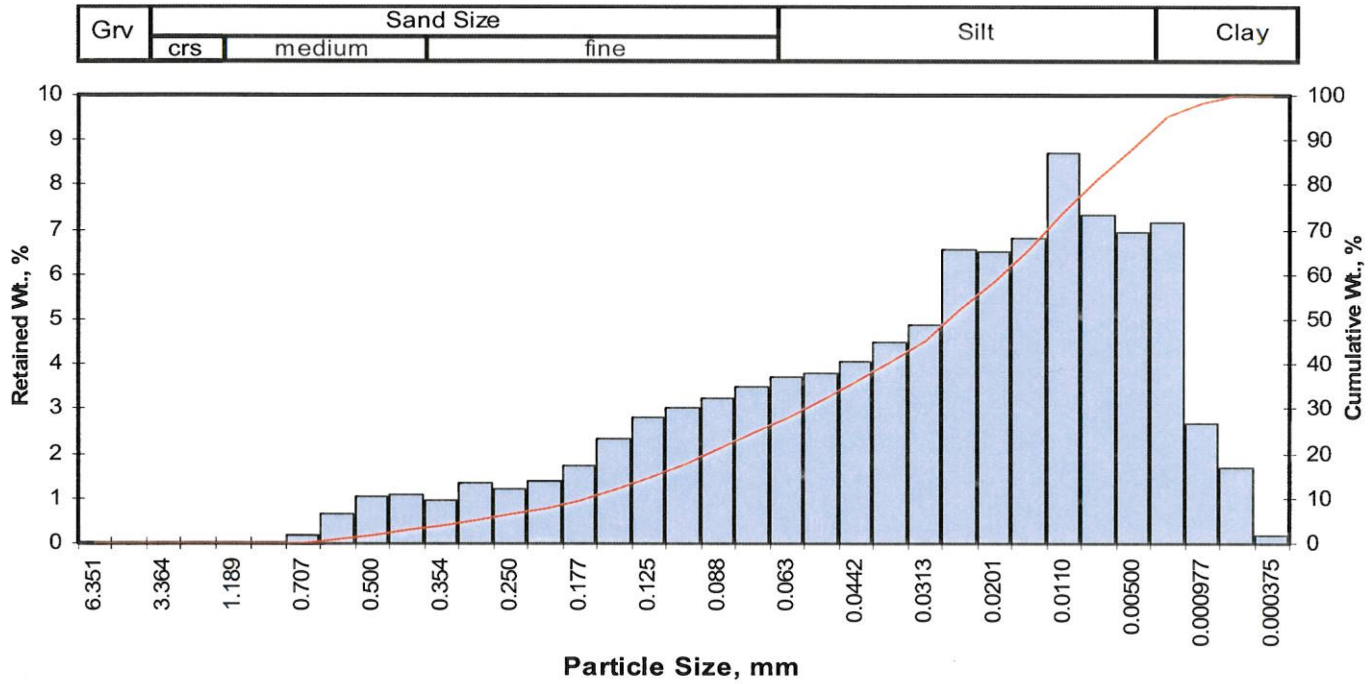
Sample ID	Depth, ft.	Mean Grain Size Description (1)	Median Grain Size mm	Particle Size Distribution, wt. percent						Silt & Clay
					Sand Size					
				Gravel	Coarse	Medium	Fine	Silt	Clay	
SM-LGT1-A	0-0.5	Silt	0.027	0.00	0.00	2.95	21.52	63.82	11.70	75.53
SM-LGT2-A	0-0.5	Silt	0.045	0.00	0.00	7.25	31.56	51.47	9.72	61.19
SM-LGT3-A	0-0.5	Fine sand	0.064	0.00	0.00	11.54	34.58	48.12	5.76	53.88
SM-LGT4-A	0-0.5	Fine sand	0.198	0.00	0.00	14.74	66.49	15.88	2.89	18.78

(1) Based on Mean from Trask

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client:	CH2M Hill	**PTS File No:**	40462
Project:	Halaco Superfund Site	**Sample ID:**	SM-LGT1-A
Project No:	385135-FI-01	**Depth, ft:**	0-0.5



