

Halaco Engineering Company
TDD: TO1-09-06-04-0007
May 16, 2008



Team 9, a Joint Venture
3700 Industry Ave
Lakewood, CA 90712
Tel: (562) 989-8494
Fax: (562) 989-8537

May 16, 2008

United States Environmental Protection Agency
2250 Obispo Ave, Suite 101
Signal Hill, California 90755

TDD: TO1-09-06-04-0007

Attention: Robert Wise, Federal On-Scene Coordinator

**Subject: Summary Report, Halaco Metal Recyclers
6200 Perkins Road
Oxnard, CA**

Latitude: 34.139214° North, Longitude: -119.183792° West

Dear Mr. Wise:

Attached is the summary report for the Halaco Metal Recyclers site in Oxnard, Ventura County, California.

Please feel free to contact me at 310-984-3494 with any questions or comments you may have regarding the report.

Regards,

A handwritten signature in black ink, appearing to read "Chad Gibson".

Chad Gibson, CHMM
START Project Manager

cc: Electronic Deliverable Systems 2

START Project File

Summary Report Halaco Metal Recyclers

**6200 Perkins Road
Oxnard, California**

Prepared For:

**United States Environmental Protection Agency
Region IX, Emergency Response Section
2250 Obispo Avenue, Suite 101
Signal Hill, California 90755**

Prepared By:



**U.S. EPA START Contractor – Team 9
3700 Industry Avenue, Suite 102
Lakewood, California 90712**

May 16, 2008

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1.0 INTRODUCTION

The Team 9 Superfund Technical Assessment and Response Team (START) prepared this summary report for of the Halaco Engineering Co. (Halaco) site in Oxnard, California for the United States Environmental Protection Agency (U.S. EPA) under technical direction document (TDD) TO1-09-06-04-0007. START performed the following activities at the site: two removal assessments, potentially responsible party (PRP) clean-up oversight, site stabilization activities, radiation assessment, and oversight of scrap metal recovery.

This summary report will consist of the following sections:

- Section 1.0, Introduction
- Section 2.0, Site Background
- Section 3.0, Removal Assessments
- Section 4.0, PRP Clean-up Oversight
- Section 5.0, Site Stabilization
- Section 6.0, Radiation Assessment
- Section 7.0, Scrap Metal Recovery
- Section 8.0, Summary

All tables for the summary report are provided in Attachment A; figures in Attachment B; health and safety plan in Attachment C; sampling plans in Attachment D; data validation reports in Attachment E; and boring logs in Attachment F.

2.0 SITE BACKGROUND

This section discusses information regarding the Halaco site location, description and site history.

2.1 Site Location

Halaco is located at 6200 Perkins Road, Ventura County, Oxnard, California (Attachment B, Figure 2-1). The Halaco site consists of two parcels of land separated by the Oxnard Industrial Drain (OID) (Figure 2-2). A former smelter consisting of 15 acres is located on the west side of the OID and a waste disposal area (including a waste management unit [WMU]) consisting of 27 acres is located on the east side of the OID. The OID drains to the Pacific Ocean, approximately 300 feet to the south. Some waste material generated during the smelting process was used as fill material for expansion and creation of concrete structures. Currently the smelter area consists of several abandoned concrete structures and large paved and unpaved surfaces.

2.2 Operation History

Halaco operated at this location from 1965 through 2004. During this time, aluminum scrap metals obtained from shredded cans, machine shop shavings, aluminum-copper radiators, and blocks of partially processed scrap aluminum from other countries were recycled on site. This scrap aluminum contained an estimated 1 to 3 percent copper, plus silver, zinc, lead, chromium, titanium, tin, and minute quantities of other impurities.

Following the smelting process, many of the process wastes, including slag, process waters, and other solid and liquid wastes generated over the life of the facility, were disposed in the waste disposal area, which includes the WMU. A waste pile from site activities covers approximately 14 acres at the eastern portion of the site; additional waste impoundment covers approximately 13 acres to the north of the waste pile.

In addition slag/waste material appears to have been used as fill to level the site for expansion and creation of concrete structures and pavings in the 15 acre smelter area of the facility.

Historical data indicate that the process wastes disposed of on-site contain concentrations of metals significantly above background and process wastes containing concentrations of radioactive materials that are significantly above background. Historic data suggest that these contaminants have likely migrated into adjacent waters including the OID and the Pacific Ocean.

Halaco filed for bankruptcy protection and reorganization under Chapter 11 of the U.S. Bankruptcy Code on July 24, 2002. Halaco ceased operations in late 2004 when it apparently lacked funds to operate in compliance with its air quality permit. In addition to multiple air quality violations, Halaco had outstanding environmental obligations to different state and local agencies and to nonprofit organizations when it stopped operating. The U.S. Bankruptcy Court converted the case to a Chapter 7 (liquidation) bankruptcy on January 10, 2006.

2.3 Regulatory History

During its 40 years of operation, Halaco incurred regulatory interest from federal, state, and local regulatory agencies including the U.S. EPA and Army Corps of Engineers (USACE or ACOE) enforcement actions under the Clean Water Act (CWA). The California Department of Toxic Substances Control (DTSC), the Los Angeles Regional Water Quality Control Board (LARWQCB), the California Department of Health Services (DHS) Radiologic Health Branch (RHB), the Ventura County Air Pollution Control District (VCAPCD), the Ventura County District Attorney, and the City of Oxnard have initiated administrative, civil, and/or criminal actions against Halaco for alleged regulatory violations. Additionally, nonprofit public interest organizations have sued Halaco.