Opening		Phi of	U.S.	Sample Weight,	Increment Weight,	Cumulative Weight,
Inches	Millimeters	Screen	No.	grams	percent	percent
0.2500	6.351	-2.67	1/4	0.00	0.00	0.00
0.1873	4.757	-2.25	4	0.00	0.00	0.00
0.1324	3.364	-1.75	6	0.00	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00	0.00
0.0468	1.189	-0.25	16	0.00	0.00	0.00
0.0331	0.841	0.25	20	0.01	0.01	0.01
0.0278	0.707	0.50	25	0.17	0.17	0.18
0.0234	0.595	0.75	30	0.66	0.66	0.84
0.0197	0.500	1.00	35	1.02	1.02	1.86
0.0166	0.420	1.25	40	1.09	1.09	2.95
0.0139	0.354	1.50	45	0.93	0.93	3.88
0.0117	0.297	1.75	50	1.35	1.35	5.23
0.0098	0.250	2.00	60	1.22	1.22	6.45
0.0083	0.210	2.25	70	1.37	1.37	7.82
0.0070	0.177	2.50	80	1.74	1.74	9.56
0.0059	0.149	2.75	100	2.34	2.34	11.90
0.0049	0.125	3.00	120	2.79	2.79	14.69
0.0041	0.105	3.25	140	3.02	3.02	17.71
0.0035	0.088	3.50	170	3.25	3.25	20.96
0.0029	0.074	3.75	200	3.51	3.51	24.47
0.0025	0.063	4.00	230	3.70	3.70	28.17
0.0021	0.053	4.25	270	3.81	3.81	31.99
0.00174	0.0442	4.50	325	4.07	4.07	36.06
0.00146	0.0372	4.75	400	4.47	4.47	40.53
0.00123	0.0313	5.00	450	4.89	4.89	45.42
0.000986	0.0250	5.32	500	6.57	6.57	51.99
0.000790	0.0201	5.64	635	6.51	6.51	58.50
0.000615	0.0156	6.00		6.83	6.83	65.33
0.000435	0.0110	6.50		8.69	8.69	74.02
0.000308	0.00781	7.00		7.34	7.34	81.37
0.000197	0.00500	7.65		6.93	6.93	88.30
0.000077	0.00195	9.00		7.16	7.16	95.46
0.000038	0.000977	10.00		2.68	2.68	98.14
0.000019	0.000488	11.00		1.68	1.68	99.82
0.000015	0.000375	11.38		0.18	0.18	100.00
TOTALS				**100.00**	**100.00**	**100.00**

Cumulative Weight Percent greater than			
Weight	Phi	Particle Size	
percent	Value	Inches	Millimeters
5	1.71	0.0121	0.306
10	2.55	0.0067	0.171
16	3.11	0.0046	0.116
25	3.79	0.0029	0.073
40	4.72	0.0015	0.038
50	5.22	0.0011	0.027
60	5.72	0.0007	0.019
75	6.57	0.0004	0.011
84	7.25	0.0003	0.007
90	7.97	0.0002	0.004
95	8.91	0.0001	0.002

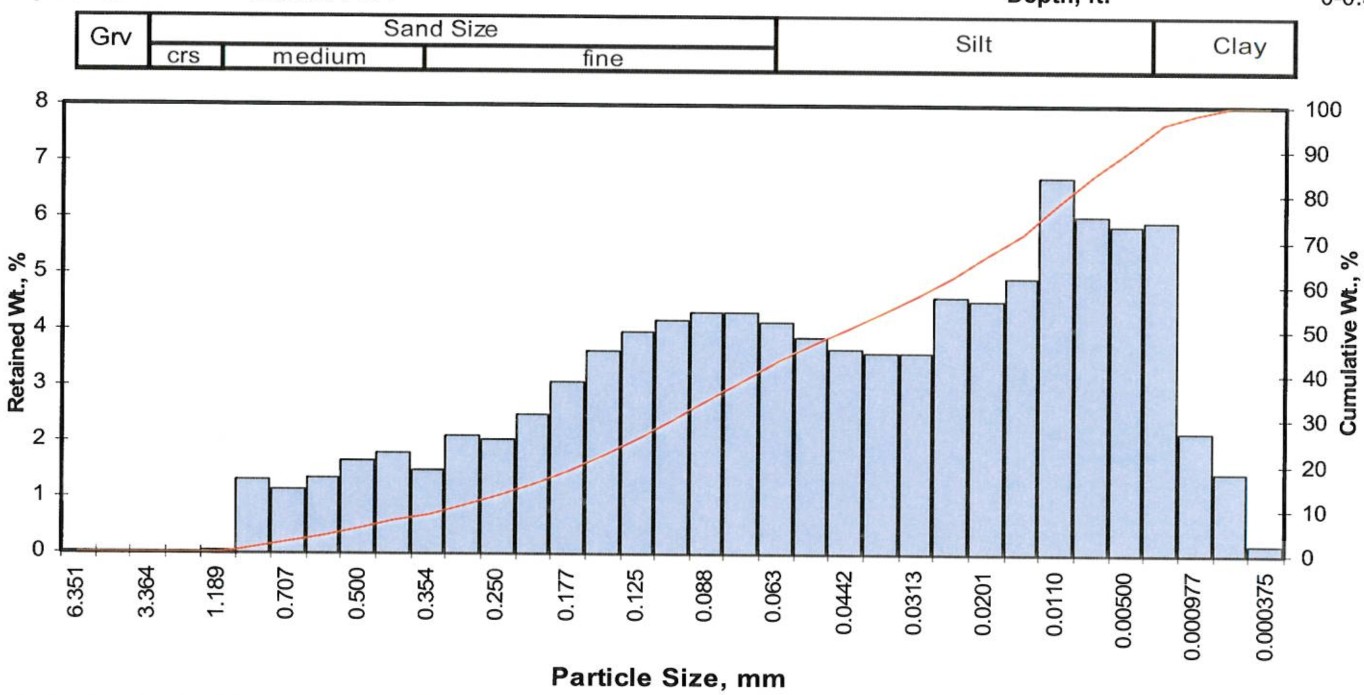
Measure	Trask	Inman	Folk-Ward
Median, phi	5.22	5.22	5.22
Median, in.	0.0011	0.0011	0.0011
Median, mm	0.027	0.027	0.027
Mean, phi	4.59	5.18	5.19
Mean, in.	0.0016	0.0011	0.0011
Mean, mm	0.042	0.028	0.027
Sorting	2.622	2.068	2.126
Skewness	1.033	-0.022	0.001
Kurtosis	0.185	0.742	1.062
Grain Size Description (ASTM-USCS Scale)	Silt (based on Mean from Trask)		

Description	Retained on Sieve #	Weight Percent
Gravel	4	0.00
Coarse Sand	10	0.00
Medium Sand	40	2.95
Fine Sand	200	21.52
Silt	>0.005 mm	63.82
Clay	<0.005 mm	11.70
	Total	**100**

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client:	CH2M Hill	**PTS File No:**	40462
Project:	Halaco Superfund Site	**Sample ID:**	SM-LGT2-A
Project No:	385135-FI-01	**Depth, ft:**	0-0.5