In July 1969, Halaco obtained a Radioactive Materials License from the RHB to handle magnesium-thorium alloy in the form of scrap metal. The permit expired in August 1974, but was never formally terminated. Between 1965 and 1977, it was estimated that Halaco received and processed 500 to 600 pounds of magnesium thorium scrap per year.

Historically, waste solids from the WMU were dredged and deposited on the WMU berms. At some point Halaco began depositing waste solids on the disputed 15-acre wetlands area to the north of the WMU. On June 9, 1977, the USACE served a Cease and Desist Order (CDO) to Halaco to stop dumping solid waste material into the wetlands area north of the WMU without a permit. This CDO was rescinded after a United States District Court ruled that the area was not a navigable water and therefore not under the ACOE jurisdiction.

Halaco was identified by U.S. EPA as a potential hazardous waste site and entered into the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) on November 1, 1979 (EPA Identification Number CAD009688052).

In early 1980, the U.S. EPA issued Halaco an enforcement order under the CWA stating that the disposal site was a wetland and required a National Pollutant Discharge Elimination System permit

for operation. The U.S. EPA obtained a preliminary injunction prohibiting further disposal to the 15 acre area north of the WMU. Also in 1980, the LARWQCB issued revised waste discharge requirements limiting waste discharge to the current disposal site. Numerous lawsuits ensued.

A Preliminary Assessment/Site Inspection was completed for the U.S. EPA by Ecology & Environment, Inc. on April 1, 1983.

An Expanded Site Inspection was completed for the U.S. EPA by Ecology & Environment, Inc. on August 7, 1992.

In 2000, the City of Oxnard Fire Department served a search warrant for illegal disposal of oil into site process equipment, ultimately being discharged into the WMU. Also in 2000, ACOE informed the LARWQCB that the area east of the WMU, beyond Halaco's property line, was a jurisdiction wetland.

In June 2000, the LARWQCB estimated that 430,000 cubic yards of waste material were present in the WMU at thicknesses varying between 20 and 40 feet. In June 2000, ACOE staff informed the LARWQCB that the area east of Halaco's surface impoundment was comprised of a substantial area of wetlands subject to Army Corp of Engineers (ACOE) jurisdiction.

In September 2002, Halaco ceased discharging into the WMU in response to the LARWQCB's March 2002 CDO No. R4-2002-0064 and began operating a filter press to process waste material. Sewer discharge ceased in June 2003 when the permit to discharge terminated and was not renewed.

Pursuant to the March 2002 CDO, Halaco characterized site wastes to determine whether the solid waste was inert. Based on Halaco's report, the LARWQCB determined that the solid waste was not inert due to elevated levels of ammonia that could be released to ground and surface waters.

In July 2003, the LARWQCB issued a Notice of Violation for piles of filter cake improperly stored at the smelter side of the property. In October 2003, the LARWQCB issued Halaco Cleanup and Abatement Order R4-2003-0135 to remove the filter cake (process waste solids). Halaco's past waste disposal practices were cited as creating conditions of pollution that violated Order 80-58, which threatened pollution to Ormond Beach and wetlands, the OID, and the Oxnard Plain groundwater.

In November 2003, the California DHS RHB issued an Order to Characterize Radioactive Materials at the site believing that residual levels of thorium and cesium were contained in the materials in the WMU, along the OID, and in the water transport system at the site.

In late 2004, all Halaco process operations ceased. Employees were terminated; filter cake and baghouse dust was sent to La Paz Landfill in Arizona for disposal. In a letter dated June 6, 2005, Halaco informed the LARWQCB that they did not have the funds to complete the required site characterization.

In June 2006, the U.S. EPA Emergency Response Section and Site Assessment Section conducted a joint hazard ranking system (HRS) Integrated Assessment (IA) to determine eligibility to the National Priority List (NPL). Halaco was placed on the NPL list on September 2007. The IA is further discussed in Section 3.0.

The U.S. EPA entered into a Consent Agreement with the PRP in mid-2006 to remove all containerized hazardous substances from the smelter facility (excluding process solids), consolidate all loose process solids in the smelter into one of the buildings, secure the smelter and WMU and place sediment runoff control measures. The PRP removal was completed on February 7, 2007. Oversight of the PRP removal action is further discussed in Section 4.0.

On June 9, 2006, U.S. EPA determined that a time-critical removal action was appropriate at the site to, among other response actions, secure the facility, remove existing containers of hazardous substances, and generally stabilize portions of the site. On July 19, 2006, EPA entered into an Administrative Settlement Agreement and Order on Consent with the current owners of Halaco and a former operator to implement the removal action under EPA oversight.

3.0 U.S. EPA REMOVAL ASSESSMENTS

In 2006 U.S. EPA Emergency Response Section (ERS) became involved in the assessment of the Halaco site to determine the threat to human health and the environment from historical wastes and contamination at the site. Given the site conditions, U.S. EPA also decided to evaluate the site for potential additional response actions.

U.S. EPA has conducted several assessments at the Halaco site to assess the threat to human health and the environment. These assessments include:

1. March 23, 2006, U.S EPA ERS, U.S. EPA Office of Radiation and Indoor Air (ORIA), and START WMU Survey
2. April 20 to 21 2006, U.S. EPA and START smelter hazardous substance inventory
3. June 2006, U.S. EPA, START, Weston IA

3.1 WMU Survey

On March 23, 2006, the WMU was randomly surveyed with Sodium Iodine (NaI) detectors by Roger Shura, Scott Faller of U.S. EPA Office of Radiation and Indoor Air and Gerlyn Perlas (START contractor), using a Model 192 (μ R meter), Model 2221 scaler/ratemeter with 3"x 3" NaI detector, Surveillance and Measurement System (SAM) 935 with 2"x 2" NaI detector and Model 2241 with 100 cm² alpha scintillation detector.