Opening Inches	Opening Millimeters	Phi of Screen	U.S. No.	Sample Weight, grams	Increment Weight, percent	Cumulative Weight, percent
0.2500	6.351	-2.67	1/4	0.00	0.00	0.00
0.1873	4.757	-2.25	4	0.00	0.00	0.00
0.1324	3.364	-1.75	6	0.00	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00	0.00
0.0468	1.189	-0.25	16	0.03	0.03	0.03
0.0331	0.841	0.25	20	1.30	1.30	1.33
0.0278	0.707	0.50	25	1.13	1.13	2.46
0.0234	0.595	0.75	30	1.36	1.36	3.82
0.0197	0.500	1.00	35	1.65	1.65	5.47
0.0166	0.420	1.25	40	1.78	1.78	7.25
0.0139	0.354	1.50	45	1.49	1.49	8.74
0.0117	0.297	1.75	50	2.09	2.09	10.83
0.0098	0.250	2.00	60	2.02	2.02	12.85
0.0083	0.210	2.25	70	2.49	2.49	15.34
0.0070	0.177	2.50	80	3.08	3.08	18.42
0.0059	0.149	2.75	100	3.63	3.63	22.05
0.0049	0.125	3.00	120	3.96	3.96	26.01
0.0041	0.105	3.25	140	4.17	4.17	30.18
0.0035	0.088	3.50	170	4.31	4.31	34.49
0.0029	0.074	3.75	200	4.32	4.32	38.81
0.0025	0.063	4.00	230	4.14	4.14	42.95
0.0021	0.053	4.25	270	3.87	3.87	46.82
0.00174	0.0442	4.50	325	3.67	3.67	50.49
0.00146	0.0372	4.75	400	3.58	3.58	54.07
0.00123	0.0313	5.00	450	3.58	3.58	57.65
0.000986	0.0250	5.32	500	4.57	4.57	62.21
0.000790	0.0201	5.64	635	4.52	4.52	66.73
0.000615	0.0156	6.00		4.92	4.92	71.65
0.000435	0.0110	6.50		6.71	6.71	78.36
0.000308	0.00781	7.00		6.04	6.04	84.40
0.000197	0.00500	7.65		5.88	5.88	90.28
0.000077	0.00195	9.00		5.94	5.94	96.22
0.000038	0.000977	10.00		2.18	2.18	98.40
0.000019	0.000488	11.00		1.44	1.44	99.84
0.000015	0.000375	11.38		0.16	0.16	100.00
TOTALS				100.00	100.00	100.00

Cumulative Weight Percent greater than			
Weight percent	**Phi Value**	**Particle Size Inches**	**Particle Size Millimeters**
5	0.93	0.0207	0.525
10	1.65	0.0125	0.319
16	2.30	0.0080	0.203
25	2.94	0.0051	0.131
40	3.82	0.0028	0.071
50	4.47	0.0018	0.045
60	5.16	0.0011	0.028
75	6.25	0.0005	0.013
84	6.97	0.0003	0.008
90	7.61	0.0002	0.005
95	8.72	0.0001	0.002

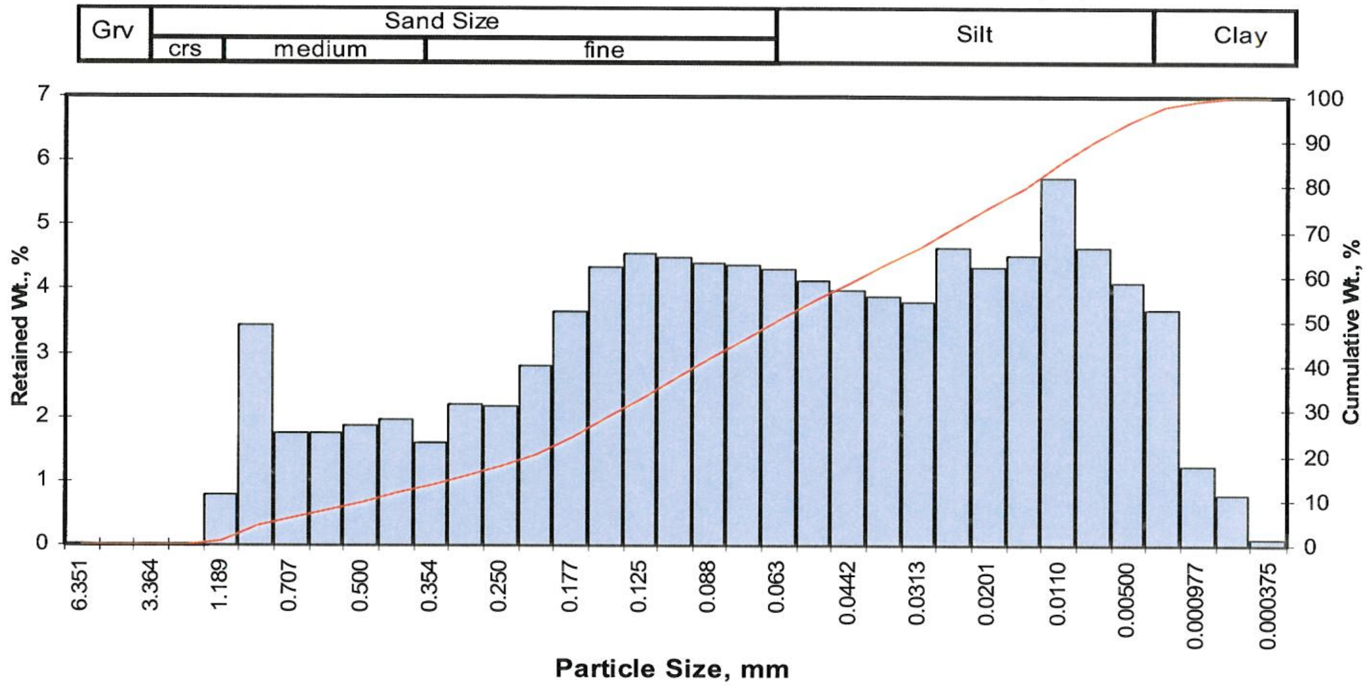
Measure	Trask	Inman	Folk-Ward
Median, phi	4.47	4.47	4.47
Median, in.	0.0018	0.0018	0.0018
Median, mm	0.045	0.045	0.045
Mean, phi	3.80	4.64	4.58
Mean, in.	0.0028	0.0016	0.0016
Mean, mm	0.072	0.040	0.042
Sorting	3.153	2.332	2.347
Skewness	0.916	0.072	0.082
Kurtosis	0.187	0.671	0.964
Grain Size Description (ASTM-USCS Scale)	Silt (based on Mean from Trask)		

Description	Retained on Sieve #	Weight Percent
Gravel	4	0.00
Coarse Sand	10	0.00
Medium Sand	40	7.25
Fine Sand	200	31.56
Silt	>0.005 mm	51.47
Clay	<0.005 mm	9.72
	Total	100

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client:	CH2M Hill	**PTS File No:**	40462
Project:	Halaco Superfund Site	**Sample ID:**	SM-LGT3-A
Project No:	385135-FI-01	**Depth, ft:**	0-0.5



Opening Inches	Opening Millimeters	Phi of Screen	U.S. No.	Sample Weight, grams	Increment Weight, percent	Cumulative Weight, percent
0.2500	6.351	-2.67	1/4	0.00	0.00	0.00
0.1873	4.757	-2.25	4	0.00	0.00	0.00
0.1324	3.364	-1.75	6	0.00	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00	0.00
0.0468	1.189	-0.25	16	0.77	0.77	0.77
0.0331	0.841	0.25	20	3.43	3.43	4.20
0.0278	0.707	0.50	25	1.76	1.76	5.96
0.0234	0.595	0.75	30	1.75	1.75	7.71
0.0197	0.500	1.00	35	1.88	1.88	9.59
0.0166	0.420	1.25	40	1.95	1.95	11.54
0.0139	0.354	1.50	45	1.61	1.61	13.15
0.0117	0.297	1.75	50	2.21	2.21	15.36
0.0098	0.250	2.00	60	2.16	2.16	17.52
0.0083	0.210	2.25	70	2.80	2.80	20.32
0.0070	0.177	2.50	80	3.64	3.64	23.96
0.0059	0.149	2.75	100	4.33	4.33	28.29
0.0049	0.125	3.00	120	4.56	4.56	32.85
0.0041	0.105	3.25	140	4.49	4.49	37.34
0.0035	0.088	3.50	170	4.40	4.40	41.74
0.0029	0.074	3.75	200	4.38	4.38	46.12
0.0025	0.063	4.00	230	4.31	4.31	50.43
0.0021	0.053	4.25	270	4.14	4.14	54.57
0.00174	0.0442	4.50	325	3.99	3.99	58.56
0.00146	0.0372	4.75	400	3.89	3.89	62.45
0.00123	0.0313	5.00	450	3.81	3.81	66.26
0.000986	0.0250	5.32	500	4.65	4.65	70.91
0.000790	0.0201	5.64	635	4.35	4.35	75.26
0.000615	0.0156	6.00		4.53	4.53	79.79
0.000435	0.0110	6.50		5.72	5.72	85.51
0.000308	0.00781	7.00		4.64	4.64	90.15
0.000197	0.00500	7.65		4.09	4.09	94.24
0.000077	0.00195	9.00		3.67	3.67	97.91
0.000038	0.000977	10.00		1.23	1.23	99.14
0.000019	0.000488	11.00		0.77	0.77	99.91
0.000015	0.000375	11.38		0.09	0.09	100.00
TOTALS				100.00	100.00	100.00