The survey was not comprehensive but covered the lower perimeter of the WMU with a walking scan that detected three significant area anomalies above 30,000 counts per minute (cpm) above background. The SAM 935 spectrum at these locations was consistent with peaks of the Th-232 chain in equilibrium. Other locations around the perimeter indicated elevated anomalies slightly above background.

The largest anomaly was around the southeast corner leading into the grassland area adjacent to the Pacific Ocean. The natural drainage and time span may suggest leaching of radionuclide from under the overburden.

The top section of the WMU survey had a low background count rate due to large quantities of overburden. Handheld detectors do not have the sensitivity for defining anomalies on top of the overburden.

The north eastern road section of the foundry revealed hard concrete like substrate near the surface with a count rate several times higher than background and consistent with Th-232 in equilibrium.

Spot surveys of hard surfaces throughout the site revealed alpha contamination near 100 disintegrations per minute (dpm) at several locations. The alpha contamination (fixed or removable) was not determined during this site visit.

For determining overall relative gamma level locations on the WMU pile and adjacent areas, the Environmental Radiological Ground Scanner system can map the statistical variations of the surface and shallow depth near the surface. This system has eight 4 inch x 4 inch x 16 inch shielded NaI detectors summed to one output. The output in gamma counts per second are displayed in real-time on an aerial photograph and Multi Channel Scaling graph simultaneously. In-situ gamma analysis is suitable for determination of the surface radionuclide composition in several areas of the WMU, the foundry and the nearby wetlands.

3.2 Smelter Hazardous Material Inventory

On April 20 to 21 2006, U.S. EPA and START performed an inventory of hazardous materials at the Smelter. The focus of the assessment was to prepare an inventory of possible hazardous waste on the foundry portion of the property. Additionally, representative process waste samples were collected and analyzed for enforcement and disposal purposes.

For inventory purposes, the site buildings were identified as:

- B-1 representing the main office, laboratory and equipment service building located on the northern portion of the foundry;
- B-2 representing the foundry building where scrap metal was heated and processed, located in the central portion of the foundry; and
- B-3, south of B-2, where for a short time, waste materials were processed into fertilizer material.

The yard area was divided into 4 areas identified as:

- Y-1 representing the central western portion south of B-1 and west of B-2;
- Y-2 north of B-2 and east of B-1;
- Y-3 on the southeastern portion of the foundry, south and east of B-3; and
- Y-4 located north of B-1.

Figure 3-1 in Attachment B illustrates the building and yard locations. Three sheds located west of B-2 were identified as S-1, S-2, and S-3 (numbered west to east). The domed area in Y1 was divided into 8 bays, in between B-2 and S-3 and was identified as D-1 through D-8 (numbered east to west). Shipping containers located throughout the yards were identified with “C” followed by a numerical number (C-1 through C-37).

A rough inventory is provided in Attachment A, Table 3-1. Limited field hazard categorization was performed on suspect materials. In general, waste types encountered at the site included acids, bases, cylinders, fuels, grease, oil, finished product, paint related waste, process waste solids, scrap metals, and various unknowns and empty containers.

The warehouse area of B-1 contained mostly fuels, oils and greases, large batteries, paint-related products, and acids. Of note were 6 one gallon containers of hydrofluoric acid. The laboratory on the second floor of B-1 had various small quantities of acids and metal solutions. Building B-2 contained over 1,000 cubic yards of process waste material and large quantities of magnesium and potassium chloride solids. Building B-3 contained several large aboveground storage tanks (ASTs) and over 100 cubic yard sacks of process waste material.

Storage containers throughout the yard were 20 feet long. Most of the containers either stored loose or cubic yard sacks of waste process material. Containers in Y-1 held mostly equipment maintenance type chemicals (oils, grease, paint-related) or debris. The domed area in Y-1 had approximately 248 cubic yard sacs of process waste material along with various scrap metal. Sheds 2 and 3 contained miscellaneous debris. Shed 1 (S-1) contained small amounts of miscellaneous chemicals including magnesium powder.

Containers in Y-2 held cubic yard sacs of process waste material, finished product, metal parts, salts, and various other process related chemicals in original packaging. Containers in Y-3 held loose process waste material.

The process tumbler was located in Y-3 along with various discarded cylinders, large ASTs, secondary containment areas, and a few miscellaneous 5 and 55 gallon drums. An estimated 2,000 gallons of acidic rainwater (field pH 2) was observed in a secondary containment area west of B-3 (container Y-3-21). Several large ASTs are located in Y-4; most of which appeared to be empty.

The following is a brief summary of large items found during the Hazardous Waste Inventory:

- 1,700 cubic yards of process waste solid was observed on the foundry portion of the site.
- 8267 gallons of an unknown liquid existed in Shed 1 on the Southwest corner of the property.
- 85 gallons of magnesium powder approximately ½ full.
- Approximately 655 gallons of oil and grease.
- 450 gallons of 99% graphite powder.
- 220 gallons contained in 2-55 gallon containers of 29% ammonium hydroxide.
- 8460 lbs of magnesium alloys.
- 50 lbs x 11 equaling 550 lbs of substance named 73M Phos PI (phosphoric acid, solid) Chromium Oxide and Phosphoric Acid Graphite and Pitch, pH3).
- A 24ft tall x 10ft wide, 13,481 gallon metal AST.
- A 8ft x 5ft x 10ft, 2,992 gallon fiberglass AST, "Liquid fertilizer" pH 7 Chlorinated liquid Hazcat ID D-gluconic Acid.
- A 15ft x 3ft, 1047 gal metal AST.
- A 30ft x 8ft round 1000 gal indicated UN1993 AST in the SW corner.
- A 4ft tall x 5ft wide 576 gal metal AST. The pH ranged between 8-9 solids in bottom.
- A 4ft circular 247 gal vessel.
- A 200 gal AST is located next to tumbler in sump area.