Cumulative Weight Percent greater than

Weight percent	Phi Value	Particle Size Inches	Particle Size Millimeters
5	0.36	0.0306	0.777
10	1.05	0.0190	0.482
16	1.82	0.0111	0.282
25	2.56	0.0067	0.170
40	3.40	0.0037	0.095
50	3.97	0.0025	0.064
60	4.59	0.0016	0.041
75	5.62	0.0008	0.020
84	6.37	0.0005	0.012
90	6.98	0.0003	0.008
95	7.92	0.0002	0.004

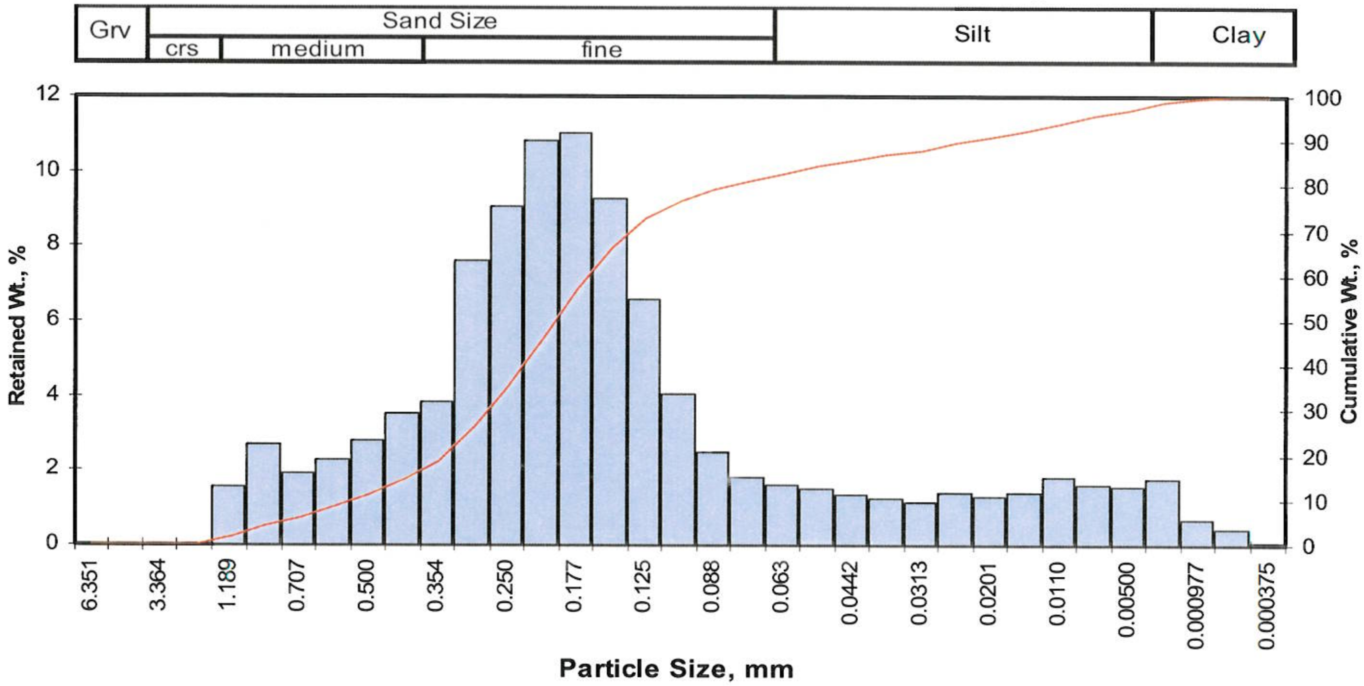
Measure	Trask	Inman	Folk-Ward
Median, phi	3.97	3.97	3.97
Median, in.	0.0025	0.0025	0.0025
Median, mm	0.064	0.064	0.064
Mean, phi	3.40	4.10	4.06
Mean, in.	0.0037	0.0023	0.0024
Mean, mm	0.095	0.058	0.060
Sorting	2.888	2.272	2.281
Skewness	0.923	0.053	0.049
Kurtosis	0.157	0.664	1.012
Grain Size Description (ASTM-USCS Scale)	Fine sand (based on Mean from Trask)		

Description	Retained on Sieve #	Weight Percent
Gravel	4	0.00
Coarse Sand	10	0.00
Medium Sand	40	11.54
Fine Sand	200	34.58
Silt	>0.005 mm	48.12
Clay	<0.005 mm	5.76
	Total	100

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client:	CH2M Hill	**PTS File No:**	40462
Project:	Halaco Superfund Site	**Sample ID:**	SM-LGT4-A
Project No:	385135-FI-01	**Depth, ft:**	0-0.5



Opening Inches	Opening Millimeters	Phi of Screen	U.S. No.	Sample Weight, grams	Increment Weight, percent	Cumulative Weight, percent
0.2500	6.351	-2.67	1/4	0.00	0.00	0.00
0.1873	4.757	-2.25	4	0.00	0.00	0.00
0.1324	3.364	-1.75	6	0.00	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00	0.00
0.0468	1.189	-0.25	16	1.56	1.56	1.56
0.0331	0.841	0.25	20	2.71	2.71	4.27
0.0278	0.707	0.50	25	1.90	1.90	6.17
0.0234	0.595	0.75	30	2.28	2.28	8.45
0.0197	0.500	1.00	35	2.79	2.79	11.24
0.0166	0.420	1.25	40	3.50	3.50	14.74
0.0139	0.354	1.50	45	3.85	3.85	18.58
0.0117	0.297	1.75	50	7.62	7.62	26.20
0.0098	0.250	2.00	60	9.06	9.06	35.26
0.0083	0.210	2.25	70	10.80	10.80	46.06
0.0070	0.177	2.50	80	11.00	11.00	57.05
0.0059	0.149	2.75	100	9.28	9.28	66.33
0.0049	0.125	3.00	120	6.56	6.56	72.89
0.0041	0.105	3.25	140	4.05	4.05	76.94
0.0035	0.088	3.50	170	2.48	2.48	79.41
0.0029	0.074	3.75	200	1.81	1.81	81.22
0.0025	0.063	4.00	230	1.60	1.60	82.82
0.0021	0.053	4.25	270	1.49	1.49	84.31
0.00174	0.0442	4.50	325	1.36	1.36	85.67
0.00146	0.0372	4.75	400	1.24	1.24	86.91
0.00123	0.0313	5.00	450	1.16	1.16	88.07
0.000986	0.0250	5.32	500	1.39	1.39	89.46
0.000790	0.0201	5.64	635	1.31	1.31	90.77
0.000615	0.0156	6.00		1.39	1.39	92.16
0.000435	0.0110	6.50		1.81	1.81	93.97
0.000308	0.00781	7.00		1.58	1.58	95.55
0.000197	0.00500	7.65		1.56	1.56	97.11
0.000077	0.00195	9.00		1.78	1.78	98.89
0.000038	0.000977	10.00		0.68	0.68	99.57
0.000019	0.000488	11.00		0.39	0.39	99.96
0.000015	0.000375	11.38		0.04	0.04	100.00
TOTALS				100.00	100.00	100.00