Following the inventory START collected samples of selected items/ process waste material for further characterization. START prepared an *Emergency Response and Time Critical QASP for Container Sampling*. The sampling design was judgmental sampling, based on the professional judgment of START and U.S. EPA. Composite samples were collected from each of the main process solid storage areas. Process waste material samples were analyzed for total metals by EPA Method 6010B, California Soluble Threshold Limit Concentration (STLC) metals by California Wet Method/EPA Method 6010B, federal toxicity characteristic leaching procedure (TCLP) metals by EPA Method 1311/6010B, and total ammonia (NH₃-N) by EPA Method 350.2.

Additionally, one liquid sample was collected from a large secondary containment area just west of B-3 with a field pH of 2 (sample ID Y-3-21). The liquid sample was analyzed for volatile organic compounds (VOCs) by EPA Method 8260B, semi-volatile organic compounds (SVOCs) by EPA Method 8270C, pH by EPA Method 9040, and total metals by EPA Method 6010B.

Sample location descriptions are provided in the table below.

Halaco Process Waste Solid Sample Location Descriptions		
Location	Sample No.	Description
Building 2	B.2S.1	8 cubic yard sacks in front of the big pile, bags marked
Building 2	B.2S.2	Piles, bags and boxes around the control room, strong ammonia odor
Building 2	B.2S.3	Front of the big pile, strong ammonia odor
Building 2	B.2S.4	Bags near east entrance
Container 24	C.24S.1	First two bags in box
Container 29	C.29S.1	One scoop each bag
Yard 1	Y.1S.1	East covered revetment
Yard 1	Y.1S.2	West covered revetment
Yard 2	Y.2S.1	Solids from ground next to B-2
Yard 3	Y.3S.1A	Ground solids between B-2 and B-3
Yard 3	Y.3S.1B	Ground solids between B-2 and B-3
Yard 3	Y.3S.4	Solids from the north facing revetments

Sample analytical results are provided in Attachment A, Table 3-2. The summary of the results indicated the following:

Total Metals

Total metal results for process waste samples were compared to California total threshold limit concentrations (TTLC). Only beryllium exceeded TTLC levels. Beryllium concentrations ranged from 33.6 to 148 milligrams per kilogram (mg/kg); 4 samples exceeded the beryllium TTLC of 75 mg/kg. Copper, which exceeded TTLC levels in some process waste samples, ranged from 14.6 to 193 mg/kg, well below the copper TTLC of 2,500 mg/kg.

STLC Metals

STLC metal results for process waste samples were compared to California STLC. Only beryllium exceeded STLC levels. Beryllium concentrations ranged from 0.431 to 6.15 milligrams per liter (mg/l); 11 of the 12 samples exceeded the beryllium STLC of 0.75 mg/l. Copper STLC concentrations ranged from below the detection limit to 3.48 mg/l.

TCLP Metals

TCLP metal results from process waste samples were compared to federal TCLP values. None of the metal concentrations exceeded their respective TCLP criteria. Note that beryllium and copper do not have a TCLP values.

Total Ammonia (NH₃-N)

Process waste samples for total ammonia concentrations ranged from 20 to 373 mg/kg.

Sample Y.3.21

Relatively low levels of VOCs and metals were detected in sample Y.3.21. All SVOCs were below the detection limit. The laboratory pH was 2.13.

3.3 Integrated Assessment

In June 2006 Weston Solutions, Inc. (WESTON[®]) performed an HRS IA at Halaco in support of the U.S. EPA ERS for potential time-critical removal efforts. The HRS assessed the relative threat associated with the actual or potential release of hazardous substances to the environment. The HRS is the primary method for determining a site's eligibility for placement on the National Priorities List (NPL). The results of the HRS are further detailed in WESTON's[®] *Integrated Assessment Report Halaco Engineering Co*, dated September 22, 2006.

4.0 PRP CLEAN-UP OVERSIGHT

From August 21, 2006 to October 14, 2006, START provided PRP oversight for the cleanup, consolidation, and removal of potentially hazardous waste from the Halaco metal recycling facility. The PRP hired Patriot Environmental Services (Patriot) to perform the work. Patriot, the primary contractor, submitted a Work Plan and Health and Safety Plan (HASP) for review and approval by U.S. EPA and START. Patriot provided 40-hr HAZWOPER certified personnel for all cleanup activities; personnel worked in Level C personal protective equipment (PPE). Thomas Gray Associates was contracted by Patriot to remove, transport, and dispose of the thorium plate, which was handled as radioactive waste.

The HASP included a plan for air monitoring during cleanup activities. START oversaw the set-up of air monitoring equipment and operation of the equipment throughout cleanup activities.

Cleanup activities included collection of scattered hazardous materials, vacuuming of mixed solid waste, emptying of diesel storage tanks, removal of collected water beneath smelter building, removal of scrap metal and removal of a thorium plate. START provided oversight during each of these activities.

Initial activities consisted of collection and consolidation of various materials such as aerosol cans, paint waste, and laboratory chemicals. Lab waste consisting of 4 cubic yard boxes of paint waste, two 55 gallon drums of aerosol cans, one 5 gallon propane cylinder, one 5 gallon bucket of alkaline batteries, and one 55 gallon drum plus one pallet of lead acid batteries were collected and contained in eight lab packs of various sizes.

A front end loader was used to remove mixed waste from concrete lined storage bins, pick up large waste, and collect material from the burn ash pit. Vacuuming of mixed solid waste was done using a Guzzler. Approximately 1000 cubic yards of material was picked up during the vacuuming operations.

One 5000 gallon diesel fuel storage tank containing approximately 1700 gallons of diesel fuel was emptied and rinsed. In addition, one 500 gallon diesel fuel storage tank containing approximately 125 gallons of fuel was emptied and rinsed.

An unknown quantity of water collected from beneath the smelter building was vacuumed up and disposed.

Removal of scrap metal and demolition of metal Conex boxes and other metal structures on the grounds took place between June 2007 and August 2007. START was on scene on random days for oversight purposes. The scrap metal crew disassembled approximately 40 Conex boxes and 2 large metal cylinders (15 feet in diameter by 40 feet long), and collected loose scrap metal from the grounds for removal. In addition, 36 skids of scrap magnesium (1 cubic yard pallet boxes) were hauled off by PRP subcontractor.

5.0 U.S. EPA STABILIZATION EFFORT

In February 2007, U.S. EPA ERS and the Emergency Rapid Response Services contractor (ERRS) and START mobilized to Halaco to conduct stabilization of the WMU. The WMU is approximately 14 acres in size and contains approximately 430,000 cubic yards of the process waste material generated over the 40-year operational period of the facility. The WMU is an unlined surface impoundment capped with an evaporation or settling pond. Historical data indicated that process wastes disposed of in the WMU contained metals, ammonia and radionuclides. The purpose of stabilization of the WMU was to control contaminated runoff from the site, windborne erosion of contaminants, and runoff erosion of sediments into the OID, Nature Conservancy Lands, and the Ormond Beach Wetlands. START was tasked to perform air sampling and monitoring during stabilization activities conducted by the U.S. EPA ERRS removal contractor.

Prior to mobilization to the site, the START prepared a site-specific HASP to all cover all initial site activities. The START and ERRS HASPs were consolidated into a combine U.S. EPA HASP at the site. The HASP was modified throughout the duration of the field work to cover all work performed on site, and is appended to this report in Attachment C.

The following section summarizes all field activities associated with stabilization efforts of the WMU by the U.S. EPA, ERRS, ORIA, and START.

5.1 Stabilization of the WMU

ERRS conducted stabilization activities of the WMU from February 5, 2007 through May 18, 2007. ERRS developed an Erosion Control Plan for the stabilization of the WMU, which detailed engineering specifications for grading, drainage and cover material. ERRS contracted a surveyor, So Cal Surveyors, to monitor compliance with the engineering specifications. ERRS performed all stabilization work in Level C protection due to health hazards posed by inhalation of air borne contaminants, including alpha particles.

ERRS heavy equipment operators re-graded the WMU with a 3-to-1 slope using various pieces of heavy equipment. ERRS placed the process waste material from sloping activities into the evaporation/settling ponds on top of the WMU using various pieces of heavy equipment. An additional 9,000 cubic yards of process waste material stored in buildings and Conex containers were removed and placed on the WMU. ERRS also removed approximately 68 cubic yards of process solids from the banks of the OID.

Following completion of grading activities, ERRS placed approximately 141,000 square yards of PermaTex™ Coir Matting 400 over the WMU and the surrounding area. The coir matting is a woven coir fiber twine and allows water infiltration and vegetation growth. ERRS secured the coir matting using approximately 70,000 wooden stakes. Silt fencing was installed around the WMU and at the eastern margin of the smelter side along the OID. The purpose of installing silt fence was to prevent any runoff to the OID and the surrounding wetlands.

Following the completion of stabilization activities in late April of 2007, approximately 6,000 feet of 6-foot chain-link fence was installed around the perimeter of the WMU. Before and after aerial photography and topographic maps of stabilization activities are presented as Figures 5-1 and 5-2, respectively.

5.2 Air Monitoring During Stabilization of WMU

START conducted air sampling and monitoring during stabilization activities using procedures specified in the START-prepared document, *EPA ERS and START Emergency Response and Time Critical QASP for Air Sampling* February 1, 2007 (Attachment D). The objectives of air sampling and monitoring were to monitor worker exposure and determine if contaminants were migrating off-site as a result of stabilization activities.

In order to document worker exposure during stabilization activities, the START conducted personal exposure sampling for metals in the air for the first 14 days of stabilization activities. START located personal sampling pumps (Gillan® GilAir 5) with mixed cellulose esters (MCE) filter in the cabs of heavy equipment. START submitted 14 MCE filters from personal pumps for definitive laboratory analysis. The samples were submitted to a START-contracted laboratory, GEL, for total metals analysis by National Institute for Occupational Safety and Health (NIOSH) Method 7300. The analytical results showed that metals concentrations were below the site-specific action level for worker safety (Attachment A, Table 5-1). Based on the results of personal exposure sampling START discontinued personal sampling and deployed five RAE Systems®, Area RAE (Area RAEs) in the work zone to monitor for ammonia. ERRS technician continued to work in Level C PPE despite the results of the personal exposure sampling as an added safety precaution.

In order to detect off-site migration of contaminants, START deployed 4 air monitoring stations when field activities commenced at Halaco. Air stations were placed generally in the same locations that the U.S. EPA collected air samples during the IA in June of 2006 and formed a perimeter around the work area. The sampling stations were identified as Air-1, Air-2, Air-3, and Air-4. The START

also deployed a background air monitoring station (Air-BKG) approximately 550 feet to the north of Halaco at the Weyerhaeuser Port Hueneme Paper Plant (Attachment B, Figure 5-3). START periodically relocated one of the air stations (Air1-4) to monitor in close proximity to new work areas (Air-5).

Each air sampling station consisted of a low volume air sampling pump (Gillan® GilAir 5), a high volume air sampling pump and a direct reading particulate monitor (ThermoScientific®, DataRam) and a direct reading ammonia monitor (Area RAE). The low volume sampling pumps with MCE filters were used to collect a daily air sample for metals in air according to NIOSH Method 7300. The high volume sampling pumps with inch diameter MCE filters were used to collect a daily air sample for radionuclides in air in accordance with the U.S. Department of Energy, Hot-Air Solder Leveling (DOE HASL) 300 Th-01-RC Method (modified). The particulate monitors were used to obtain daily average particulate concentration. The daily average particulate concentration at each station was calculated each day. Air samples (metal and radionuclides) from the air sampling station with the highest daily average particulate concentration were submitted to the laboratory for analysis.

START submitted 83 MCE cassette filters (not including 10 field blanks) from air stations to GEL Laboratories for definitive laboratory analysis. Samples were analyzed for total metals by NIOSH Method 7300. The comparison criteria for the analytical results are the 2004 U.S. EPA Preliminary Remediation Goals (PRGs) for residential air, and Occupational Safety and Health Administration permissible exposure limits for worker safety (Attachment A, Table 5-2). Field blanks showed low-levels of chromium and zinc contamination. Field blanks were not exposed to ambient air in the field, therefore the samples were likely cross-contaminated during laboratory analysis.

START submitted 34 four-inch MCE filters (not including 8 field blanks) to GEL Laboratories for definitive laboratory analysis of isotopic Thorium-228,-230,-232 by HASL 300 Th-01-RC (modified). The comparison criteria for analytical results are the 2004 U.S. EPA PRGs for thorium in residential air is displayed in Attachment A, Table 5-3. The laboratory results showed no concentrations for thorium were significantly above background or PRGs for residential air.

All laboratory results from GEL Laboratory were validated by a START chemist following *Quality Assurance/ Quality Control Guidance for Removal Activities, Sampling QA/QC Plan Validation Procedures*, OSWER Directive 9360.4-1, April 1990. The START data validation reports are appended to this report in Attachment E. The data were found to be acceptable as definitive category data, and determined to be usable to meet project use objectives.

6.0 BERM ASSESSMENTS AND REMOVAL

At the request of FOOSC Wise and ORIA, the START conducted a soil assessment of a bermed area located to the southwest of Halaco in the Ormond Beach Wetlands (Attachment B, Figure 5-4) on February 19, 2007. The berm was approximately 550 yards in length, with varying height ranging from 5 feet to 12 feet. Visual inspection of the berm prior to sampling revealed that the berm was likely composed of the process waste material from Halaco. ORIA screened the berm for radiation levels using a SAM 935, and a Ludlum 2241 with a 3 inch x 3 inch NaI gamma probe. Initial screening results identified an isotopic thorium series with gamma levels up to 3 times background.

The START collected a total of 8 surface soil samples from the berm. The purpose of the sampling was to obtain definitive data in order to determine if further assessment of the berm was necessary. All sampling was conducted using procedures specified in the START-prepared document, *ERS and START Emergency Response QASP for Soil, Water and Miscellaneous Matrix Sampling* March 05, 2007 (Attachment D). Samples were collected in accordance with this QASP and screened in the field for gamma radiation. All samples were submitted to GEL Laboratory for total metals analysis by U.S. EPA Method 6010B. Two of the samples submitted were also analyzed for isotopic Thorium-228,-230,-232 by DOE HASL 300 Th-01-RC (modified).

The total metal analysis results show no surface soils contained metals concentrations above PRGs for residential soils. However, radiation screening results in the field showed Thorium-230 and -232 isotope concentrations exceeded the PRGs for residential soils. These results indicated that thorium contamination from the Halaco site migrated from the site to the Ormond Beach Wetlands. On March 2, 2007, the U.S. EPA closed access to the Ormond Beach Wetlands from the footbridge at Perkins Road to the J Street drain (Attachment B, Figure 5-5) due to public health risks posed by elevated levels of radiation at the berm.

START performed a subsurface investigation of the berm on March 7 and 9, 2007. The purpose of the investigation was to further delineate the lateral and vertical extent contamination in the Ormond Beach Wetlands caused by migration from the Halaco site. All sampling was conducted using procedures specified in the START-prepared document, *EPA ERS and START Emergency Response QASP for Soil, Water and Miscellaneous Matrix Sampling* March 05, 2007 (Attachment D).

Soil sample locations were sited along the berm with 50-foot horizontal intervals between each location. Thirty-seven sample locations were sited (Soil-9 to Soil-46). At each location two samples were collected. The first sample was collected at the surface using a dedicated trowel and the second

was collected below the ground surface using a hand auger. The second sample was collected when native sand was encountered, generally between 2 and 4 feet below ground surface (bgs). At each sample location the START placed each sample on a clean sheet of paper and scanned the sample for alpha activity using a Ludlum 2241 with a 4390 alpha scintillator probe. The START recorded all field screening results in the field book. Following alpha screening the sample was placed in a Ziploc® bag and homogenized by hand. Each Ziploc® sample bag was later screened with a Niton® XLP-732 x-ray fluorescence (XRF) for approximate metals concentrations in the soil (Attachment A, Table 5-4).

Based on field screening results START submitted 10 berm soil samples to GEL Laboratory for total metals analysis by U.S. EPA Method 6010B. The laboratory results are appended to this report in Attachment A, Table 5-5. The results show no surface soils contained metals concentrations above PRGs for residential soils. However, radiation screening results in the field showed Thorium-230 and -232 isotope exceeded the PRGs for residential soils.

Removal of the thorium contaminated process waste material from the berm was initiated on March 15, 2007. At the request of FOOSC Wise, ORIA was onsite during removal to assist with establishing site-specific action levels and confirmation scanning. Background gamma activity levels during the removal were approximately 7,000 cpm and ORIA and the U.S. EPA established a site-specific action level of 10,000 cpm. ORIA and START monitored gamma levels during the removal with a Ludlum 2241 with a 3 inch x 3 inch NaI gamma probe.

ERRS contractors removed approximately 7600 cubic yards of process waste material from the berm, with excavation depths ranging from 1 to 4 feet bgs. ERRS placed a land bridge at the end of Perkins Road to allow transport of the waste to the WMU via haul-truck. The bridge was composed of two 3-foot culverts and crushed rock.

The Tidewater Goby is a federally endangered species that inhabits the Ormond Beach Wetlands. Per United States Fish and Wildlife Service (USFWS) regulations, only biologists certified in Ventura County can perform recovery and relocation of any endangered species. An ERRS-contracted consultant, Entrix, performed Tidewater Goby recovery and relocation prior to removal of the land bridge. Entrix recovered approximately 700 Tidewater Gobies from the channel at the land bridge on April 3, 2007. The Tidewater Gobies were relocated approximately 520 feet to the southeast of the land bridge in the Ormond Beach Wetlands.

Following the completion of the berm removal, the U.S. EPA worked with the USFWS and the California Coastal Conservancy to ensure minimal impacts and full recovery of the wetlands and endangered species habitat. These efforts included sloping and re-vegetation of areas impacted by the removal.

7.0 BUILDING MATERIAL ASSESSMENT

U.S EPA tasked START with assessing the building materials present at the Halaco site. START environmental scientists sampled building materials March, 21, 2007. The purpose of the sampling was to determine if building materials posed a health threat and to identify any additional items that would require disposal as hazardous waste. The following section describes the sampling of building materials.

START collected five samples for asbestos analysis from building materials around the smelter site at Halaco. The sample identifiers for the asbestos samples are associated with the building number or material and the date of the sampling event (e.g. Building1/Brick1-030807). The samples were submitted to EMS Laboratories in Pasadena, California for polarized light microscopy analysis for asbestos by U.S. EPA Method 600/R-93/116 (Attachment A, Table 5-6). The two brick samples were also submitted to GEL Laboratories for total metals and hexavalent chromium analysis by U.S. EPA Methods 6010B and 7196, respectively.

Asbestos results showed the presence of non-friable amosite (15 percent) in the main building on the smelter (Building 2-32107). Due to the laboratory results, the U.S. EPA will require an asbestos abatement prior to any demolition of the main smelter building.

At the request of FOOSC Wise, the START performed several miscellaneous sampling events while at Halaco. These events included sampling of bricks, and processing ingots, composite waste process solids and sludges from the smelter building. These sampling events were conducted in order to identify any additional items that would need disposal. The laboratory results are appended to this report in Attachment A, Table 5-7.

8.0 RADIATION ASSESSMENT

Preliminary assessment of soils and metal items suggested elevated levels of alpha and gamma radiation throughout the smelter side of the property. Based on this, two radiation assessments were performed by START in conjunction with The Palladino Company (TPC) and United States Coast Guard in order to:

1. Investigate alpha contamination on building and metal surfaces, throughout the smelter property; and
2. Investigate gamma contamination within surface and subsurface soils and groundwater.

8.1 Alpha Screening

At the request of FOSC Wise, an alpha radiation screening was completed within the smelter property. All scrap metal items, Conex boxes, buildings and bricks were scanned using a handheld alpha detector. Each Conex box exhibited alpha radiation contamination greater than the free release levels set for the site (100 disintegrations per minute (dpm)). Because of this, the boxes were destroyed rendering them unusable for storage. Metal was allowed to leave the site as scrap metal with restricted uses.

Slightly elevated levels of alpha radiation were also noted on bricks as well as on the walls of the buildings. A recommendation was made by FOSC Wise to demolish the smelter building due to the radiation contamination as well as the unsafe building condition. At the time this report was written, actions to mitigate these hazards had not been taken.

8.2 Soil Radiation Assessment

To further investigate the elevated gamma radiation detected during the Removal Assessment, the U.S. EPA directed START to perform additional assessment activities in the southeast portion of the smelter property and along the western bank of the OID. A gamma radiation assessment was performed between May 31, 2007 and June 11, 2007. Assessment activities included surface, subsurface and sediment soil surveying and sampling as well as groundwater sampling. All screening and sampling was completed in accordance with the START-prepared document, *ERS and START Emergency Response QASP for Soil, Water and Miscellaneous Matrix Sampling May 2007* (Attachment D).

Background Measurements

Background measurements were collected in an area believed to be free of radiation contamination. Background locations are illustrated on Attachment B, Figure 5-6. Results from these background readings were used as a baseline during surface and subsurface investigations.

Surface Soil Investigation

Following the removal of surface concrete in the QASP identified area of concern a 100 percent surface soil gamma survey was completed utilizing NaI detectors. Results indicated a large area within the southeast corner, which is significantly above background, including areas that exceeded ten times background levels. An additional surface survey was completed in the northeast portion of the smelter property along the fence and along the western bank of the OID. Results of these surface surveys revealed areas significantly above background. Results of this surface survey are illustrated in Attachment B, Figure 5-7.

Subsurface Soil Investigation

Using a Visual Sampling Plan grid, in conjunction with the results from the surface soil investigation, soil sampling locations were selected in areas that appeared to be significantly above background. These locations were investigated for subsurface levels and the extent of horizontal and vertical radiation contamination. The subsurface investigation included subsurface gamma radiation surveys and soil sampling within the west side of the smelter and along the OID. Results for each of these areas are summarized below.

Smelter Property Subsurface Investigation Results

Twenty-seven soil borings were advanced on the smelter property using direct push drilling methods (Geoprobe™). Soil boring locations are shown in Attachment B, Figure 5-8. Soil borings were advanced to approximately 12 feet bgs and then completed as temporary screening wells. A NaI probe was lowered into the screening wells to measure gamma radiation levels. Gamma measurements were recorded on boring logs which are provided in Attachment F. A cross-section illustrating the East-West extent on subsurface contamination within the area of concern is presented in Attachment B, Figure 5-9. A cross-section illustrating the North-South extent of subsurface contamination along the eastern border of the smelter property is presented in Attachment B, Figure 5-10. Soil samples were collected approximately every 5 feet in accordance with the START-prepared document, *ERS and START Emergency Response QASP for Soil, Water and Miscellaneous*

Matrix Sampling May 2007 (Attachment D). Soil samples were screened using an XRF to determine metals concentrations in the soils. XRF results are displayed in Attachment A, Table 5-8.

Based on the survey results, 27 soil samples were selected for laboratory analysis for total metals (excluding mercury) by NIOSH Method 6010B, Thorium-228, Thorium-230 and Thorium 232, and Radium-226 by DOE EML HASL-300, Th-01-RC (modified). Laboratory analytical results indicated soil radiation levels up to 113 times background. Analytical results are presented in Attachment A, Table 5-9. Select analytical results are illustrated on Attachment B, Figure 5-11.

Temporary groundwater wells were installed at 9 locations during the subsurface soil investigation. The temporary wells were installed by placing 1 inch slotted poly vinyl chloride piping down the bore hole. Three well volumes were purged from the wells and samples were collected for metals and radiation analysis (Attachment A, Table 5-10).

OID Subsurface Investigation Results

Eight soil borings were advanced along the western bank of the OID using hand auguring methods. Soil borings were advanced to approximately 2 feet bgs and then completed as temporary screening wells. A NaI probe was lowered into the survey well to measure gamma radiation levels. Measurements were recorded every 6 inches. Results from the subsurface survey along the OID are presented as Attachment B, Figure 5-12. Based on the survey results, eight soil samples plus additional sediment samples were selected for laboratory analysis for total metals (excluding mercury) by NIOSH Method 6010B, Thorium-228, Thorium-230, Thorium 232, Radium-226 and Radium-228 by DOE EML HASL-300 modified. Laboratory analytical results indicated soil radiation levels up to 19 times background. Analytical results are presented in Attachment A, Table 5-11. Select analytical results are illustrated on Attachment B, Figure 5-13

Based on the findings during this assessment, an action memo and presentation were drafted by FOOSC Robert Wise in conjunction with START and the TPC recommending soil removal activities in the southeast portion of the smelter property and the adjacent OID soils. At the time this report was written no further action was taken by the US EPA remedial or emergency response branch to mitigate radiation contamination in this area.

9.0 SCRAP METAL RECYCLING

From April 30 to August 23, 2007, START assisted the U.S. EPA in the removal of scrap metal from Halaco. American Tubing subcontracted with the PRP to remove scrap metal at the Halaco Facility. Ron Miller, president of American Tubing, served as the supervisor for the removal. START was tasked with oversight of scrap metal removal, identification of metal with unacceptable amounts of residual waste product general site security, and site safety. American Tubing subcontracted with the PRP to remove scrap metal at the Halaco Facility. Ron Miller, president of American Tubing, served as the supervisor for the removal.

START was tasked with monitoring state and federal health and safety regulations compliance during their scrap removal activities. U.S. EPA determined that the HAZWOPER standard did not apply to the scrapping contractor, because the chemical and radiological hazards associated with the site were not present in the scrapper's designated work zone. To prevent wandering out of the designated work zone, U.S. EPA established and enforced the boundaries of the designated work zone. PPE worn by the contractor included hard hats, steel toed boots and safety glasses. Fire extinguishers and first aid supplies were present at all times, as ordered and enforced by U.S. EPA and START.

For the duration of the removal activities, START monitored the metal scrapper contractor to ensure that scrap metal removed from the site was free of contamination by process waste material. In some cases, START observed metal containers with residual contamination by process waste material. These containers were marked and staged in an area away from the designated zone and managed by ERRS at a later date.

Twice during the removal activities, at the request of FOSC Wise, START notified the Oxnard Police Department of incidences of trespassing onto the Halaco property. Evidence of stolen scrap metal was observed and reported.

At the conclusion of operations, approximately 1,000 tons of metal had been removed from the Halaco site and transported to a recycling facility. Remaining metal on-site is associated with the industrial boilers located in one of the large production buildings. The boilers weigh approximately 30 tons each. The boilers are contaminated with product and asbestos and will required abatement by a certified asbestos abatement contractor, prior to removal. All scrap metal issues have been deferred to the U.S. EPA Remedial Branch for future decisions.

10.0 SUMMARY

The Halaco site consists of 2 parcels of land separated by the OIDA former smelter; one parcel consisting of 15 acres is located on the west side of the OID, and the other parcel, a waste disposal area consisting of 27 acres, is located on the east side of the OID. The OID drains to the Pacific Ocean approximately 300 feet to the south. Some waste material generated during the smelting process was used as fill material for expansion and creation of concrete structures. Currently the smelter area consists of several abandoned concrete structures and large paved and unpaved surfaces. The U.S. EPA has performed stabilization and removal activities at the site. To support these activities the U.S. EPA tasked START to perform the following activities at the Halaco site: two removal assessments, PRP clean-up oversight, site stabilization oversight, radiation assessment, and oversight of scrap metal recovery.

Halaco is currently on the NPL list and has been since September 2007.