Cumulative Weight Percent greater than

Weight percent	Phi Value	Particle Size Inches	Particle Size Millimeters
5	0.35	0.0310	0.787
10	0.89	0.0213	0.540
16	1.33	0.0156	0.397
25	1.71	0.0120	0.306
40	2.11	0.0091	0.232
50	2.34	0.0078	0.198
60	2.58	0.0066	0.167
75	3.13	0.0045	0.114
84	4.20	0.0021	0.055
90	5.45	0.0009	0.023
95	6.83	0.0003	0.009

Measure	Trask	Inman	Folk-Ward
Median, phi	2.34	2.34	2.34
Median, in.	0.0078	0.0078	0.0078
Median, mm	0.198	0.198	0.198
Mean, phi	2.25	2.76	2.62
Mean, in.	0.0083	0.0058	0.0064
Mean, mm	0.210	0.147	0.162
Sorting	1.636	1.433	1.698
Skewness	0.946	0.297	0.341
Kurtosis	0.185	1.261	1.870

Grain Size Description (ASTM-USCS Scale)	Fine sand (based on Mean from Trask)

Description	Retained on Sieve #	Weight Percent
Gravel	4	0.00
Coarse Sand	10	0.00
Medium Sand	40	14.74
Fine Sand	200	66.49
Silt	>0.005 mm	15.88
Clay	<0.005 mm	2.89
	Total	100

PTS Laboratories
ENVIRONMENTAL SERVICES

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

COMPANY: CH2M HILL

ADDRESS: 6 Hutton Centre Dr. CITY: Santa Ana ZIP CODE: 92707

PROJECT MANAGER: Mark Wuttig

PROJECT NAME: Halaco Superfund Site PHONE NUMBER: 805-402-3407

PROJECT NUMBER: 385135.FI.01 FAX NUMBER:

SITE LOCATION: 6200 Perkins Road, Oxnard, CA

SAMPLER SIGNATURE: [signature]

PO#:

TURNAROUND TIME: 24 HOURS ☐ 48 HOURS ☐ 72 HOURS ☐ 5 DAYS ☐ NORMAL ☒ OTHER:

SAMPLE INTEGRITY (CHECK): INTACT ✓ ON ICE ✓

PTS QUOTE NO.:

PTS FILE: 40462

ANALYSIS REQUEST

SAMPLE ID NUMBER	DATE	TIME	DEPTH, FT	NUMBER OF SAMPLES (JS 6-30-10)	SOIL PROPERTIES PACKAGE	HYDRAULIC CONDUCTIVITY PACKAGE	PORE FLUID SATURATIONS PACKAGE	TCEQ/TNRCC PROPERTIES PACKAGE	CAPILLARITY PACKAGE	FLUID PROPERTIES PACKAGE	PHOTOLOG: CORE PHOTOGRAPHY	MOISTURE CONTENT, ASTM D2216	POROSITY: TOTAL, API RP40	POROSITY: EFFECTIVE, ASTM D425M	SPECIFIC GRAVITY, ASTM D854	BULK DENSITY (DRY), API RP40 or ASTM D2937	AIR PERMEABILITY, API RP40	HYDRAULIC CONDUCTIVITY, EPA9100, API RP40, D5084	GRAIN SIZE DISTRIBUTION, ASTM D422/4464M	TOC: WALKLEY-BLACK	ATTERBERG LIMITS, ASTM D4318	COMMENTS
✓ SM-LGT1-A	6/10/10	1020	0-0.5	2															X	~~X~~	X	
✓ SM-LGT2-A	6/14/10	1445	0-0.5	2															X		X	
✓ SM-LGT3-A	6/10/10	1124	0-0.5	2															X		X	
✓ SM-LGT4-A	6/9/10	1245	0-0.5	2															X		X	

1. RELINQUISHED BY	2. RECEIVED BY	3. RELINQUISHED BY	4. RECEIVED BY
[signature]	[signature]		
COMPANY: CH2M HILL	COMPANY: PTS LABS Inc	COMPANY:	COMPANY:
DATE: 6/29/10 TIME: 1100	DATE: 6/30/10 TIME: 1306	DATE: TIME:	DATE: TIME: