# THIRD FIVE-YEAR REVIEW REPORT

## FOR
## UNITED HECKATHORN SUPERFUND SITE
## RICHMOND, CALIFORNIA

**September 2011**

**Prepared for**
**Contract No. EP-S9-08-04/WA NO. 214-FRFE-09R3**
**U.S. Environmental Protection Agency**
**Region 9**
**75 Hawthorne Street**
**San Francisco, California 94105**

**Approved by:**

**Date:**

September 21, 2011

**Michael M. Montgomery**
**Assistant Director, Superfund Division**
**USEPA, Region 9**

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# Acronyms and Abbreviations

| | |
|---|---|
| µg/kg | micrograms per kilogram |
| ARARs | Applicable or Relevant and Appropriate Requirements |
| AWQC | Ambient Water Quality Criteria |
| CDHS | California Department of Health Services |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act of 1980 |
| COC | contaminants of concern |
| DDT | dichlorodiphenyl trichloroethane |
| DTSC | California Department of Toxic Substances Control |
| ESD | Explanation of Significant Differences |
| ETS | Environmental Technical Services |
| FDA | Food and Drug Administration |
| FFS | Focused Feasibility Study |
| LRTC | Levin Richmond Terminal Corporation |
| mg/kg | milligrams per kilogram |
| MIT | Massachusetts Institute of Technology |
| MLLW | mean lower low water |
| NAS | National Academy of Sciences |
| NCP | National Oil and Hazardous Substances Pollution Contingency Plan |
| ng/L | nanograms per liter |
| $ng/m^3$ | nanograms per cubic meter |
| NPL | National Priorities List |
| NRWQC | National Recommended Water Quality Criteria |
| O&M | operations and maintenance |
| OEHHA | State of California Office of Environmental Health Hazard Assessment |
| PED | polyethylene device |
| RAO | Remedial Action Objective |

| | |
|---|---|
| RBC | risk-based concentration |
| RI | Remedial Investigation |
| ROD | Record of Decision |
| TBC | to be considered |
| USACE | United States Army Corps of Engineers |
| USEPA | United States Environmental Protection Agency |
| Water Board | San Francisco Bay Regional Water Quality Control Board |
| YBM | Young Bay Mud |

# Executive Summary

This Five-Year Review of the United Heckathorn Superfund Site (the Site) in Richmond, California (Figure 1-1) was prepared for completion in September 2011. A Five-Year Review is required by statute and conducted because hazardous substances, pollutants, or constituents remain at the Site at concentrations above levels that would allow for unrestricted use and unlimited exposure. This is the third Five-Year Review for the Site. The triggering action for this review was the initiation of the first remedial action that left hazardous substances, pollution, or contaminants onsite above levels that allow for unlimited use and unrestricted exposure in 05/08/1998.

The Site has a long history of industrial activities. From the mid-1940s to the mid-1960s, it was used for processing, packaging, and shipping pesticides, particularly total dichlorodiphenyl trichloroethane (DDT). Pesticide releases to adjacent soil and waterways occurred as a result of poor material management and housekeeping controls during this period of operation.

The pesticide processing operations ended at the Site in 1966. In 1980, the California Department of Health Services investigated and discovered chlorinated pesticides and metals in soil samples at the Site. In 1990, the Site was placed on the National Priorities List (NPL), and the USEPA assumed lead-agency status.

Extensive environmental investigations were conducted during the 1990s. Based on results from the remedial investigations, DDT and dieldrin were identified as the primary contaminants of concern (COCs). The area affected by the COCs included the northern 5 acres of upland area known as the terminal, as well as marine sediments in harbor channels, including the Lauritzen Channel, the Santa Fe Channel, the Parr Canal, and the Richmond Inner Harbor. Because of the existence of potential risks, USEPA determined that remedial action was necessary. Remedial actions for sediment were conducted in the Lauritzen Channel and the Parr Canal with the goal of remediating areas with the higher DDT concentrations.

The Record of Decision (ROD; USEPA 1994) was signed in October 1994. The 1994 ROD presents the selected remedial action implemented at the Site. The remedial action goals of the Site were developed based on Applicable or Relevant and Appropriate Requirements (ARARs) and results from the human health and ecological risk assessments. The implemented remedy was proposed to address two areas: (1) the upland area (consisting of the former United Heckathorn facility), and (2) the marine area. Major components of the remedy included:

- Dredging of all soft bay mud from the Lauritzen Channel and Parr Canal, with offsite disposal of dredge material.
- Placement of clean material after dredging.
- Construction of a 5-acre upland cap and stormwater collection system around the former Heckathorn facility to prevent erosion.

- A deed restriction limiting use of the property at the former Heckathorn facility location to non-residential uses.
- Marine monitoring to verify the effectiveness of the remedy.

Based on a review of documents and data related to operations and maintenance (O&M) and monitoring activities at the Site, the capping system at the upland area of the Site has been functioning as intended, effectively eliminating the potential for surface soil erosion and human exposure to contaminated upland soils. In addition, the implementation of the institutional controls for the upland area, as set forth in the ROD, has been effective. The perimeter fence at the Site remains intact, and the property is operating as a marine terminal with a deed restriction that limits the land use to industrial (non-residential) use.

However, the remediation goals for DDT and dieldrin in the water and sediments of the marine area have not been maintained. This conclusion is based on results of post-remediation monitoring and data gaps investigations of marine sediment, water and biota. This conclusion is consistent with the Second Five-Year Review Report (USEPA 2006) but is now supported with new data from additional sampling activities.

A review of ARARs and other standards to be considered at the Site, since the ROD was issued, indicates that changes have occurred to some action-specific, chemical-specific, or location-specific ARARs, or to standards to be considered. These changes do not affect the protectiveness of the upland remedy and do not change the conclusion that the marine remedy is not protective. In addition, no new human health routes of exposure or new contaminants were identified.

The conclusions of this Third Five-Year Review are that:

1. The remedy implemented at the upland area of the United Heckathorn Superfund Site is protective of human health and the environment, due to capping of contaminated soils which has eliminated human exposure pathways and prevented erosion. Routine inspection and monitoring assures the protectiveness of the upland remedy at the Site. Some improvements to the Operations and Maintenance Plan Reporting were recommended in 2010 to provide added confidence that the upland area remedy maintains its effectiveness.
2. The remedy implemented at the marine area of the Site is not protective because DDT concentrations in sediment, water and biota remain a potential exposure risk to human health and the environment. Fishermen and their families may be exposed to contaminants when fish or other edible biota from the Lauritzen Channel are consumed. The updated State of California fish advisory that warns against consumption of any fish from the channel. In addition, DDT concentrations in the sediment indicate significantly higher concentrations than the average reported following dredging over 10 years ago. DDT concentrations in mussel tissues show an increasing trend compared to the initially decreasing trend observed following remedial dredging in 1997. Water sample results indicate that DDT concentrations are similar to pre-remediation concentrations, which are greater than the remedial action objective. A Focused Feasibility Study (FFS) is underway to evaluate alternatives to address the potential exposures to sediment in the Lauritzen Channel.

# Five-Year Review Summary Form

## SITE IDENTIFICATION

**Site name :** United Heckathorn Superfund Site

**EPA ID:** CAD981436363 **CERCLIS ID :** 09R3

**Region:** 9 **State:** CA **City/County:** Richmond / Contra Costa County

## SITE STATUS

**NPL status:** ☒ Final ☐ Deleted ☐ Other (specify)

_____

**Remediation status** (choose all that apply): ☐ Operating ☒ Complete

**Multiple OUs?** ☐ YES ☒ NO **Construction completion date:**

Has site been put into reuse? ☒ YES ☐ NO

## REVIEW STATUS

**Reviewing agency:** ☒ EPA ☐ State ☐ Tribe ☐ Other Federal Agency

_____

**Author name:** Penny Reddy

**Author title:** Task Order Project Officer **Author affiliation:** EPA Region 9

**Review period:** March – June 2011

**Date(s) of Site inspection:** April 21, 2011

**Type of review:** ☒ Statutory

☐ Policy ☐ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only

☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead

☐ Regional Discretion)

**Review number:** ☐ 1 (first) ☐ 2 (second) ☐ 3 (third) ☒ Other (specify)

**Triggering action:**

☐ Actual RA Onsite Construction at OU #__

☐ Actual RA at OU #__

☒ Previous Five-Year Review Report

☐ Construction Completion

☐ Other (specify) _____

**Triggering action date:** September 2006

**Due date (five years after triggering action date):** September 2011

# Issues and Recommendations

Issue:

1. Post-remediation marine monitoring indicates that remediation goals for total dichlorodiphenyl trichloroethane (DDT) and dieldrin in water and sediments have not been maintained. Concentrations of DDT and dieldrin in mussel tissue exhibited an increasing trend between 2002 and 2009. Remaining levels of DDT and dieldrin may still pose risks to fish-eating birds, mammals, and fishermen and their families.
2. Community interviews conducted by USEPA for the human health risk assessment (ICF 1994) confirmed that the marine area is used by recreational and subsistence fishermen, despite multi-lingual signs posted by the California Department of Health Services that warn of the risks of consuming fish or shellfish.

Recommendation and Follow-up Action:

1. Complete the Focused Feasibility Study (FFS) to evaluate alternatives for addressing concentrations that exceed the Site Remedial Action Objectives (RAOs) and determine what, if any, remedial actions should be taken to address DDT and dieldrin in sediment, water and tissues.
2. The signs need to be updated to include the State of California Office of Environmental Health Hazard Assessment May 2011 updated fish advisory that recommends no consumption of fish from the Lauritzen Channel and limited consumption of fish from San Francisco Bay (OEHHA 2011).

# Protectiveness Statement

The remedy implemented at the **upland area** of the United Heckathorn Superfund Site is protective of human health and the environment, due to capping of contaminated soil which has eliminated human exposure pathways and prevented erosion. Routine inspection and monitoring assures the protectiveness of the upland remedy at the Site. A deed restriction also limits the property use to industrial activities.

The remedy implemented at the **marine area** of the Site is not protective because concentrations of DDT and dieldrin in sediment within the Channel indicate that the dredging remedy was incomplete: sediment data show an apparent increase in DDT concentrations compared to remedy confirmation samples; surface water concentrations remain above the ROD remediation goals and are near pre-remediation concentrations; mussel tissue data show an increasing trend in DDT concentrations between 2002 and 2009; and a re-evaluation of the risk to human health and ecological receptors indicates that sediment in Lauritzen Channel continues to pose a risk. Although there is increased security around the facility as required by the Office of Homeland Security and the US Coast Guard and an updated State advisory that warns against consumption of any fish from the Lauritzen Channel, these controls may be ignored or misunderstood. In addition, contaminated biota (e.g., fish) cannot be prevented from migrating outside of the Site, where they might be caught and consumed by fishermen, or wildlife. EPA is conducting a Focused Feasibility Study (FFS) to evaluate alternatives for addressing concentrations that exceed the Site Remedial Action Objectives (RAOs) to determine what, if any, remedial actions should be taken to address DDT and dieldrin in sediment, water and tissues.

SECTION 1.0

# Introduction

This report summarizes findings of a Five-Year Review of the remedial actions implemented at the United Heckathorn Superfund Site (the Site) in Richmond, California (see Figure 1-1). The Five-Year Review evaluates whether the remedy at the Site remains protective of human health and the environment.

The United States Environmental Protection Agency, Region 9 (USEPA) conducted the Five-Year Review from March to June 2011. To assist the USEPA in documenting the methods, findings, and conclusions of this review, CH2M HILL prepared this report in accordance with USEPA's guidance document, *Comprehensive Five-Year Review Guidance* (USEPA 2001b). In addition, this report identifies any deficiencies found during the review and provides recommendations to address these deficiencies.

This Five-Year Review report is prepared pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), Section 121(c), the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) Section 300.400 (f)(4)(ii). CERCLA Section 121(c) states:

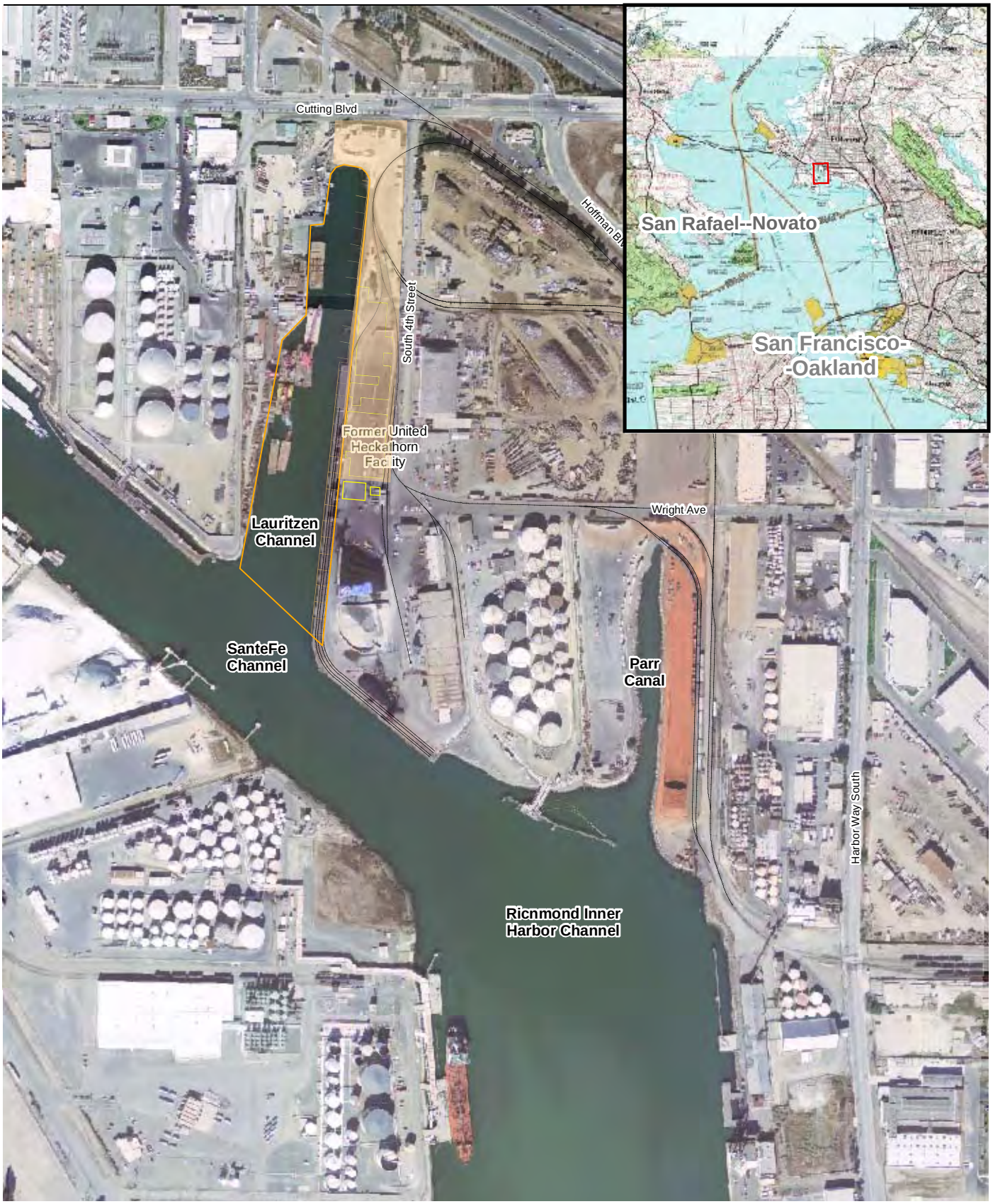
> If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the Site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

This requirement is further interpreted in the NCP. Title 40 of the Code of Federal Regulations, Section 300.400 (f)(4)(ii) states:

> If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the Site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

Federal statute requires that Five-Year Reviews be conducted when the implemented remedy at the Site results in hazardous substances, pollutants, or constituents remaining at the Site above levels that allow for unrestricted use and unlimited exposure. The United Heckathorn Site consists of two areas, the upland and marine areas. The cleanup goals specified by the Record of Decision (ROD; USEPA 1994) do not allow for unlimited use in the upland area, where contaminated soils are capped and the land use is restricted to industrial use. Contaminants were also left in place in the Lauritzen Channel as part of the remedy due to impracticability of removing sediments under and around the piers. Therefore, the Site is subject to a statutory Five-Year Review.

This is the Third Five-Year Review for the United Heckathorn Superfund Site. The trigger date for this review is September 22, 2006, the USEPA approval date of the Second Five-Year Review report (USEPA 2006).




**LEGEND**

- Project Boundary
- Former United Heckathorn Buildings
- Embankment Pier
- Embankment Pilings
- Approximate Area of Upland Cap

Aerial Source: USGS 2004

N

0 500 1,000 Feet

FIGURE 1-1
Site Location Map
*United Heckathorn Superfund Site*
*Richmond, California*

CH2MHILL

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SECTION 2.0

# Site Chronology

Table 2-1 provides a chronology of events at the Site. Reports associated with these events that were reviewed as a part of this Five-Year Review are listed in Appendix A.

TABLE 2-1
Chronology of Site Events
*Third Five-Year Review Report, United Heckathorn Superfund Site, Richmond, California*

| Event | Date |
|---|---|
| **Pre-remediation** | |
| Site used to formulate and package pesticides, particularly dichlorodiphenyl trichloroethane (DDT). | 1947-1966 |
| The Regional Water Quality Control Board inspected and cited the facility for the release of DDT-laden wastewater into the Lauritzen Channel. | 1960 |
| California Department of Fish and Game identified a discharge of wastewater overflow into the Lauritzen Channel and leakage from the pesticide settling tanks. | 1965 |
| California Department of Health Services investigated the Site as part of its Abandoned Site Project. | 1980 |
| California Department of Health Services designated the Site as a State Superfund Site. | March 1982 |
| Interim Removal Actions occurred at the upland portion of the Site. | 1982-1993 |
| Last recorded maintenance dredging performed to Lauritzen Channel prior to remediation. | 1985 |
| The 1984-1985 California State Mussel Watch (SMW) survey, for the first time, included Richmond Harbor and found levels of DDT and dieldrin “highest ever measured in mussels by the SMW program.” | 1986 |
| Site listed on USEPA National Priorities List. | March 1990 |
| Pursuant to USEPA Removal Order 90-22, approximately 1,500 cubic yards of soil and visible pesticide residue containing up to 100% DDT were excavated by several potentially-responsible parties. | November 1990 |
| Approximately 1,800 cubic yards of residue and contaminated soil were excavated from Site. | 1991 |
| Final soil removal action completed. | May 1993 |
| Battelle completed remedial investigation on marine sediment. | February 1994 |
| California Department of Toxic Substances Control issued advisory against consuming any bottom fish from the Richmond Inner Harbor. | April 1994 |
| Battelle completed feasibility study. | July 1994 |
| Record of Decision (ROD) signed. | October 1994 |

TABLE 2-1
Chronology of Site Events
*Third Five-Year Review Report, United Heckathorn Superfund Site, Richmond, California*

| Event | Date |
|---|---|
| **Sediment Remediation** | |
| Remedial Design/Remedial Action Work Plan for sediment dredging submitted. | May 1996 |
| Consent Decree approved by U.S. District Court. | July 1996 |
| Remedial action at Parr Canal and Lauritzen Channel began. | August 1996 |
| Remedial action at Parr Canal and Lauritzen Channel ended. | April 1997 |
| Post-remediation biomonitoring began. | July 1997 |
| **Post-sediment Remediation** | |
| Remedial Design/Remedial Action Work Plan for upland cap submitted. | April 1998 |
| Construction of upland area cap began. | July 1998 |
| Construction of upland area cap ended. | July 1999 |
| Post-remediation Biomonitoring of Pesticides in Marine Waters Near the United Heckathorn Superfund Site, Year 1 Report prepared. | September 1998, revised July 2000 |
| Post-remediation Biomonitoring, Year 2 Report prepared. | October 1999, revised July 2000 |
| Post-remediation Biomonitoring, Year 3 Report prepared. | October 2000 |
| Post-remediation Biomonitoring, Year 4 Report prepared. | June 2001 |
| First Five-Year Review Report prepared. | September 2001 |
| Post-remediation Biomonitoring, Year 5 Report prepared. | August 2002 |
| Phase I Source Investigation completed. | March and July 2002 |
| Phase I Source Investigation Report prepared. | December 2002 |
| Phase II Source Investigation completed. | May 2003 |
| Site conceptual model updated. | December 2003 |
| Post-remediation Biomonitoring, Year 6 and Phase II Source Investigation Report prepared. | March 2004 |
| Phase III Source Investigation completed. | July 2004 |
| Phase III Fluid Mud and 2004 Water Quality Investigation Report completed. | December 2004 |
| Second Five-Year Review Report prepared. | September 2006 |
| Focused Feasibility Study Data Gaps Sampling and Analysis Plan prepared. | August 2007 |
| Summary of Mussel, Water, and Sediment Sampling submitted. | January 2008 |
| Fish sampling performed. | May 2008 |

TABLE 2-1
Chronology of Site Events
*Third Five-Year Review Report, United Heckathorn Superfund Site, Richmond, California*

| Event | Date |
|---|---|
| Phase 1 of MIT Passive Sampler Investigation completed. | October 2009 |
| Human Health and Ecological Risk Assessment Update submitted. | February 2010 |
| Fish Advisory for Lauritzen Channel and San Francisco Bay Issued. | May 2011 |

SECTION 3.0

# Site Background

This section provides Site background information including the Site description, the current land use, the physical setting, the history of contamination, and the initial response and basis for taking cleanup action.

## 3.1 Site Description and Current Land Uses

The Site is located on Richmond Harbor on the east side of San Francisco Bay in Contra Costa County, California. It is situated in an industrial area dominated by active petroleum and shipping terminals. A Site location map is provided in Figure 1-1.

The Site, as outlined in the ROD, is composed of two areas: (1) the upland area, which is the former United Heckathorn Site, and (2) the marine area, which includes the Lauritzen Channel, the Santa Fe Channel, the Parr Canal, and the Richmond Inner Harbor.

### 3.1.1 Upland Area

The former United Heckathorn Site is an approximate 5-acre upland area located at the northern portion of the Levin Richmond Terminal, which encompasses a total of approximately 42 acres. The property is currently owned by Levin Richmond Terminal Corporation (LRTC), and is operated as a dry bulk-cargo shipping terminal with docks for ocean-going vessels. The 5-acre upland capped area is mainly used for cargo stockpiling and railroad operations.

Land use at and in the surrounding vicinity of the former United Heckathorn Site consists of mainly industrial activities. This is consistent with the *San Francisco Bay Plan* (San Francisco Bay Conservation and Development Commission 2008), which designates the area for port-priority or water-related industrial use, and the *Richmond General Plan* (City of Richmond 2006), which designates the area as heavy industrial (M3) zoning. The City of Richmond is updating their General Plan and the draft indicates that the site will be designated as port area for industrial use (City of Richmond 2011). No significant changes to land use, future land use, and land-use restrictions are anticipated at the Site in the foreseeable future.

Historical maps indicate that the Richmond Harbor area was originally intertidal marshlands. Dredge and fill activities began prior to 1917. The Site upland area is now approximately 7 to 11 feet above mean lower low water (MLLW). The MLLW is the average height of the lower low water over a 19-year period referenced to a datum based at the Port of Richmond Terminal 2 and it is generally level (Battelle 1994).

### 3.1.2 Lauritzen Channel

The Lauritzen Channel is approximately 1,800 feet long (north-south) and varies in width between 120 feet near its northern end to 350 feet near its southern end at the connection to the Santa Fe Channel.

Historical water line channel depths ranged from -10 feet to -40 feet MLLW. Portions of the Lauritzen Channel had been periodically dredged. The most recent maintenance dredging occurred in January 1985 and reached a depth -41 feet MLLW. Dredging during the remedy reached a depth of -39 MLLW. More recently the sediment surface was measured at a maximum of -29 MLLW. The Lauritzen Channel continues to be actively used as a deep-water channel for LRTC operations and activities associated with Manson Construction, a dredging contractor located along the west shoreline of the Lauritzen Channel.

The channel shoreline consists of: 1) riprap protection (including riprap materials derived from concrete construction debris); 2) sandy gravel fill; and 3) pile-supported docks with and without metal plating to retain upland shoreline. Within the shoreline area, there are also free-standing wooden pilings associated with former docks that are in various stages of decay. The tidal zone within the Lauritzen Channel ranges between about -2 feet to +7 feet MLLW (Battelle 1994). There is a City of Richmond stormwater outfall structure located at the northern end of the Lauritzen Channel.

### 3.1.3 Parr Canal

The Parr Canal lies to the east of the Lauritzen Channel and is not actively used as a waterway. It is approximately 750 feet long (north-south), a maximum of 100 feet wide, and generally less than 10 feet deep relative to MLLW. The shoreline surrounding the Parr Canal is armored with riprap typically derived from concrete construction debris. A Richmond City stormwater outfall structure is located at the northern end of the Parr Canal (Battelle 1994). In 2011, the City of Richmond installed a flap gate on the outfall to prevent tidal-related inflow of bay water into the storm drain system; such inflows reduce the capacity of the drain system during storm events.

### 3.1.4 Santa Fe Channel and Richmond Inner Harbor Channel

The south end of the Lauritzen Channel enters the Santa Fe Channel. The Santa Fe Channel runs northwest to southeast, is approximately 4,000 feet long, and is up to about 380 feet wide. Approximately one-half of the channel length is maintained at a depth of -35 feet MLLW by the United States Army Corps of Engineers (USACE). The head of the channel and its berth areas are maintained by the Port of Richmond or private owners. The Santa Fe Channel connects at its east end with the Richmond Inner Harbor Channel (Battelle 1994).

## 3.2 Physical Setting

The Site is located within a low-lying tidal flats area adjacent to an alluvial plain. This area lies near the western edge of a small northwest-trending structural graben (i.e., a depression between geologic faults) called the Richmond Basin. The basin is bounded on the west by the San Pablo Fault, which parallels the eastern face of the Potrero-San Pablo Ridge west of the Site, and on the east by the Hayward Fault Zone, which forms the western scarp of the Berkeley Hills.

The basin comprises Franciscan bedrock between 140 and 400 feet below ground surface, overlain by a thick sequence of younger interfingering alluvial fan and estuary deposits. Bay mud and marsh deposits are located approximately 15 to 30 feet deeper than the present San

Pablo Bay and are found on the Bay side of the 1894 shoreline, located at the northern end of the Lauritzen Channel.

The surficial bay mud and marsh deposits were altered with construction activities that began in the 1950s. In some areas, bay mud and marsh deposits were partially removed and replaced with fill material of varying composition. Fill was simply placed over the natural surface in most areas at the Site (CH2M HILL 1988).

Portions of the Lauritzen Channel embankment feature revetments that include riprap (consisting mostly of concrete construction debris), cobbles, gravel, as well as retaining features such as metal sheeting and pilings below the dock areas. A dock and other overhanging structures mostly visually obscure the eastern embankment adjacent to the upland area of the Site. In general, the channel embankments are abutted by paved surfaces (Battelle 2002).

### 3.2.1 Lithology

The upland area of the Site is mostly paved. Underneath the pavement is a layer of fill soil that varies from approximately 5 to 15 feet below ground surface. The layer beneath the fill material is called Young Bay Mud (YBM).

The majority of YBM within the Lauritzen Channel was either removed during original channel construction or had subsequently been removed during maintenance dredging and remedial dredging.

The YBM is underlain by Old Bay Mud, which is relatively more consolidated, stiffer, and laterally continuous. A relatively small amount of the upper Old Bay Mud may have been removed in conjunction with remediation dredging activities in 1996 and 1997.

### 3.2.2 Hydraulics

Exchange of water between the Lauritzen Channel and the Santa Fe Channel occurs relatively slowly because exchange is primarily driven by tidal action. Other factors that affect the circulation into and out of the channel include wind-induced circulation and intermittent flows resulting from stormwater runoff from adjacent land features and outfall structures. The tidal zone within the Lauritzen Channel ranges between about -2 feet to +7 feet (Battelle 1994). Tides at the Site are semidiurnal, with a mean tidal fluctuation of about 4.3 feet.

Interstitial porewater (bank storage) at the channel margin is considered the zone where surface water and groundwater mixing occurs. The hydraulics in this mixing zone are complicated and dependent on pore pressure, water density, and hydraulic conductivity. It is expected that some net discharge or seepage of groundwater diffuses to the harbor waters (CH2M HILL 2003).

Stormwater from areas to the north and west, outside of the Site, enters the channel through one of two concrete outfall structures located at the north ends of the Lauritzen Channel and Parr Canal, and as sheet flow from surrounding uncollected upland areas. Stormwater within the upland area of the Site is captured and discharged to the sanitary sewer.

Generally, currents within the Lauritzen Channel are weak. As a result, the Richmond Inner Harbor Channel, Santa Fe Channel, and Lauritzen Channel all experience net deposition of

sediment and require maintenance dredging to remain navigable (CH2M HILL 1988). In addition, the Lauritzen Channel sediments are stirred up and redistributed due to ship and barge traffic within the channel. This redistribution likely includes sediment among the piers and along the slope adjacent to the upland area that was outside the limits of the 1997 remedial dredging.

## 3.3 History of Contamination

The Site has a long history of industrial activities. In the 1940s, World War II shipbuilding operations included a shipyard between Lauritzen Channel and Parr Canal. In 1948, the War Department transferred title of the land to Parr Industrial Corporation. Parr Industrial Corporation owned the Site from 1949 until 1961, followed by the Parr-Richmond Terminal Corporation, which owned the Site until 1981. The land was leased to various industrial tenants, including Universal Pigment and Chemical Company, which manufactured napalm.

From the mid-1940s to the mid-1960s, the Site was used for processing, packaging and shipping pesticides. United Heckathorn was one of a number of companies operating at the Site. Although many pesticides, such as aldrin, dieldrin and endrin, were processed onsite, dichlorodiphenyl trichloroethane (DDT) was by far the most commonly-processed pesticide.

Under United Heckathorn, the facility was used to receive technical-grade pesticides from manufacturers, grind the pesticide into powder, add solvents and other components to facilitate its application, and package the product for final use in liquid and powder forms. Information regarding the exact types and quantities of materials used and onsite waste disposal methods is limited.

It is indicated that during United Heckathorn operations, equipment containing pesticide residues was routinely washed, and washwater was permitted to infiltrate through the ground surface to discharge via outfall structures or utilities directly to nearby waterways. Later modifications included incorporating settling tanks to recover pesticide residuals; however, leaks from these tanks were believed to have occurred. Additionally, poor housekeeping controls, as well as spills, leaks, and releases, are believed to have facilitated direct discharges of DDT and dieldrin to soils and waterways.

In 1960, the San Francisco Regional Water Quality Control Board (Water Board) observed bulk storage of pesticides and solvents, leaking pipelines, and release of pesticide-laden wastewater to the Lauritzen Channel. In 1965, California Department of Fish and Game staff reported leakage from settling tanks and a discharge of water overflow to the Lauritzen Channel.

Pesticide processing operations ended at the Site in 1966, and United Heckathorn went bankrupt. In 1980, the California Department of Health Services (CDHS) investigated the United Heckathorn Site. Chlorinated pesticides and metals were discovered in soil samples, and the area was designated as a state Superfund Site in 1982. In 1990, the Site was placed on the NPL, and the USEPA assumed lead agency status (Battelle 1994).

## 3.4 Initial Response

Extensive environmental investigations on both marine sediments and upland areas were conducted during the 1990s to characterize, develop, and initiate removal actions for upland soils and remediation strategies for marine sediment contamination.

Interim response actions were conducted at the upland and embankment areas of the Site beginning in the early 1980s. As early as 1982, contaminated soil, asphalt, and concrete from the Site were excavated and moved to a nearby lot adjacent to the Parr Canal. These materials were subsequently transported to several hazardous waste disposal facilities. In 1983, soils containing high levels of pesticides were removed by the current landowner during routine maintenance and extension of onsite railroad lines. A 6-inch to 8-inch layer of gravel was placed over the surface of the Site, including a 6-inch layer of ballast rock over the Lauritzen Channel embankment and selected areas of high DDT concentrations. In 1986, during excavation for the construction of a train scale, high levels of pesticides were detected and approximately 60 cubic yards of soil were removed.

In November 1990, pursuant to USEPA Removal Order 90-22, approximately 1,500 cubic yards of soil and debris, containing up to 100 percent DDT, were excavated from the Lauritzen Channel embankment. Confirmation samples following excavation contained approximately 30 percent DDT.

An additional 1,800 cubic yards of pesticide residue and contaminated soil were excavated from this area in April 1991. The excavated material and stockpiles that remained onsite from activities performed in the 1980s were hauled offsite to permitted hazardous waste disposal facilities.

A final soil removal action was completed in May 1993. The USEPA estimated that approximately 99 percent of the mass of pesticides had been removed from the upland portion of the Site since 1990.

These removal actions were intended to address risks only at the upland portion of the Site. Marine sediment contamination was not addressed by these prior removal actions. The southeastern area of the Lauritzen Channel was last dredged for berth maintenance in 1985.

## 3.5 Basis for Taking Action

Based on results from the remedial investigation(s), DDT and dieldrin were identified as the primary contaminants of concern (COCs) at the Site. The area affected by the COCs included the northern 5 acre upland area of the LRTC terminal, as well as marine sediments in harbor channels, including the Lauritzen Channel, the Santa Fe Channel, the Parr Canal, and the Richmond Inner Harbor.

### 3.5.1 Upland Area

Soil removal actions conducted at the upland area from 1983 to 1993 reduced contaminant concentrations in the soil to levels that are acceptable for current and expected future commercial or industrial uses. However, an estimated 95,000 tons of pesticide-impacted soil was left over a large area of the Site and a posed a threat to the marine environment from potential erosion of contaminated upland soils to adjacent waterway.

Among all the remaining onsite environmental media, soil and embankment sediments contained the highest chlorinated pesticide concentrations, generally greater than 1 milligram per kilogram (mg/kg) near the upland area, and exceeding 10,000 mg/kg in localized areas. Ambient air measurements at the Site and downwind areas detected very low airborne DDT concentrations, approximately 1 nanogram per cubic meter (ng/$m^3$).

### 3.5.2 Marine Area

Remedial investigation(s) for marine sediments identified the Lauritzen Channel as the area with the highest pesticide concentrations, followed by the Parr Canal. The pesticide concentrations typically decreased with increasing distance from the former United Heckathorn facility, which clearly indicated that the Site was the source of contamination.

Median total DDT concentrations sediment in the Lauritzen Channel ranged from approximately 47,000 micrograms per kilogram (µg/kg) at the head (north) end of the Channel to 1,500 µg/kg at the LRTC terminal that underwent periodic dredging for ship access. The highest pre-remediation total DDT concentration of 633,000 µg/kg was measured in a sediment sample from the center of Lauritzen Channel, while concentrations greater than 100,000 µg/kg were detected in sediment from the northern and western portions of the channel. Approximately 98 percent of the mass of DDT in Richmond Harbor was contained in the Lauritzen Channel. Concentrations of dieldrin were lower compared to total DDT, with a maximum concentration of 16,000 µg/kg. The maximum and median total DDT pre-remediation concentrations measured in the Parr Canal were 4,080 µg/kg and 840 µg/kg, respectively. The maximum dieldrin concentration was 170 µg/kg.

In general, sediment from the upper Lauritzen Channel and Parr Canal had higher concentrations of contaminants than sediment from the Santa Fe and Inner Harbor Channels. Total DDT concentrations in sediment decreased by at least two orders of magnitude from the Lauritzen Channel to the Santa Fe Channel (median total DDT concentrations in sediment in the Santa Fe Channel were 110 µg/kg and 210 µg/kg in the upper and federally-maintained portions of this channel, respectively). Median concentrations of DDT decreased by another order of magnitude from the Santa Fe Channel to the Richmond Inner Harbor Channel (median total DDT concentrations in sediment of 60 µg/kg and 10 µg/kg in the upper and lower inner harbor, respectively). DDT and dieldrin were consistently found in sediment and biota at concentrations that were orders of magnitude higher than the regional background levels (Battelle 1994).

Results from the risk assessments (ICF 1994) indicated that the risks from long-term consumption of fish caught in the Lauritzen Channel were unacceptable. The contaminant levels in the Lauritzen Channel posed a threat to a variety of ecological receptors at various trophic levels, including benthic (i.e., living in bottom sediments) organisms, water column organisms, and fish-eating birds.

SECTION 4.0

# Remedial Actions

This section summarizes the remedial actions selected and implemented at the Site, and the basis for selection of the RAOs as well as the O&M of the remedy. The ROD and the ESD for the Site were signed in 1994 and 1996, respectively.

## 4.1 Selected Remedial Actions

For the marine area, the remedial action objective (RAO) was to reduce concentrations of the COCs, DDT and dieldrin, in marine sediments and water to levels that would be protective of human health and the environment. For the upland area, the RAO was to prevent contact with DDT in upland soil and erosion of upland soil into the adjacent marine area.

The remedy presented in the ROD addressed both the upland and the marine RAOs. Major components of the remedy included:

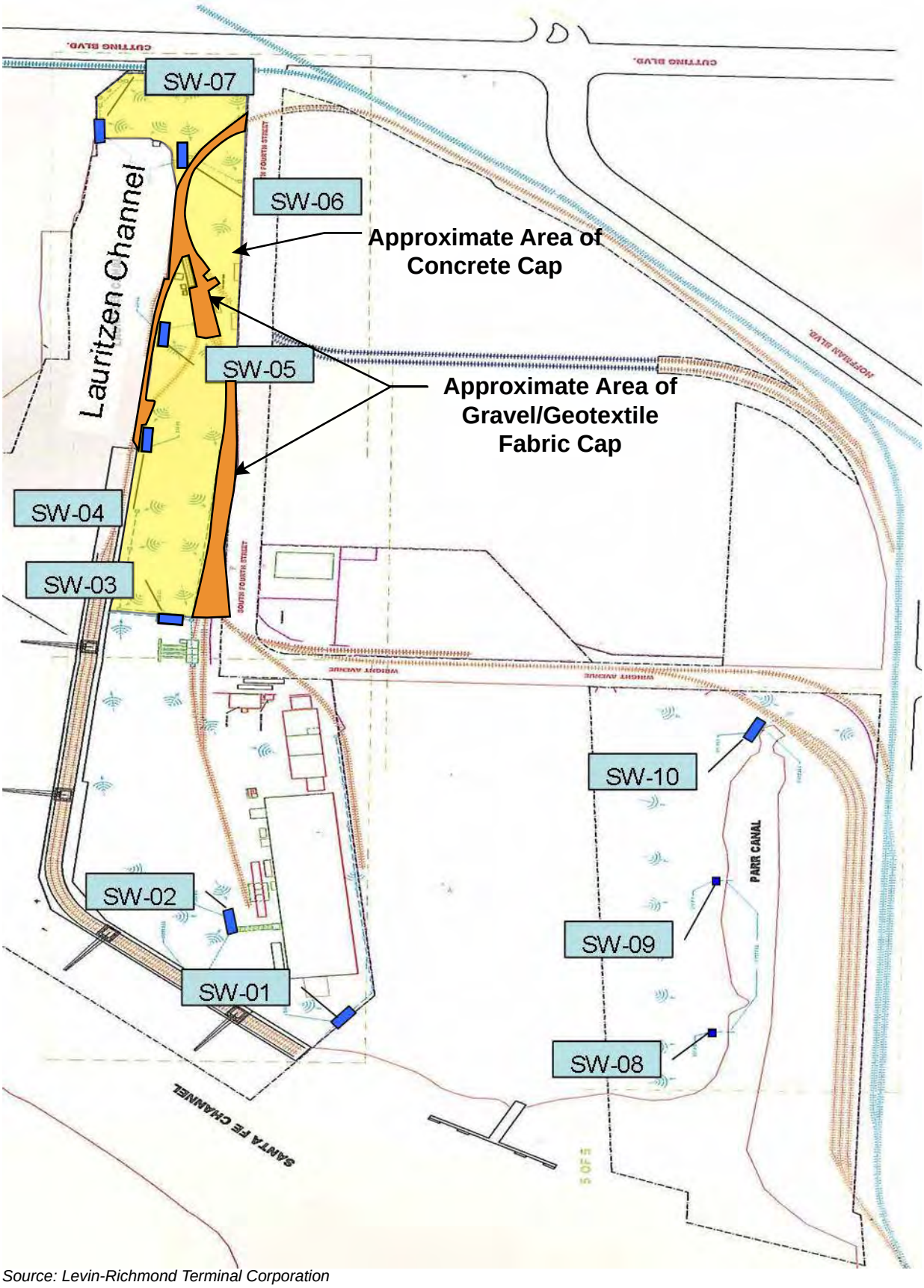
- Dredging of all soft bay mud from the Lauritzen Channel and Parr Canal, with offsite disposal of dredged material.
- Placement of clean material after dredging.
- Construction of a cap around the former Heckathorn facility to prevent erosion, and associated maintenance and collection and monitoring of stormwater to demonstrate effectiveness.
- A deed restriction limiting use of the property at the former Heckathorn facility location to non-residential uses.
- Marine monitoring to verify the effectiveness of the remedy.

### 4.1.1 Upland Area

The selected remedy for the upland area included construction of a 5-acre upland cap in the northern portion of the Levin Richmond Terminal (see Figure 4-1); installation of a drainage system to collect surface runoff from the cap; execution of a land use restriction to limit use of the property to industrial classification; and cap inspection and stormwater monitoring programs to be implemented as O&M activities.

### 4.1.2 Marine Area

The selected remedy at the marine area consisted of dredging of soft bay mud from the Lauritzen Channel and the Parr Canal, transport and disposal of the dredged material to a permitted land disposal facility, and placement of clean sand material over the dredged areas. In addition, a post-remedial monitoring program for surface water and biota was to be implemented for at least five years, or longer, until it was demonstrated that the remediation goals had been achieved.




*Source: Levin-Richmond Terminal Corporation*

SW-0#
Stormwater Interceptor

1" = 385'
Approximate Scale

North

FIGURE 4-1
Location of Stormwater Interceptors at Levin Richmond Terminal
*United Heckathorn Superfund Site*
*Richmond, California*

CH2MHILL.

ES061611063729BAO_Fig_4-1_Loc_StormwaterInterceptor.ai_082411_lho

The remediation goals for the selected remedy as specified in the ROD are summarized in Table 4-1 below.

TABLE 4-1
Summary of Remediation Goals
*Third Five-Year Review Report, United Heckathorn Superfund Site, Richmond, California*

| Medium | Constituents | Level | Basis | Cancer Risk Level |
|---|---|---|---|---|
| Surface Water | DDT | 0.59 ng/L | USEPA Ambient Water Quality Criteria (AWQC) | $1 \times 10^{-6}$ |
| | Dieldrin | 0.14 ng/L | | $1 \times 10^{-6}$ |
| Sediment | DDT | 590 μg/kg | Ecological Assessment | $1 \times 10^{-6}$ |

**Notes:**
μg/kg = micrograms per kilogram; ng/L = nanograms per liter
Source: Record of Decision (USEPA 1994).

Monitoring for demonstrating the effectiveness of the remedy included surface water and mussel sampling. The goal of the mussel sampling was to confirm that concentrations of DDT in mussel tissue were declining as a result of the remedial action.

The following paragraphs summarize the basis for the ROD remediation goals. The values cited below were applicable in 1994 when the goals were developed and do not necessarily reflect changes to these values since 1994. The USEPA's Ambient Water Quality Criteria (AWQC), promulgated under Section 304 of the Clean Water Act, were identified as Applicable or Relevant and Appropriate Requirements (ARARs) for surface water at the Site. Criteria for the protection of saltwater aquatic life are, for most pollutants, based upon toxic effects data for water-column organisms. However, for DDT and its metabolites, which bioaccumulate to high levels and may cause toxicity to organisms at higher trophic levels, it was determined that more restrictive criteria were necessary to protect fish-eating birds.

The chronic marine aquatic life criterion for DDT is 1 nanogram per liter (ng/L). The water quality criterion for the protection of human health from the consumption of bioaccumulated DDT in fish is 0.59 ng/L (USEPA 1994). This is based on achieving a $1 \times 10^{-6}$ lifetime excess cancer risk level.

The chronic marine aquatic life criterion for dieldrin is 1.9 ng/L. This criterion is set to achieve the Food and Drug Administration's (FDA's) action level in fish oil after bioaccumulation and is protective of sensitive aquatic organisms. The water quality criterion for the protection of human health from the consumption of bioaccumulated dieldrin in fish is 0.14 ng/L (USEPA 1994). This is based on achieving a $1 \times 10^{-6}$ lifetime excess cancer risk level.

Other "to be considered" criteria (TBCs), as defined in Title 40 of the Code of Federal Regulation 300.400(g)(3), are non-promulgated advisories or guidance issued by federal or state government that are not legally binding but may provide useful information or recommended procedures for remedial action. The following information from the 1994 ROD, as cited in the previous Five-Year Review Report (USEPA 2006), identifies TBC criteria for the Site:

> No chemical-specific ARARs were identified as remediation goals for soil or sediment at the Site. The NAS [National Academy of Sciences] saltwater action levels are TBCs, which provide an additional level of protection to fish-eating birds beyond the level that is the basis of the surface water ARARs for aquatic life. The NAS action level was retained as a TBC to help determine the protectiveness of remediation, since the U.S. Fish and Wildlife Service raised concerns that the USEPA criteria for DDT might not be stringent enough for the protection of fish-eating birds. The NAS action level for DDT in fish = 0.05 mg/kg.

Based on results of the ecological risk assessment, mean sediment levels were calculated to provide one metric that the remediation goal ARARs for surface water and the NAS action level for DDT in fish would be achieved. The Site remedial action goal for sediment is 590 μg/kg for DDT, based on achieving a $1 \times 10^{-6}$ lifetime excess cancer risk level.

The FDA action levels for the marketability of fish and shellfish are TBCs for protecting human health. These levels are less stringent than the levels that would be achieved by meeting the surface water ARARs (FDA action levels: DDT = 5.0 parts per million; dieldrin = 0.3 parts per million.

Water Board Resolution 68-16 requires that waters of the Bay be maintained free of toxic substances in concentrations that are lethal to or that produce detrimental responses in aquatic organisms. Other relevant biological measures and effects on human health due to bioaccumulation will be considered. The Water Board identified Resolution 68-16 as an ARAR for the site. The USEPA does not agree that Resolution 68-16 is an ARAR; however, the USEPA does agree that achieving the human health water quality criteria and the marine chronic water quality criteria would meet the requirements of Resolution 68-16.

## 4.2 Remedial Actions Implementation

Remedial actions at the Site were implemented separately for the upland area and the marine area, as described in the subsections below.

### 4.2.1 Upland Area

Construction of the concrete cap at the upland area began in July 1998 and was completed in July 1999. The cap design and construction activities were performed by the property owner, pursuant to a Consent Decree with USEPA, under the oversight of USEPA.

Installation of the cap consisted of three steps: (1) site grading to promote surface runoff to collection points; (2) installation of a drainage system to collect surface runoff, including best management practices for stormwater pollution prevention; and (3) construction of a reinforced concrete cap in the majority of the 5-acre area used for material stockpiling and construction of a geotextile fabric and gravel cap in the railroad track area. The combination concrete and gravel/geotextile cap was designed primarily to prevent surface soils from presenting a risk via direct contact soil contact. Although storm water that falls directly on the gravel capped areas could infiltrate into the subgrade, DDT and dieldrin have very low solubilities in water and very high soil adsorption coefficients. Because of their low solubility and tendency to bind to fine grain-size particles, the most significant mechanisms for transport of COCs into and out of the site are those associated with movement of soils and sediments. The concrete and gravel/geotextile cap areas were designed to protect against

erosion of contaminated soils and subsequent flow into the channel associated with surface water runoff.

The reinforced concrete cap was placed in high traffic and material stockpiling areas (Figure 4-1). The concrete cap surface was sloped uniformly to direct localized drainage towards designated drop inlets. In some areas, 7- to 12- inch high concrete curbs were constructed along perimeters to retain water within cap areas. The gravel and geotextile fabric cap was placed in low traffic areas and was also placed as part of the track ballast along segments of rail lines within the facility. The surface water collection system consists of a series of drip inlets and catch basins which direct collected water to five below-grade surface water interceptor structures to retain surface water runoff.

Due to the fact that a 1,100-gallon underground storage tank was found in the central portion of the former United Heckathorn Site during grading activities, additional work was conducted for the excavation and removal of the underground storage tank and all visibly-affected soil (approximately 250 cubic yards).

Institutional controls were also implemented at the Site. A deed restriction was implemented to the land parcel, which imposed limitation on the property to non-residential use.

### 4.2.2 Marine Area

Sediment dredging of Lauritzen Channel and Parr Canal at the marine area began in August 1996 and was completed in March 1997. The remedial action was performed by Montrose Chemical Corporation of California, Inc., pursuant to a USEPA Consent Decree dated April 22, 1996.

During the remedial activities, silt curtains were installed to prevent suspended sediment from migrating out of the excavation area. Approximately 107,000 cubic yards of sediments were removed, transported by rail from the Site, and disposed of at designated disposal facilities.

Difficulties encountered during the remedial action include: (1) damage of the silt curtains, (2) unexpected finding of debris at the Site, and (3) change in designated disposal facility.

The silt curtain was damaged and repaired on a continuous basis throughout the project. A second temporary emergency curtain was also used as needed when the main silt curtain required repair.

In addition to two sunken barges, used storage tank caissons, cables, and other previously located and identified large debris, a smaller metal barge and a concrete dock were found and removed from the dredging area. During the dredging operation, the sediments encountered from the excavation area were filled with metal debris, railroad spikes, metal cable, rope and miscellaneous rubble that damaged tires, halted pumping operations, stopped processing operations and caused severe damage to equipment. Overall processing cycles were impacted due to the discovery and subsequent operational challenges associated with this material.

The location for offsite disposal of the sediment was changed from Butterfield Station in Mobile, Arizona to an ECDC Environmental disposal facility in Utah due to community protests and demonstrations in Richmond, California, and Arizona.

After completion of the dredging operation, sediment samples were taken at the dredging area as confirmation of the remedial actions. Before remediation, the median total DDT concentration at the head of Lauritzen Channel and Parr Canal were 47,000 µg/kg and 840 µg/kg, respectively. After remediation, confirmation sampling indicated that the average DDT concentrations in Lauritzen Channel were 264 µg/kg and in Parr Canal 200 µg/kg (CWM 1997).

An average of 18 inches of clean sand was placed over the dredged areas to promote the return of habitat and fauna for the purpose of Site restoration.

## 4.3 Operations and Maintenance

To assess and ensure long-term effectiveness of the remedial actions, two types of operations and maintenance (O&M) activities are being implemented at the Site, including: (1) cap inspection and stormwater monitoring programs at the upland area, and (2) post-remediation monitoring of surface water and biota at the marine area.

### 4.3.1 Upland Area

The objective of the cap inspection and stormwater monitoring programs is to identify any potential release of pesticide-impacted soil by examining the integrity of the cap system through inspection and stormwater monitoring.

#### 4.3.1.1 Inspection Monitoring

The inspection monitoring program includes inspection of the concrete cap, and storm water collection drainage system. While the upper layer of the concrete capping system is being observed daily by the LRTC onsite personnel during normal operation, inspection of the drainage system around manholes and drop inlets is conducted on a monthly basis. A formal site inspection is performed once a year. The annual report is maintained at the LRTC office and submitted to the USEPA.

According to the O&M Plan (ETS 2006), areas that show signs of deterioration and a potential for exposure of the underlying material are to be repaired in a timely manner within 2 weeks of discovery. Any evidence of deterioration and exposure of the underlying material are to be repaired within 1 week. Repairs are required to be documented in the annual report.

#### 4.3.1.2 Stormwater Monitoring

The stormwater monitoring program consists of sampling and analysis of stormwater runoff from the upland capping system. There are 10 stormwater monitoring locations at the shipping terminal (SW-1 through SW-10), as shown in Figure 4-1. Stormwater runoff from the 5-acre upland cap area is directed by surface swales and subsurface piping into five stormwater interceptors (SW-3 through SW-7). The five stormwater interceptors are designed to have sufficient capacity to hold all stormwater runoff generated during the rainy season (October through May) to avoid direct discharge into Lauritzen Channel.

As part of the routine maintenance, the five interceptors are drained, emptied of all sediment, and pressure-washed, as necessary, to prevent outflow of sediments into the Lauritzen Channel. Direct discharge to the Lauritzen Channel is not anticipated. Stormwater within the interceptors is sampled and analyzed for discharge to the City of Richmond publicly-owned

treatment works under an annual industrial discharge permit. Sediments are tested and transported to a qualified landfill.

Because the facility is operating under a State Water Resources Control Board Industrial Activities – Storm Water General Permit, the stormwater monitoring schedule and analytical program is incorporated into the LRTC's existing facility-wide Stormwater Pollution Prevention Plan and Stormwater Monitoring Plan. In addition to analyzing for pesticides using USEPA Test Method 8081, additional analyses required under the facility Stormwater Monitoring Plan include selected heavy metals; suspended sediments; pH; total petroleum hydrocarbons (TPH) in the gasoline, motor oil and diesel ranges; oil and grease; specific conductance; and chemical oxygen demand.

#### 4.3.1.3 Operations and Maintenance Costs

The costs for environmental related O&M activities (stormwater sampling and inspections) at the 42-acre LRTC marine terminal include the O&M activities for the upland cap area. LRTC estimates that 50 percent of the total of environmental-related O&M activities are for the upland cap area at the former United Heckathorn site. The estimated annual costs for O&M activities in 1998 was $5,750. For the annual periods from July 2005 through July 2010 the estimated annual costs ranged from $40,600 to $76,600.

### 4.3.2 Marine Area

The objective of the marine monitoring program is to evaluate the long-term effectiveness of the implemented remedy by demonstrating a reduction in contaminants resulting from the USEPA remedial actions. The post-remediation marine monitoring program included: (1) surface water monitoring, and (2) biological monitoring. Trends of COC concentration levels in surface water and mussel tissue samples are used as indicators of whether the remedy is effective and functioning as intended. Results from each marine monitoring event were documented in a post-remediation marine monitoring report.

As indicated in the ROD, post-remediation monitoring is required annually for at least five years or until the remediation goals have been achieved. Six sampling and analysis events were conducted at designated stations along the Lauritzen Channel and Parr Canal by USEPA and Battelle from 1997 to 2003. Three additional sampling events were conducted in 2004, 2007 and 2009. The following sections describe activities conducted since the last Five-Year Review in 2006. Complete analytical results are summarized in Appendix B, Data Review, Attachment 2, Summary of Investigation and Monitoring Data (2006 through 2010).

#### 4.3.2.1 Surface Water Monitoring

Surface water samples were collected in 2007 and 2009 at the historic sampling locations established during previous post-remedial characterization investigations and during the five-year monitoring program (see Figure 4-2). In addition, water samples were also collected at additional locations shown on Figure 4-2. The results of the surface water sampling are discussed in Section 6.4.2.1 and in Appendix B.

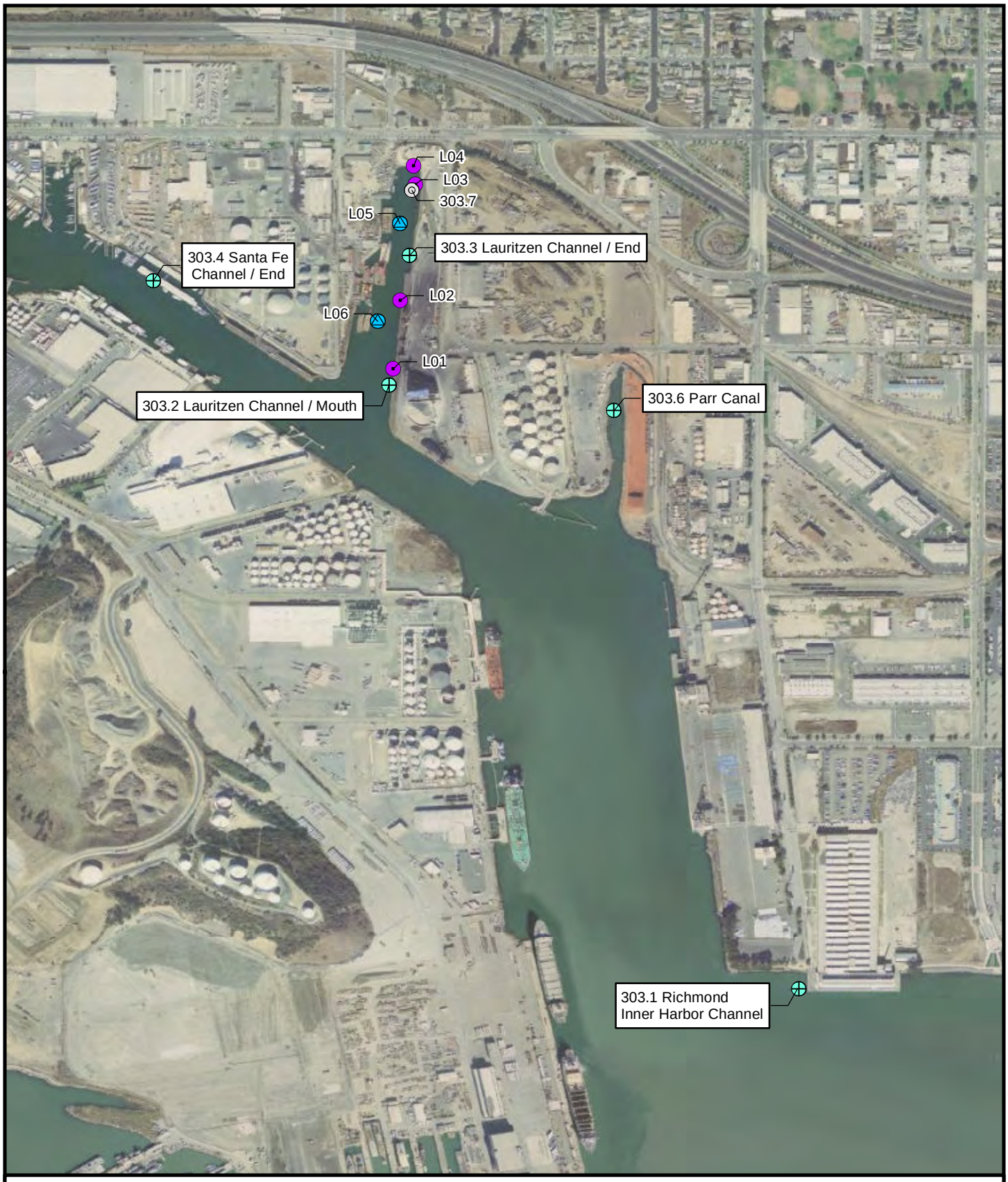
#### 4.3.2.2 Mussel Tissue Monitoring

Resident mussel samples were collected in 2007 and resident and transplanted mussels were collected in 2009. Samples were collected at the locations established during previous post-remedial characterization investigations as well as locations sampled during the first five-

year monitoring programs, and at expanded locations (Figure 4-2). The results of the mussel sampling are discussed in Section 6.4.2.2 and Appendix B.

#### 4.3.2.3 Sediment Sampling

Sediment sampling was performed as part of multiple investigations primarily focused on identification of hot spot areas within the Lauritzen Channel. Sediment samples were also collected in 2007 with the goal of characterizing the lateral and vertical extent of DDT and dieldrin in sediment in the Lauritzen Channel and Parr Canal. Figure 4-3 shows the sediment sampling locations. The results of sediment sampling are discussed in Section 6.4.2.3 and Appendix B.




**LEGEND**

- Mussel Sample Only (2009)
- Marine Monitoring Program Stations (2007)
- Water and Mussel Sample (2007)
- Water Sample (2007)

N

0 300 600 1,200 Feet

FIGURE 4-2
Sampling Locations for Marine Monitoring Program and Additional Sampling 2007 and 2009
*United Heckathorn Superfund Site*
*Richmond, California*

CH2MHILL

D:\Projects\EPA_UnitedHeckathorn\MapFiles\2011\MarineMonitoring

**LEGEND**

Sample Locations

N

0 250 500 1,000 Feet

FIGURE 4-3
Sediment Sample Locations
2007-2008
*United Heckathorn Superfund Site*
*Richmond, California*

ES061611063729BAO sediment_sample_locs.ai 07-22-11 dash

CH2MHILL.

SECTION 5.0

# Progress Since the Last Five-Year Review

The last Five-Year Review conducted at the United Heckathorn Superfund Site was prepared by USEPA Region 9 in September 2006.

## 5.1 Protectiveness Statements from Last Review

The protectiveness statement from the last Five-Year Review Report (USEPA 2006) was as follows:

> *The remedy implemented at the upland area of the United Heckathorn Superfund Site is protective of human health and the environment, due to capping of contaminated soils which has eliminated human exposure pathways and prevented erosion. Routine inspection and monitoring assures the protectiveness of the upland remedy at the Site.*
>
> *The remedy implemented at the marine area of the Site is not protective because potential exposure is clearly present. Fishermen and their families may be exposed to contaminants when fish or other edible biota from the Site are consumed. This may occur if warning and no-trespassing signs are ignored or misunderstood. Fish-eating birds and wildlife cannot be prevented from consuming potentially contaminated food from the Site. In addition, contaminated biota (e.g., fish) cannot be prevented from migrating to areas outside of the Site, where they might be harvested and consumed by fishermen, birds, or wildlife.*

The last Five-Year Review concluded that the upland concrete cap is functioning as intended. The RAOs for water and sediment, however, are not being maintained in the Lauritzen Channel.

## 5.2 Issues and Recommendations from Last Five-Year Review

Two issues were identified in the previous Five-Year Review Report, as stated below:

- Post-remediation marine monitoring indicates that remediation goals for DDT and dieldrin for water and sediments have not been maintained. Further, concentrations of DDT and dieldrin in mussel tissues, while declining since remedial dredging occurred, are still elevated. These contaminants may still pose risks to fish-eating birds, mammals, and fishermen and their families.
- Community interviews conducted by USEPA for the human health risk assessment (ICF 1994) confirmed that the marine area is used by recreational and subsistence fishermen, despite multi-lingual signs posted by the CDHS that warn of the risks of consuming fish or shellfish. It is likely that some consumption of contaminated fish still occurs because access to the Site by trespassing boats cannot be completely eliminated. Also, fish within the Site may migrate to outlying areas that are legally accessible to fishermen. Such conditions may pose a risk to human health.

The recommendation for both issues identified in the previous Five-Year Review is as follows:

- Continue preparation of a Focused Feasibility Study (FFS) to evaluate alternatives for addressing the remaining contamination. It is not possible to determine what, if any, remedial actions should be taken to address contaminated sediments, water and tissues without a complete analysis of alternatives.

## 5.3 Follow-up Actions from Last Five-Year Review

Preparation of an FFS to evaluate alternatives for the Lauritzen Channel continued throughout this Five-Year Review. This work has included re-evaluation of the human health and ecological receptors and derivation of risk-based concentrations for DDT in sediment. Actions in support of the FFS are outlined below.

- In June through August 2007, three mussel tissue, surface water, and sediment sampling events were conducted. Samples from multiple locations within the Lauritzen Channel, Parr Canal, Santa Fe Channel, and Richmond Inner Harbor Channel were analyzed for dieldrin and total DDT.
- In 2008, fish and shrimp sampling was conducted in the Lauritzen Channel, Richmond Inner Harbor Channel, Santa Fe Channel, and Parr Canal. Total DDT and dieldrin concentrations were analyzed for individual and composite fish and shrimp samples examining both fillet and whole fish samples.
- In June, July and September 2008 and June 2009, storm drain systems potentially leading to the City of Richmond outfall at the north end of the Lauritzen Channel were investigated and sediment samples collected from manholes in the site vicinity.
- In 2009, resident and transplanted mussels, passive samplers (polyethylene devices [PEDs]) and solid phase microextraction devices ([SPMEs]) were deployed at five historic sampling locations, at one new location in the northern end of the Lauritzen Channel, and at three "background" locations in the Santa Fe Channel. Water samples were collected at each mussel location to provide a biota comparison to the results of the passive samplers.
- In January 2011, a site inspection via boat was conducted to review warning signs posted at the site regarding fishing and trespassing.
- In May 2011, the State of California Office of Environmental Health Hazard Assessment issued an updated fish advisory that recommended no consumption of fish from the Lauritzen Channel and recommended limited consumption of fish from San Francisco Bay.

SECTION 6.0

# Five-Year Review Process

The following sections discuss findings from this Five-Year Review.

## 6.1 Administrative Components

Penny Reddy, USEPA Remedial Project Manager for the Site, led this Third Five-Year Review. CH2M HILL provided technical support to the USEPA.

## 6.2 Community Involvement

The USEPA website provided notification of the commencement of this Five-Year Review. A notice was also published in the *West County Times*. Following the release of this document, a fact sheet will be prepared by USEPA for distribution to the community near the Site. The fact sheet will summarize the findings of this Five-Year Review Report and provide instructions on how to obtain a copy.

## 6.3 Document Review

As part of the Five-Year Review process, relevant documents and information related to the Site activities were reviewed. The documents chosen for review primarily focused on progress since the last Five-Year Review but ranged in publication date from 1995 to present. A list of the documents reviewed is provided in Appendix A.

## 6.4 Data Review

Over the Five-Year Review period, monitoring and inspection of the upland area cap was conducted. For the marine sediments, monitoring and additional data gap sampling was performed. The Data Review provided in Appendix B includes a discussion, data tables and figures that summarize the results of monitoring and investigations conducted since the last Five-Year Review.

### 6.4.1 Upland Area

For this Five-Year Review, annual reports documenting the implementation of the O&M Plan from June 2006 to 2010 were reviewed (ETS 2006; 2007; 2008; 2009; 2010).

#### 6.4.1.1 Inspection Monitoring

Based on review of the annual reports, the upland cap is determined to be uncompromised and functioning as intended.

Some surface cracks were noted during the routine site inspections but they are considered too small to need repair. The most recent cap inspection was conducted and documented on June 14, 2010. It was concluded that the integrity of the cap remains intact and it is in good condition.

Inspections of the stormwater drop inlets and interceptors are being conducted monthly, which is documented in the Annual Report for Stormwater Discharges Associated with Industrial Activities (ETS 2006; 2007; 2008; 2009; 2010). According to the annual reports, the stormwater system, in general, has been maintained in good condition, with occasional minor sedimentation observed within the storm drains. Staining and odors have not been observed or detected. Some improvements were made to the interceptors to ensure discharges to the Lauritzen Channel would not occur or could be better controlled. In 2010, the USEPA recommended that LRTC perform additional documentation and inspection activities to provide a more robust basis for assessing when maintenance and repair activities may be necessary.

#### 6.4.1.2 Stormwater Monitoring

The annual reports indicate that no pesticides (including DDT and dieldrin) were detected in the composite samples taken from the five stormwater interceptors during the monitoring events. It should be noted that DDT was not tested in storm drain sediment as part of annual monitoring in 2006 and 2007. This was corrected in 2008. The industrial discharge permit from the City of Richmond has been updated annually to allow discharge to the publicly-owned treatment works. The facility has been in compliance with both the O&M stormwater monitoring program and the stormwater general permit.

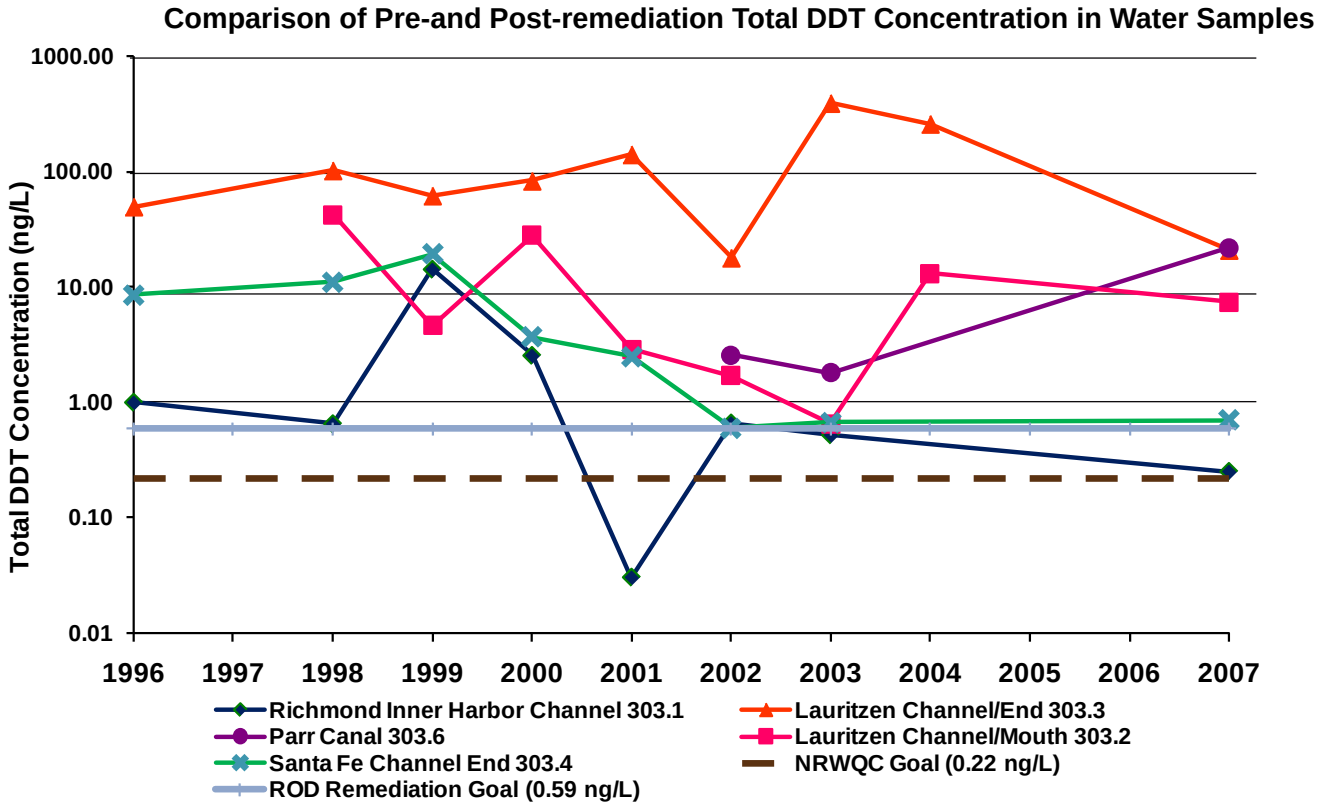
### 6.4.2 Marine Area

Investigation and monitoring activities conducted since 2006 include 2007-2008 Focused Feasibility Study Data Gaps Sampling events, ongoing investigations into the storm drain systems which discharge to the Lauritzen Channel and Parr Canal, fish sampling and surface water and passive device sampling. Sampling results from investigation and monitoring activities are presented in Appendix B, Data Review, Attachment 2, Summary of Investigation and Monitoring Data (2006 through 2010).

#### 6.4.2.1 Surface Water Monitoring

A graph of concentrations of total DDT in marine surface water samples beginning with pre-remediation through 2007 is provided on Figure 6-1. In 2007, sampling was performed to identify potential remaining sources. This graph illustrates that the remediation goal of 0.59 ng/L total DDT established for the Site has not been consistently maintained. This same conclusion is applicable to dieldrin concentrations in surface water (see Appendix B). No persistent data trend is observed in total DDT concentrations in water samples throughout the monitoring program and subsequent sampling events.

Data from the monitoring indicate the highest total DDT and dieldrin concentrations occur at the "Lauritzen Channel End" near the mid-point of the channel, closest to the former United Heckathorn facility (Station 303.3), and that they decrease with distance from Lauritzen Channel/Mouth (Station 303.2) to Santa Fe Channel/End (Station 303.4) and are the lowest at the Richmond Inner Harbor Channel. Limited results for water samples in the Parr Canal (3 samples) do show an increasing DDT trend The most elevated and variable concentrations occur at the mid-point of the Lauritzen Channel and could be attributed to the re-suspension of sediment by frequent vessel traffic in this area.



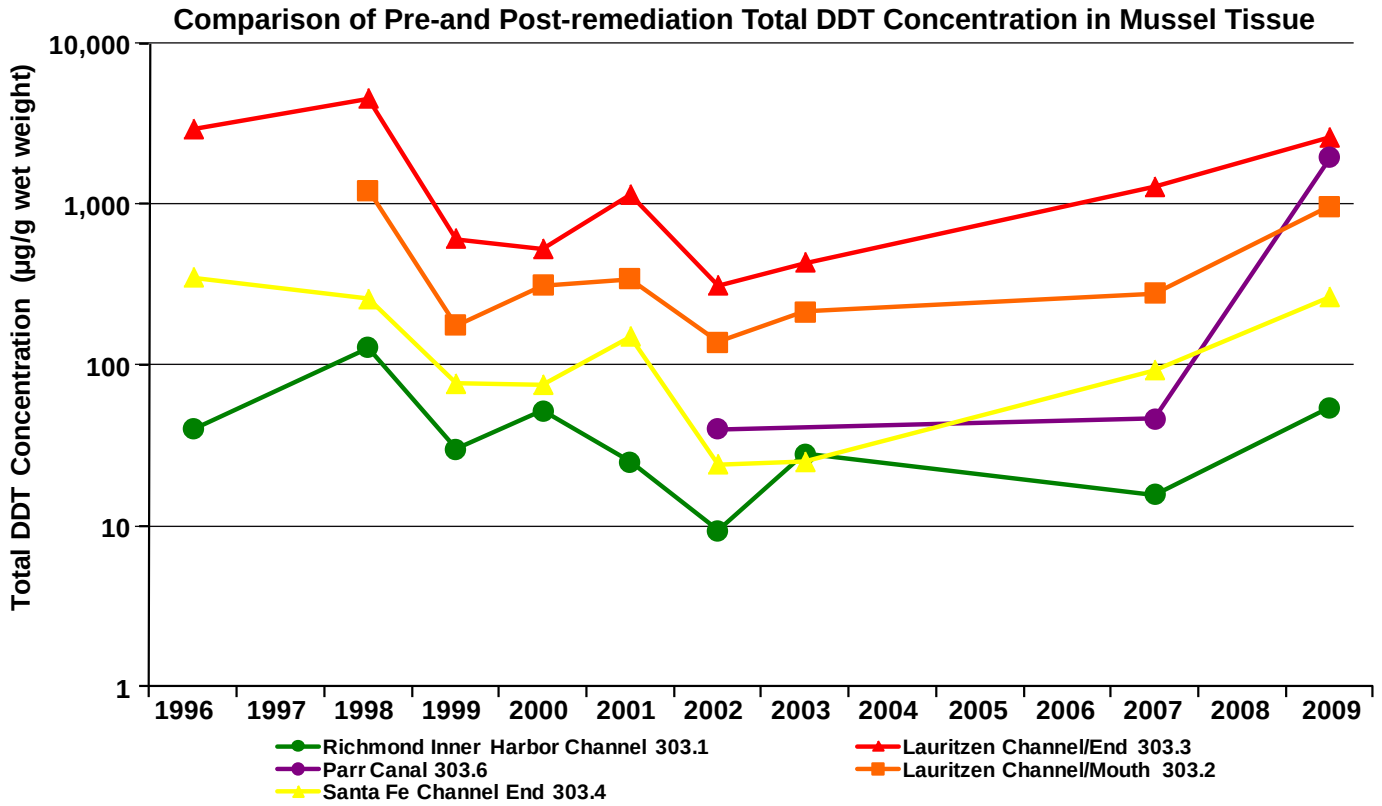




FIGURE 6-1
DDT Concentrations in Water and Mussel Tissue at Marine Monitoring Stations
*United Heckathorn Superfund Site*
*Richmond, California*



CH2MHILL

#### 6.4.2.2 Mussel Tissue Monitoring

A graph of concentrations of total DDT in mussel tissue samples from pre-remediation through post-remediation monitoring is also provided on Figure 6-1. The concentration of total DDT in mussel tissues exhibits a decreasing trend from 1998 to 2002, but samples collected in 2003, 2007 and 2009 suggest an increasing trend. In addition, 2009 DDT concentrations were found to be at levels similar to pre-remediation concentrations. Dieldrin concentrations show a similar pattern. As with surface water samples, the concentrations in the tissue samples indicate that the highest total DDT and dieldrin concentrations occur at the "Lauritzen Channel End" and decrease with distance from this location. The lowest concentrations were found in mussels sampled from the Richmond Inner Harbor Channel. The 2009 concentration of DDT in mussel tissue from the Parr Canal is higher relative to previous post-remediation monitoring years.

#### 6.4.2.3 Sediment Sampling

DDT concentrations in surface sediment from 1998 to 2007 (post-remedy) were significantly higher than sediment samples collected as confirmation samples following the implementation of the remedy. A comparison of the data is shown on Figure 6-2. The average concentration of DDT in confirmation surface sediments samples following the implementation of the remedy was 264 µg/kg. The median concentration of DDT in sediment collected post-remedy between 1998 and 2007 is approximately 27,000 µg/kg. This average concentration exceeds the remedial action goal for DDT that was specified in the ROD (average concentration of 590 µg/kg).

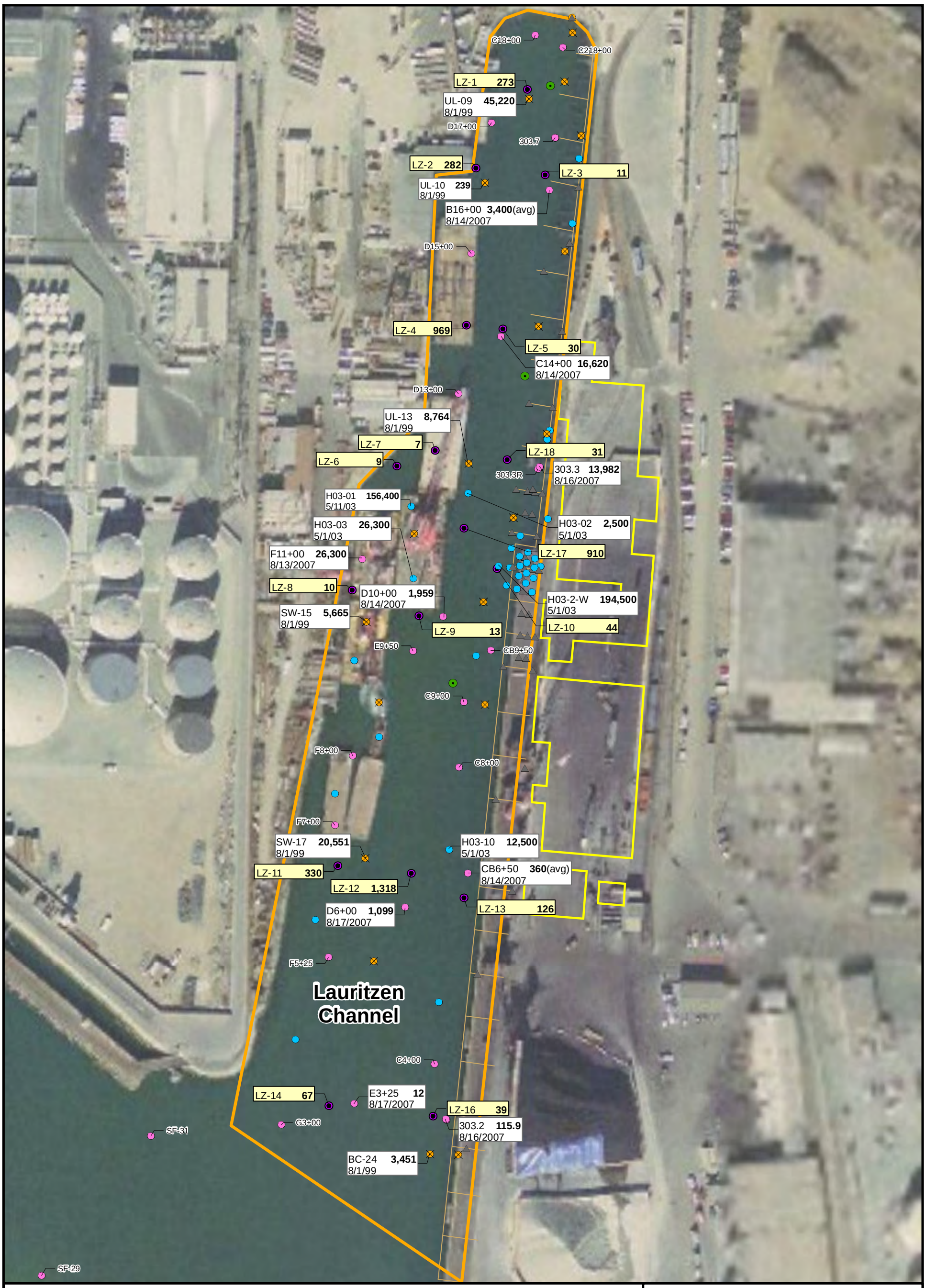
#### 6.4.2.4 Fish Tissue Sampling

Average total DDT and dieldrin concentrations from fish collected within the Lauritzen Channel were significantly higher than corresponding average concentrations in fish collected within the Santa Fe Channel, Parr Canal or Richmond Inner Harbor. Fish tissue collected from the Lauritzen Channel in 2008 (CH2M HILL 2008c) showed concentrations of total DDT and dieldrin up to two orders of magnitude higher than background concentrations (SFEI 2006).

#### 6.4.2.5 Updates to Human Health and Ecological Risk Assessments

An update of the Human Health Risk Assessment (CH2M HILL 2010a) and Ecological Risk Assessment (CH2M HILL 2010b) produced the following findings:

- Fish tissue concentrations of total DDTs and dieldrin in the Lauritzen Channel are still present at levels that could pose unacceptable risk to people consuming fish.
- For some fish species and locations, concentrations of DDT are comparable or higher than levels observed in the data collected for the 1994 HHRA (ICF 1994).
- Fish tissue risk-based concentration (RBCs) were derived using well-accepted risk assessment methods and would be appropriate for use in demonstrating the effectiveness of future remedial actions.
- Sediment RBCs were derived using empirical data describing the relationships between sediment and acceptable fish tissue concentrations and would be appropriate for use in evaluating remedial alternatives (CH2M HILL 2010b).




**LEGEND**

- Sample collected in 1997
- Sample collected in 1998
- Sample collected in 1999
- Sample collected in 2002
- Sample collected in 2003
- Sediment sample collected in 2007
- Lauritzen Channel Project Boundary
- Former Buildings
- Embankment Pilings
- Embankment Pier

Sample ID — Total DDT in confimation sediment sample (µg/kg)

Sample ID — Comparison DDT concentration in surface sediment post remedy. (µg/kg) Investigation 1998-2007

N

0 62.5 125 250 Feet

Note: (avg) is average of laboratory results from USEPA lab and USEPA Contract Laboratory for surface sample.

FIGURE 6-2
Comparison of Post-Remediation DDT Concentrations in Lauritzen Channel Sediment:
1997 Confirmation Results vs. 1999-2007 Investigation Results

*United Heckathorn Superfund Site*
*Richmond, California*

CH2MHILL

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The results of the ecological and human health update (see Appendix C) indicate that:

- Risks to fish and wildlife from total DDT and dieldrin persist in the Lauritzen Channel.
- All surface sediment concentrations of total DDT and dieldrin in the Parr Canal, Sante Fe Channel mouth, and Richmond Inner Harbor Channel fall below the minimum risk-based sediment concentrations calculated for fish and wildlife receptors. Dieldrin in the Santa Fe Channel mouth is also below minimum risk-based sediment concentrations.

#### 6.4.2.6 Storm Drain Source Investigation

A series of investigations were performed to determine the possibility of a post-remediation offsite source of DDT and or dieldrin to the Site. The City of Richmond provided a map of their storm drainage system that discharges into the Lauritzen Channel and Parr Canal. A series of site visits were conducted to determine the hydraulic connectivity of the storm drain structures to the outfalls and to characterize the sediments in the storm drainage system for DDT and dieldrin concentrations. Additionally, a series of videos were collected to confirm the integrity of the storm drains that extend under the existing upland cap, and to determine if the upstream sources of the elevated DDT and dieldrin sediment were present in the storm drain structures. The results of this work indicated that sediment in some storm drain manholes contained total DDT at concentrations up to 52 mg/kg. Sediment sampling results and the location of the manhole and lines are shown on Figure 6-3. There are several possible interpretations for the presence of the DDT in these manholes; however, the most likely interpretation is that the DDT in sediment from these manholes is a remnant of historical operations at the United Heckathorn Site and the manholes have not been cleaned out by the City of Richmond as have other manholes.

#### 6.4.2.7 Passive Samplers Study

USEPA's Office of Research and Development is conducting a joint effort with representatives of the Massachusetts Institute of Technology (MIT) and USACE to examine the use of passive samplers in and around the United Heckathorn Site to characterize and monitor DDT and dieldrin concentrations in biota, sediment and water. Samplers (polyethylene sheets and solid phase microextraction fibers) were deployed in the water column at nine locations for 30 days between September and October 2009. Local and deployed mussels were also collected at selected collocated locations. The results of the first phase indicated that polyethylene sheets may be effective at measuring dissolved water concentrations of DDT and dieldrin as well as predicting contaminant concentrations bioaccumulated by mussels. The next phase of work, Phase II, will evaluate the use of passive samplers to monitor DDT concentration fluxes from the sediment into the water column.

## 6.5 Regulatory Review

A review of ARARs and TBCs was conducted for the selected remedy at the Site, as included in Appendix D. The review was conducted to determine if changes to standards and TBCs have occurred since the ROD was issued in 1994 that might affect current protectiveness of the selected remedy.

The specific documents that were reviewed for any changes, additions, or deletions include the ROD, dated October 26, 1994, and the ESD, dated November 29, 1996.

Based on the evaluation, several changes to ARARs and TBCs were noted including:

- The recommended human health water quality criteria (WQCs) were lowered in 2009: DDT was lowered from 0.59 ng/L to 0.22 ng/L, and dieldrin was lowered from 0.14 ng/L to 0.054 ng/L (USEPA 2009); however, there have been no corresponding changes to the ROD remediation goals or the values promulgated as the California Toxics Rule (CTR). Previously the WQCs, the ROD remediation goals and the CTR values for DDT and dieldrin were all identical. Appendix C presents an evaluation of risk to human health based on these revised WQCs.
- The ROD and the 2006 Five-Year Review identified the California least tern and California brown pelican as federally listed endangered species. The California brown pelican was delisted due to recovery in 2009 (74 FR 59444); the least tern remains listed.
- The ROD and the 2006 Five-Year Review identified the American peregrine falcon as a state listed endangered species; it was delisted due to recovery in 2009 (California Department of Fish and Game 2011).

The above changes do not affect the protectiveness of the upland remedy and do not change the conclusion that the marine remedy is not protective. An analysis of remediation goals appropriate for the marine remedy will be evaluated in the focused feasibility study and any necessary changes would be completed as part of an Amendment to the Record of Decision.

## 6.6 Site Inspection

On April 21, 2011, a site inspection was conducted by representatives of USEPA, the California Department of Toxic Substances Control (DTSC), and CH2M HILL. The purpose of the site inspection was to observe conditions and the status of operation at the Site and its surrounding area. The inspection included a walking tour of the 5-acre upland capping area with LRTC onsite personnel at the Levin Richmond Terminal. A summary of the inspection findings is presented below. The site inspection checklist and photos are provided in Appendix E.

The Levin Richmond Terminal is surrounded by other industrial facilities. The property is fenced and secured by gates with limited access. Security guards are onsite 24 hours a day. All visitors entering the Site are required to register in the security office at the main entrance of the terminal.

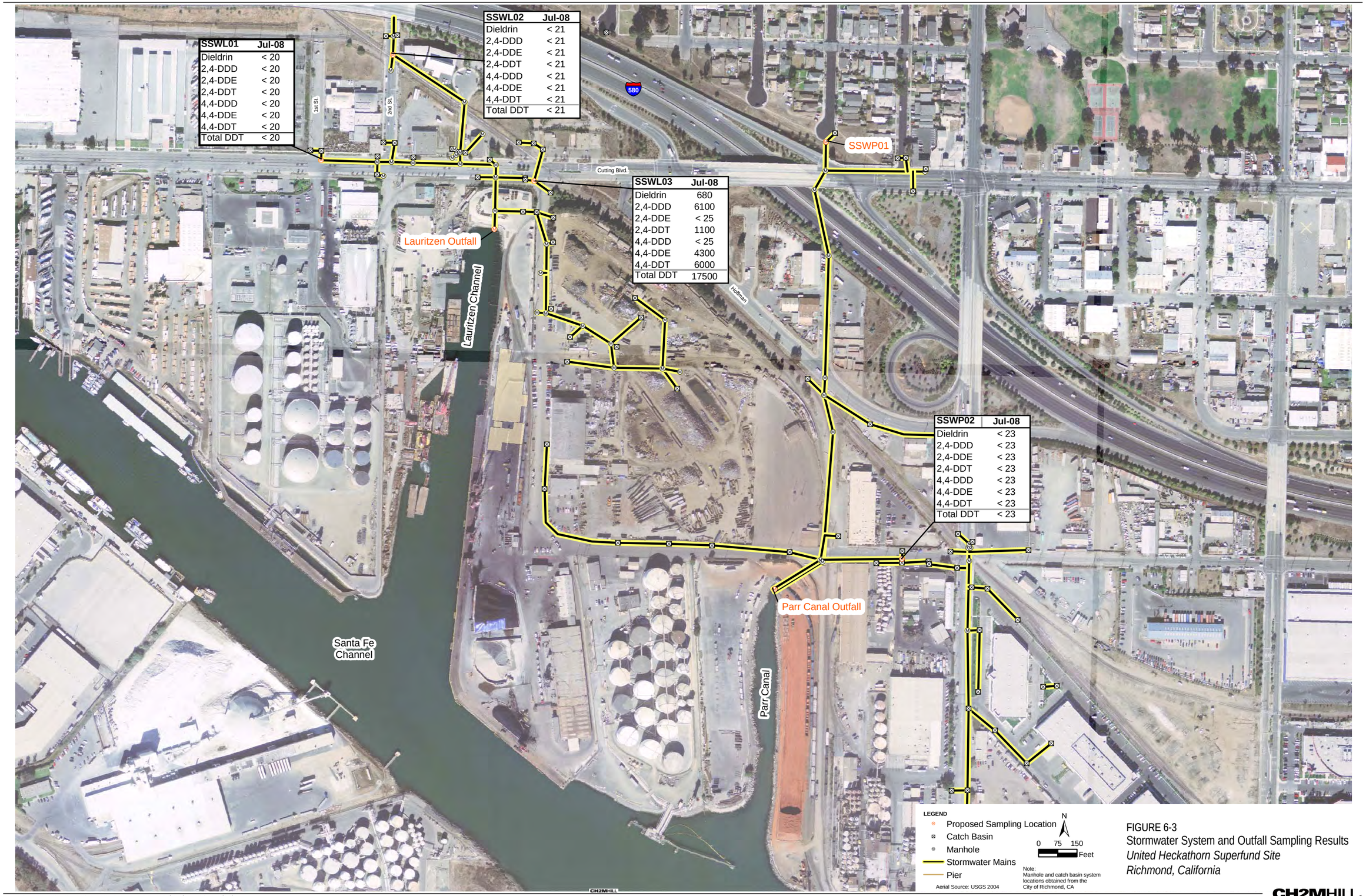


FIGURE 6-3
Stormwater System and Outfall Sampling Results
*United Heckathorn Superfund Site*
*Richmond, California*

ES061611063729BAO stormwater_system_results.ai 07-22-11 dash

CH2MHILL

Based on observation from the site inspection, the integrity of the upland cap was well-maintained, and the cap was in good condition with no erosion. Although surface cracks were visible on the cap, it was indicated in the annual reports that they were not indicative of stress fractures but most likely developed subsequent to the curing of freshly-poured concrete. They were noted to be insignificant and do not require repair.

Stormwater interceptors (SW-3 to SW-7) were observed to be in good condition. Based on personal communication with the LRTC personnel, the stormwater interceptors were functioning properly during the previous rain event.

It was perceived during the inspection that LRTC is proactively looking for optimization opportunities for maintenance of the upland cap, material management, and stormwater pollution prevention at the Site. General housekeeping was well-performed.

Based on observations from the site inspection, no major issues were identified on the upland capping area that could potentially affect the protectiveness of the remedy at the Site. The inspection and stormwater monitoring program should be continued for evaluation of any potential propagation of the existing surface cracks on the cap.

Warning and "No Fishing" advisory signs in the Lauritzen and Santa Fe Channels at multiple locations were observed by USEPA and CH2M HILL during a boat tour on January 26, 2011. Signs were in English, Spanish, and Vietnamese. Most contact phone numbers on signs were no longer correct (phone numbers were disconnected) and some signs were difficult to read. Details regarding the signs and photographs of the inspection are presented in Appendix E. Although the signs are outdated, the signs along the piers clearly state warnings against trespassing on the piers and surrounding waterways within the channel or consuming fish or shellfish caught in the channel. The signs need to be updated to include the State of California Office of Environmental Health Hazard Assessment May 2011 updated fish advisory that recommends no consumption of fish from the Lauritzen Channel and limited consumption of fish from San Francisco Bay (OEHHA 2011).

SECTION 7.0

# Technical Assessment

This section evaluates the protectiveness of the implemented remedy at the Site based on data and information presented in the previous section. The technical assessment was conducted by examining three questions, as listed in the following subsections.

## 7.1 Question A: Is the Remedy Functioning as Intended by the Decision Documents?

### 7.1.1 Upland Area

The review of documents, ARARs, risk assumptions, and the site inspection indicates that the remedy at the upland area is functioning as intended. The 5-acre cap area has achieved the remedial objectives by eliminating the potential of erosion and exposure of contaminated soils from the upland capping area.

The implementation of institutional controls has been effective. The property is operating as a marine terminal under industrial land use/port classification. A deed restriction allows for only commercial or industrial (non-residential) uses. An institutional controls assessment memorandum, including the results of 2011 title search to verify the deed restriction, is included in Appendix F.

O&M of the cap and drainage structures have been effective. Minor surface cracks on the cap are visible but do not compromise the protectiveness of human health and the environment. The O&M annual reports indicate that the cap remains intact and is in good condition. In addition, the facility has been in compliance with both the O&M stormwater monitoring program and the stormwater general permit.

There are no opportunities for system optimization observed during this review. Recommendations for improvements to inspection and stormwater monitoring program were provided by USEPA to LRTC in 2010. Although, the existing program provides sufficient data to evaluate the integrity of the upland capping system, mapping and measurement of surface cracks, periodic settlement surveys and drainage system video inspection would provide data to better plan when future maintenance and repairs may be necessary. Continual inspection and stormwater monitoring should be conducted to assess any further propagation of surface cracks and any potential erosion of the contaminated soil from the upland capping area.

### 7.1.2 Marine Area

The review of documents, ARARs, and risk assumptions indicates that the remedy at the marine area is not functioning as intended by the ROD. Based on the post-remediation marine monitoring program, the remediation goals for the marine area have not been maintained. The first post-remediation monitoring event, conducted in April 1997, indicated that RAOs had been achieved. However, subsequent monitoring indicated that DDT and dieldrin concentrations in sediment, water, mussel tissue and fish were not within the

acceptable limits. Re-evaluation of the risk to human health and ecological receptors (CH2M HILL Appendix B), the risk reviews contained in Appendix C, and the May 23, 2011 Fish Advisory for Lauritzen Channel (OEHHA 2011) support this conclusion.

## 7.2 Question B: Are the Assumptions Used at the Time of Remedy Selection Still Valid?

The exposure assumptions used at the time of remedy selection are generally unchanged.

### 7.2.1 Upland Area

No major changes in the Site conditions of the upland area that might affect the exposure pathways were identified. The Levin Richmond Terminal is surrounded by other industrial facilities. The property is fenced and access is limited.

In addition, no new human health or ecological routes of exposure were identified that would affect the protectiveness of the remedy, and no new contaminants were identified.

### 7.2.2 Marine Area

No major changes in the Site conditions of the marine area that might affect the exposure pathways were identified. The Lauritzen Channel and Parr Canal continue to be connected to the Santa Fe Channel, so that fish and other migratory aquatic biota have access to these areas. In addition, fish-eating birds forage in the area. Even though the marine areas are posted with warning and no trespassing signs, these areas may be accessed by boat. Fishermen may still harvest fish and other edible biota from these areas.

No new contaminants have been identified. Proposed changes to toxicity values have been identified and documented in the technical memorandums in Appendix C; however, these changes do not affect the protectiveness of the remedy.

The remedial goals for surface water, as reported in the 1994 ROD, were based on the USEPA Ambient Water Quality Criteria for DDT and dieldrin. These criteria were updated in 2009. The National Recommended Water Quality Criteria (NRWQC) for DDT and dieldrin have decreased from 0.59 ng/L to 0.22 ng/L for DDT and from 0.14 ng/L to 0.054 ng/L for dieldrin (USEPA 2009).

As discussed in Section 6.4.2.5, human health and ecological risk were reexamined at the site. An HHRA Update Technical Memorandum presents sediment risk-based concentrations derived using empirical data on the relationships between sediment and acceptable fish tissue concentrations (CH2M HILL 2010a). The sediment RBC for dieldrin is 13 µg/kg based on a cancer endpoint of $1x10^{-4}$, and the sediment RBC for DDT is 450 µg/kg based on a noncancer endpoint (Hazard Quotient=1).

A reassessment of remediation levels to address risks to ecological receptors concluded that concentrations lower than the 1994 remedial goal may be needed to be protective of invertebrates, fish, birds, and mammals (CH2M HILL 2010b). Total DDT concentrations as low as 150 µg/kg, and sediment concentrations of dieldrin as low as 34 µg/kg would be protective of all modeled ecological receptors.

## 7.3 Question C: Has Any Other Information Come to Light that Could Call Into Question the Protectiveness of the Remedy?

### 7.3.1 Upland Area

No other information has surfaced that would call into question the protectiveness of the remedy at the upland of the Site.

### 7.3.2 Marine Area

As discussed in Section 7.1, the remedy implemented at the marine area of the Site is not effective or functioning as intended by the ROD. No other information changes this conclusion. As discussed in Section 7.2, risk-based concentrations for sediment and fish tissue were developed for the Site should be considered in evaluating and selecting additional remedial actions for the Site. An FFS is in progress to identify options that would be protective of human health and the environment.

SECTION 8.0

# Issues

This section describes issues identified for the United Heckathorn Site during this Five-Year Review. Issues are summarized in Table 8-1. There are no issues related to the upland area.

In the marine area, post-remediation marine monitoring indicates that remediation goals for DDT and dieldrin for water and sediment have not been maintained. Further, concentrations of DDT and dieldrin in mussel tissues indicate that concentrations have increased since 2002 after showing a decline from 1998 to 2002. Re-evaluation of risks to fish-eating birds, mammals, and fishermen and their families indicates that risk to human health and ecological receptors persists despite performance of the remedial action for sediment in the Lauritzen Channel and Parr Canal in 1996-1997.

Although increased security measures around port facilities and an updated fish advisory warns that no fish from Lauritzen Channel should be consumed, it is still possible that human consumption of contaminated fish will occur, whether the fish are caught in the Lauritzen Channel or after migrating to adjacent waters.

TABLE 8-1
Issues
*Third Five-Year Review Report, United Heckathorn Superfund Site, Richmond, California*

| Issue | Affects Protectiveness? (Y/N) Current | Affects Protectiveness? (Y/N) Future |
|---|---|---|
| The Remedial Action Objectives for DDT and dieldrin in the marine area water and sediment have not been maintained. | Y | Y |
| The signs need to be updated to include the State of California Office of Environmental Health Hazard Assessment May 2011 updated fish advisory that recommends no consumption of fish from the Lauritzen Channel and limited consumption of fish from San Francisco Bay (OEHHA 2011). | Y | Y |

SECTION 9.0

# Recommendations

This section describes recommendations and follow-up action items identified for the United Heckathorn Site during this Five-Year Review. It is recommended that the Focused Feasibility Study to evaluate alternatives for addressing the sediment in the Lauritzen Channel be completed as described in Table 9-1. In addition, the advisory signs within the Lauritzen Channel need to be updated with the May 2011 updated fish advisory from the State of California Office of Environmental Health Hazard Assessment.

TABLE 9-1
Recommendations
*Third Five-Year Review Report, United Heckathorn Superfund Site, Richmond, California*

| Issue | Recommendations and Follow-Up Actions | Party Responsible | Oversight Agency | Milestone Date |
|---|---|---|---|---|
| The Remedial Action Objectives for DDT and dieldrin in the marine area water and sediment have not been maintained. | Complete the Focused Feasibility Study, which is currently underway. | USEPA | USEPA | 2013 |
| The signs need to be updated to include the State of California Office of Environmental Health Hazard Assessment May 2011 updated fish advisory that recommends no consumption of fish from the Lauritzen Channel and limited consumption of fish from San Francisco Bay (OEHHA 2011). | Update signs at the site | State of California Office of Environmental Health Hazard Assessment | State of California Office of Environmental Health Hazard Assessment | 2012 |

SECTION 10.0

# Protectiveness Statement

The remedy implemented at the upland area of the United Heckathorn Superfund Site is protective of human health and the environment, due to capping of contaminated soil which has eliminated human exposure pathways and prevented erosion. Routine inspection and monitoring assures the protectiveness of the upland remedy at the Site.

The remedy implemented at the **marine area** of the Site is not protective because concentrations of DDT and dieldrin in sediment within the Lauritzen Channel indicate that the dredging remedy was incomplete: sediment data show an apparent increase in DDT concentrations compared to remedy confirmation samples; surface water concentrations remain above the ROD remediation goals and are near pre-remediation concentrations; mussel tissue data show an increasing trend in DDT concentrations between 2002 and 2009; and a re-evaluation of the risk to human health and ecological receptors indicates that sediment in Lauritzen Channel continues to pose a risk. Although there is increased security around the facility as required by the Office of Homeland Security and the US Coast Guard and an updated State advisory that warns against consumption of any fish from the Lauritzen Channel, these controls may be ignored or misunderstood. Conducting a Focused Feasibility Study (FFS) to evaluate alternatives for addressing concentrations that exceed the Site Remedial Action Objectives (RAOs) will determine what, if any, remedial actions should be taken to address DDT and dieldrin in sediment, water and tissues. In addition, contaminated biota (e.g., fish) cannot be prevented from migrating outside of the Site, where they might be caught and consumed by fishermen, or wildlife.

SECTION 11.0

# Next Five-Year Review

The next Five-Year Review for the United Heckathorn Site will be conducted in 2016, five years from the date of this review.

SECTION 12.0

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# Appendix A
# Documents Reviewed

**APPENDIX A**

# Documents Reviewed


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# Appendix B
# Data Review

# United Heckathorn Superfund Site Five-Year Review Data Review Memorandum

PREPARED FOR: United States Environmental Protection Agency Region IX

PREPARED BY: CH2M HILL

DATE: July 22, 2011

PROJECT NUMBER: 419426.SR.01

This technical memorandum (TM) summarizes the findings from a review of documents and data related to activities at the United Heckathorn Superfund Site (the Site) during the Third Five-Year Review (Years 2006 to 2011). Figure B-1 shows the Site location. All figures are presented at the end of this TM.

The purpose of this data review is to provide the basis for conclusions as to whether the implemented remedies are or continue to be protective of human health and the environment. This data review TM was performed for the Third Five-Year Review Report.

## 1.0 Data Since 2006 Five–Year Review

Data since the 2006 Five-Year Review was available from the following sources:

- Operation and Maintenance (O&M) Plan Reports prepared annually by Levin-Richmond Terminal Corporation (LRTC) for the upland cap: These reports also are prepared to document State of California required stormwater sampling for the entire LRTC facility, as well as cap integrity inspection and stormwater sampling for the five stormwater interceptors (SW-3 through SW-7) within the 4.5-acre upland cap (see Figure B-2). Reports dated June 2006; July 1, 2007; July 1, 2008; July 19, 2009; and August 13, 2010 were provided by LRTC.
- Investigation and monitoring data collected for the U.S. Environmental Protection Agency (USEPA) by CH2M HILL: These data include sediment sample results from investigations in the Lauritzen Channel in 2007 (see Figure B-3); sediment sample results from a storm drain investigation conducted in 2009 (Figure B-4); surface water and mussel sampling at the post-remediation monitoring stations within the Lauritzen Channel, Santa Fe Channel, Parr Canal, and Richmond Inner Harbor (Figure B-5); and fish sampling within the Lauritzen and Santa Fe Channels and Parr Canal (2009) (Figure B-5).

# 2.0 Results of Data Review

## 2.1 Upland Cap Area

The upland cap area of the former United Heckathorn Site is an approximately 5–acre area in the northern portion of Levin-Richmond Marine Terminal property. The purpose of the cap is to prevent contact with and erosion of soil that contains DDT and dieldrin at concentrations above 1 milligram per kilogram (mg/kg). Between 1982 and 1993, removal actions for soil, asphalt and concrete were performed to reduce the mass of DDT by generally removing visible pesticide residues in the upland area and along the embankment on the east side of the Lauritzen Channel. In accordance with the Record of Decision (ROD; USEPA 1994), the upland or active facility area was capped with reinforced concrete and asphalt in July 1999. Smaller areas within railroad tracks were capped with a geomembrane covered with 1 foot of railroad ballast (gravel). A stormwater control system consisting of five stormwater interceptors (SW-3 through SW-7) and piping was installed within the cap area to control runoff into the Lauritzen Channel. Maintenance and inspection of the cap system continue, and results of the most recent Five-Year Review for the Site indicate that the cap functions as intended (USEPA 2006).

### 2.1.1 Upland Area Monitoring and Inspections Data

The annual O&M Plan Reports for LRTC provide data on the performance of the upland cap. DDT and dieldrin concentrations in surface water samples from the storm drain interceptors as reported in the annual O&M Plan Reports (ETS 2006; 2007; 2008; 2009; 2010) were reviewed and the results are summarized in Attachment 1, Table 1 – Summary of Surface Water Sampling for DDT and Dieldrin. These data indicate that from November 2005 through June 2007, surface water samples from the stormwater interceptors (SW-3 through SW-7) in the upland cap area (see Figure B-2) were not tested for organochlorine pesticides, although samples were collected and tested for constituents required in the Industrial Storm Water Permit. From November 2007 through April 2010 surface water samples collected on nine occasions were analyzed for organochlorine pesticides. Most samples (seven of the nine occasions) were a composite of surface water from the five interceptors in the cap area. DDT and dieldrin were not detected in any of the samples. These results provide an indication that the cap is functioning as intended and that surface water is not eroding or in contact with soil that contains DDT or dieldrin.

The O&M Plan Reports submitted over the last five years also note the following:

- Cap inspections note the presence of cracks but conclude that the cracks do not compromise the integrity of cap, and that the cracks are not large enough to require maintenance.
- Water and sediment that collects in the stormwater interceptors is periodically removed and discharged to the sanitary sewer under a permit from the City of Richmond's Waste Water Treatment Program. The purpose of this activity is to eliminate the need for discharges to the Lauritzen Channel.
- On January 27, 2010, interceptors SW-3 through SW-6 did release some surface water to the Lauritzen Channel as a result of heavy rainfall. Surface water samples

collected on that day contained no detected concentrations of DDT or dieldrin (or any organochlorine pesticides).

- Best management practices such as placing straw wattles or bales around drains, and using sweeping equipment and a truck to pump and contain water removed from the surface water interceptors, are performed.

The implementation of best management practices for controlling stormwater runoff from the Site is necessitated primarily because the Site is used for the temporary stockpiling of bulk materials such as coal, green coke, dry distilled grain, and other products that can generate dust or be carried by water. LRTC's Stormwater Pollution Prevention Plan and General Industrial Stormwater Permit require implementation of these measures.

Although the data in the O&M Plan Reports indicate that the Upland Cap is functioning as intended, our review of the reports indicates that (a) stormwater samples were not consistently tested for organochlorine pesticides between 2006 and 2007, and (b) documentation and incorporation of some additional best management practices would strengthen the conclusions that the integrity of the cap is being maintained and assist with identifying when cap maintenance activities should be performed. Additional best management practices that should be incorporated into the O&M Plan for the upland cap include:

- Crack monitoring: Perform annual inspections of the cap under the oversight of a registered engineer and document cracks, maintenance, and repairs on a baseline map which is updated annually.
- Settlement monitoring: Conduct a periodic topographic survey of the cap surface to document that the cap is not undergoing significant differential settlement which could ultimately impact its integrity. Compare subsequent surveys with a baseline survey to identify areas of differential movement.
- Sediment in storm drain interceptors: Collect, quantify, and analyze accumulated sediment (using EPA Method 8081) that is removed from storm drain interceptors within the cap area, and include this information in the annual O&M Plan Report.
- Integrity of underground drainage systems: Conduct periodic underground videoscoping or other equivalent methods to verify the integrity of the underground stormwater collection and discharge structures that underlie the Site, including the portion of the storm drain structure that underlies the cap.

### 2.1.2 Conclusions of Upland Cap Data Review

Based on review of the annual LRTC O&M Plan Reports for 2006 through 2010, we conclude that:

1. The stormwater sampling data and cap inspections indicate that the cap integrity has been maintained.
2. There are a number of additional inspection and monitoring activities that should be implemented to document and demonstrate with greater confidence that the cap is functioning as intended.

3. The concrete cap has been in place for approximately 12 years; portions of the cap are subject to heavy equipment use, and it should be anticipated that increased maintenance and repair activities will be required in the future.

## 2.2 Marine Area

The marine area of the Site includes the Lauritzen Channel, the Parr Canal, and adjacent portions of the Santa Fe Channel and the Richmond Inner Harbor. The majority of the mass of DDT and dieldrin was characterized to be within the Lauritzen Channel and Parr Canal. The remedial action for the marine area consisted of removal and capping of sediment within the Lauritzen Channel and Parr Canal followed by confirmation sediment sampling (see Figure B-3) and annual monitoring of surface water and mussel tissue at six monitoring stations within the Site waterways (see Figure B-5). Between August 1996 and 1997, approximately 107,945 cubic yards of sediment were removed from the Lauritzen Channel and the Parr Canal. The sediment was disposed of offsite at designated disposal facilities. Clean sand was placed to an average depth of 6 inches over dredged portions of the Lauritzen Channel and placed to an average depth of 18 inches throughout the Parr Canal (Chemical Waste Management, Inc. 1997).

Before remediation, the median total DDT sediment concentrations at the head of the Lauritzen Channel and the Parr Canal were approximately 47,000 micrograms per kilogram (µg/kg) and 840 µg/kg, respectively (CH2M HILL 2006). Immediately following remediation, the average DDT sediment concentrations averaged 264 µg/kg in the Lauritzen Channel and 200 µg/kg in the Parr Canal (USEPA 2006), which met the remediation goal for sediment. However, subsequent monitoring between 1999 and 2003 indicated that DDT concentrations in sediment and surface water samples collected within the Lauritzen Channel exceeded the RAOs (Battelle 2004).

The prior Five-Year Reviews concluded that although post-confirmation sediment sampling indicated that the remediation goal for sediment was achieved, subsequent monitoring of surface water and mussel tissue followed by additional sediment sampling indicated that the remedy had not been maintained and remediation goals were not being met and were not likely achievable without additional remedial actions.

### 2.2.1 Marine Area Investigations and Monitoring Data

Since the last Five-Year Review in 2006, the USEPA has continued with investigations, evaluations and monitoring with the purpose of identifying additional remedial actions that could be implemented to protect human health and the environment from DDT and dieldrin that remain in sediment at the Site (primarily the Lauritzen Channel). The activities undertaken include:

- Preparation of a Sampling and Analysis Plan for a Focused Feasibility Study Data Gaps Investigation (CH2M HILL 2007)
- Performance of a Focused Feasibility Study Data Gaps Investigation (CH2M HILL 2008). This phased investigation included sediment, water and mussel tissue sampling and analysis within the Lauritzen Channel and sampling water and mussel tissue at the marine monitoring stations sampled as part of remedy performance monitoring.

- Investigation of storm drains that potentially discharge to the Lauritzen Channel (2009 and continuing)
- Sampling of fish within the Lauritzen Channel, Parr Canal and Santa Fe Channel (CH2M HILL). The results of this sampling were evaluated by the State of California Office of Environmental Heath Hazard Assessment (OEHHA) and used as the basis for the May 23, 2011 Fish Advisory that recommends no consumption of fish from the Lauritzen Channel.
- Evaluation and update of the Human Health and Ecological Risk Assessments that were the basis for the Remediation Goals in the ROD (CH2M HILL 2010).
- Preliminary identification and consideration of remedial alternatives for the Lauritzen Channel sediment.

Tables that present the results of all data collected since 2006 grouped by media are included as Attachment 2. These tables are:

- Marine Sediment Results: Tables 1, 1a and 1b present marine sediment sample descriptions, results of pesticides analysis and results of polychlorinated biphenyl (PCB), polycyclic aromatic hydrocarbons (PAHs) and semivolatile organic compounds (SVOCs) analyses, respectively.

  The purpose of the sampling was to fill data gaps from prior sampling and analysis performed prior to 2005. The samples were collected and submitted through the Contract Laboratory Program (CLP) to Liberty Analytical for the analyses of pesticides. Split samples from 4 locations were also submitted to the USEPA Region 9 Laboratory for pesticide and PCB analyses. PCB results are presented in Table 1a. Sediment samples were collected at five prior sampling locations using a box core; at 21 locations in the Lauritzen Channel, four locations in the Santa Fe Channel and three locations in the Parr Canal using a vibracore, and at nine locations under the pier by diver. Two samples were also analyzed for SVOCs and PAHs. The locations of the samples are presented on Figure B-3.

- Storm Drain Sediment: Table 2 presents the results of sediment samples collected from storm drains in the vicinity of the United Heckathorn Site. These samples were collected in 2009 with the purpose to assess whether sediment in storm drains was contributing pesticides into the Lauritzen Channel. All samples were analyzed by the USEPA Region 9 laboratory. Sample locations and results are also presented on Figure B-4.
- Surface Water Samples; Table 3 presents the results of surface water samples collected during the August 2007 Data Gaps Investigation. These samples were analyzed through an Army Corps of Engineers contract laboratory (GPL). The sample locations are shown on Figure B-5.
- Marine Biota – Mussels: Table 4 present the results of biota sampling of mussels. As part of the 2007 Data Gaps investigation, resident mussels were collected at each of the prior historic mussel sampling locations (see Figure B-5). These mussels, which were not depurated, were submitted through the CLP to GPL. In 2009, duplicate sets

of mussels were transplanted at each of the historic locations, and at four new locations (see Figure B-5). These mussels were harvested from a pristine location at Bodega Head, allowed to equilibrate at the Site for approximately 2 months, then were depurated in clean sea water for 24 hours before being frozen and shipped to the lab (STLV). Duplicate sets of resident mussels were also harvested at each of the transplant locations (where available) and depurated for 24 hours in clean seawater.

- Marine Biota – Fish: Table 5 presents the analysis results for fish that were collected in 2009 by trawling at five locations (see Figure B-5). These locations were selected to be representative of the historic sampling locations. Trawls were conducted over an approximate 500-meter line with the center of each line corresponding to a historic sampling location. Fish that were large enough to produce sufficient mass for analyses were submitted as individual samples to the lab. Small fish (anchovies, gobys, etc.) were grouped together by size to form one sample. Large fish (halibut, flounder, etc.) were filleted and submitted to the lab as fillet and carcass. The analytical results were then combined to produce a whole fish number. Fish tissues were analyzed by the CLP laboratory TAMV.

### 2.2.2 Re-evaluation of Risk to Human Health and Ecological Receptors

In 2010, the USEPA re-evaluated risk to human health and ecological receptors posed by DDT in the marine environment. The conclusions of the memorandums are summarized below.

**Ecological Risks:**

a. Risks to fish and wildlife from total DDT and dieldrin persist in the Lauritzen Channel.

b. All surface sediment concentrations of total DDT and dieldrin in the Parr Canal, Sante Fe Channel mouth, and Richmond Inner Harbor Channel fall below the minimum risk-based sediment concentrations calculated for fish and wildlife receptors. Dieldrin in the Santa Fe Channel mouth is also below minimum risk-based sediment concentrations.

c. Total DDT concentrations in 80 percent of the surface sediment samples from the Lauritzen Channel and 20 percent of the sediment samples from the Santa Fe Channel head exceed at least one total DDT risk-based concentration.

**Human Health Risks:**

a. Total DDT concentrations in fish caught in 2008 from the Lauritzen Channel could pose an unacceptable risk to people who consume fish from the channel. Total DDT concentrations in fish caught in the Parr Canal, Sante Fe Channel, and Richmond Inner Harbor are within the acceptable risk management range or below the noncancer threshold.

b. For some fish species, concentrations of total DDT are comparable to or higher than levels reported in the 1994 Human Health Risk Assessment (ICF 1994). Between 1994 and 2008, concentrations of dieldrin measured in anchovy tissues increased by approximately a factor of 4 (average 15 µg/kg in 1994 to average of 63 µg/kg in

**NOTE**

Appendix B, Section 2.2.2 , Page 7

The text states that "anchovy DDT concentrations increased by an approximate factor of 30 (average of 21 ug/kg in 1994 to average of 640 ug/kg in 2008)". This conclusion was originally presented in the February 2010 technical memorandum prepared by CH2M Hill and titled *Draft Reassessment of Remediation Levels to Address the Fish Consumption Pathway*. The DDT concentration of 21 ug/kg wet weight for anchovy is the sum of the two DDT isomers and does not include the four DOD and DOE isomers.) The correct concentration for comparison is 98 ug/kg which is the total DDT including DOE and DOD isomers. Therefore, the correct increase in total DDT between 1994 and 2008 is 6 times.

A corrected version of Appendix B, Section 2.2.2, Page 7 can be found in the errata dated April 18, 2012 that has been appended to the end of this document.

2008) and anchovy DDT concentrations increased by an approximate factor of 30 (average of 21 µg/kg in 1994 to average of 640 µg/kg in 2008). DDT concentrations in surf perch caught in 2008 (6,300 µg/kg) were similar to those caught in 1994 (average 9,400 µg/kg).

Fish tissue risk-based concentrations (RBCs) and sediment RBCs were developed and are considered more appropriate for use in future remedial decisions than the remediation objectives contained in the 1994 ROD. These RBCs are shown below.

Summary of Potential Site Specific Remediation Goals Based on Human Health Risks
*United Heckathorn Superfund Site*

| Matrix | DDTs | Dieldrin | Risk Endpoint | Consumption Rate (g/day) |
|---|---|---|---|---|
| Fish tissue concentration (fillet) (ug/Kg wet weight) | 860 | 25 | DDTs: HQ=1<br>Dieldrin: ELCR= $10^{-4}$ | 85.1 |
| Sediment concentration (ug/Kg dry weight) | 450 | 13 | DDTs: HQ=1<br>Dieldrin: ELCR= $10^{-4}$ | 85.1 |

**Note:**
Sediment concentration is based on sediment-biota regressional relationship in Section 8.

Source: *Reassessment of Total DDT and Dieldrin Remediation Levels to Address the Fish Consumption Pathway* Technical Memorandum (CH2M HILL 2010a).

Ecological RBCs developed for dieldrin and total DDT in sediment using the trophic trace model were higher than the human health RBCs shown above except for bay shrimp, where the RBC for sediment was 148 µg/kg dry weight. It should be noted that Human Health RBCs is based on a fish consumption rate of 85.1 grams/day.

### 2.2.3 Conclusions of Marine Data Review

A review of the data collected in the Lauritzen Channel and adjacent waterways indicates the following:

1. Sediment within the Lauritzen Channel contains DDT and dieldrin at concentrations above ROD remediation goals. The 1996-1997 Sediment Removal Action was unable to address all areas within the channel. As directed in the ROD (USEPA 1994), the remedial action for the marine sediment mandated the removal of Young Bay Mud (YBM) sediment by dredging or excavation. For the accessible areas of the Lauritzen Channel, a Cable Arm Environmental Bucket dredge was used to remove the YBM. The completion report (Chemical Waste Management, Inc. 1997) notes that although mechanical dredging was used to effectively remove YBM within accessible portions of the Lauritzen Channel, dredging equipment was not able to penetrate into Old Bay Mud surfaces, and many areas under the existing pier and abandoned pilings on the east side of the Lauritzen Channel were not accessible with the equipment used. Data also indicates that some redistribution and sloughing of sediment along the eastern side of the channel has occurred and resulted in DDT concentrations higher than the concentrations reported in confirmation samples. A comparison of the average total DDT concentration from the post-dredging confirmation samples in 1996-1997 to the nearest (less than 50 feet away) surface sediment sample collected from investigations performed between 1999 through 2007 indicates that the total average DDT in dry

weight concentration has changed from 263 µg/kg to approximately 26,000 µg/kg. Figure B-3 illustrates the concentrations of DDT reported in confirmation samples compared to later DDT concentrations in sediment at nearby locations. The purpose of the 2007 Data Gaps Investigation was to delineate the extent of DDT in sediment within the Lauritzen Channel. The results of this study indicated that samples from within Lauritzen Channel contain DDT at concentrations up to approximately 88 mg/kg (88,000 µg/kg) with high concentrations generally in the area of the abandoned pilings. The variability of sample results also suggests that sediment with DDT is being redistributed within areas of the channel.

2. Sediment in Storm Drains: In 2008, an investigation was performed on the city storm drain system that discharges at the north end of the Lauritzen Channel. City of Richmond maps were reviewed and video inspection was conducted in storm drain lines and manholes that potentially discharge to the Lauritzen Channel. Sediment within the manholes was sampled and tested for organo-chlorine pesticides (Figure B-4). Results indicate that DDT concentrations in sediment ranged from non-detected to 52.1 mg/kg (see Attachment 2 – Table 2). Preliminary evaluation of the data indicated that the sediment is likely a remnant of historic operations because there were no records that these manholes had been cleaned and some of these manholes may not be connected to the Lauritzen Channel outfall. There is the possibility that some of manholes could receive sediment from high tidal cycles when the surface water in the channel moves into the storm drain system.

3. Surface water DDT and dieldrin concentrations remain above ROD remediation goals of 0.59 nanograms per liter (ng/L) and and 0.14 ng/L, respectively, and do not exhibit any trend. Periodic collection and analysis of surface water samples determine compliance with the USEPA ambient water quality criteria, which are the ARARs for the Site. The post-remediation water monitoring data are compared with the pre-remediation data from the Ecological Risk Assessment and with the remediation goals for the Site. Figure B-5 shows the locations of the five marine monitoring locations. Figure B-6 presents the results of DDT and dieldrin concentrations versus time between 1996 and 2007. This data illustrates that with the exception of several samples collected from the Richmond Inner Harbor station, surface water concentrations for DDT and dieldrin remain above ROD remediation goals, and although concentrations fluctuate they do not exhibit a declining trend. Data from the monitoring also indicates that the highest total DDT and dieldrin concentrations (59.7 ng/L and 11 ng/L for 2007 samples, respectively) occur at Lauritzen Channel/End (Station 303.3); decrease with distance from Lauritzen Channel/Mouth (Station 303.2) to Santa Fe Channel/End (Station 303.4); and the lowest concentrations (non-detect [less than 0.5 ng/L in 2007 samples]) at the Richmond Inner Harbor Channel (Station 303.1). Data for surface water samples collected in 2007 is included in Attachment 2.

4. Mussel tissue DDT concentrations do not exhibit a declining trend between 2002 and 2009. Mussel tissue samples were collected to evaluate bioaccumulation uptake of DDT and dieldrin in the marine environment. Declining trends in concentration of DDT and dieldrin in mussel tissue are another indicator of remedy effectiveness and an expected goal of the sediment removal completed in 1997. Periodic deployment and subsequent collection and analysis of mussels determine the bioaccumulation of chemical

concentration based on tissue residues. The post-remediation tissue monitoring data are compared with pre-remediation tissue concentration from the California State Mussel Watch program and the Ecological Risk Assessment of the United Heckathorn Site. Sampling locations for mussel tissue are shown in Figure B-5. Figure B-7 shows analytical results of total DDT and dieldrin in the mussel tissue between 1996 and 2009. Data for the mussel tissue sampling performed since 2005 are summarized in Attachment 2 - Table 4. Similar to the results of surface water samples, DDT and dieldrin concentrations are highest in mussel tissues in the Lauritzen Channel and decrease with distance from the channel. In general, the DDT and dieldrin concentrations show a declining trend from 1998 to 2002. Three samples collected in 2003, 2007 and 2009 indicate an increasing trend for DDT and dieldrin concentrations in mussel tissue.

5. Fish sampling results indicate that DDT concentrations in fish pose an unacceptable risk and an OEHHA Fish Advisory issued in May 2011 recommends no consumption of fish from the Lauritzen Channel. In 2008, the USEPA sampled and analyzed fish and shrimp caught in Lauritzen Channel and adjacent waterways (Attachment 2, Table 5). The results of the testing indicated that total DDT in fish were as high as 733 µg/kg in a composite of anchovy and dieldrin was 69 µg/kg in this same sample. The fish data was used by the USEPA to re-evaluate risk to human health (see Attachment 2 and discussion below). In addition this data was used by OEHHA as the basis for an advisory issued on May 23, 2011 that recommends no consumption of fish from the Lauritzen Channel due to DDT. This advisory also included restrictions on consumption of fish within San Francisco Bay for mercury and other chemicals.

6. Risk re-evaluation for human health and ecological exposures to marine conditions indicates that the DDT present in the Lauritzen Channel marine environment poses an unacceptable risk to human health and the environment. Potential Human Health Risk ranges from $4x10^{-5}$ to $3x10^{-3}$ and the Hazard Indexes range from 0.1 to 19. Total DDT is the largest contributor to the Hazard Index.

# 3.0 Conclusions of Data Review

The following conclusions are made based on this data review:

1. The upland cap remedy is functioning as intended and effectively eliminates the potential of erosion of and exposure to contaminated soil beneath the cap. In 2010, the USEPA recommended that Levin-Richmond Terminal Company improve the inspection and monitoring procedures to increase confidence in the cap performance and develop criteria for when repairs of the cap are necessary.

2. The remedy implemented for the marine environment (sediment removal) has not been maintained, remediation goals have not been attained. This conclusion is supported by sediment, water, mussel tissue and fish sampling analysis data.

3. The risks to human health and the environment posed by sediment in the Lauritzen Channel persist. Concentrations of DDT and dieldrin in sediment with the Lauritzen Channel exceed risk-based sediment concentrations calculated using data gathered since the last Five-Year Review. Risk-based concentrations calculated in 2010 for fish tissue

and sediment may be more appropriate for future remedial decisions than the 1994 ROD remediation goals.

# 4.0 References

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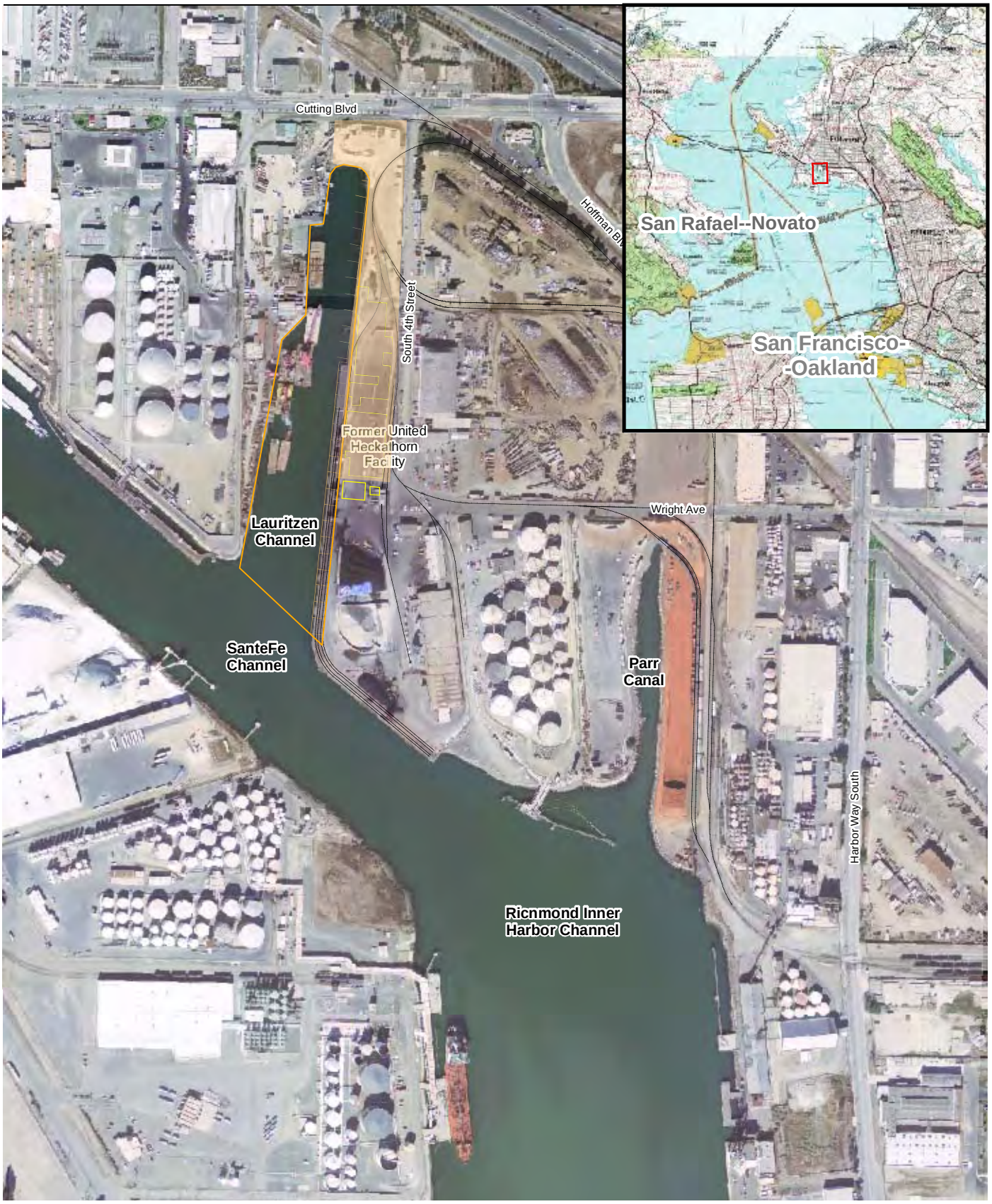
# Figures




**LEGEND**

- Project Boundary
- Former United Heckathorn Buildings
- Embankment Pier
- Embankment Pilings
- Approximate Area of Upland Cap

Aerial Source: USGS 2004

N

0 500 1,000 Feet

FIGURE B-1
Site Location Map
*United Heckathorn Superfund Site*
*Richmond, California*

CH2MHILL

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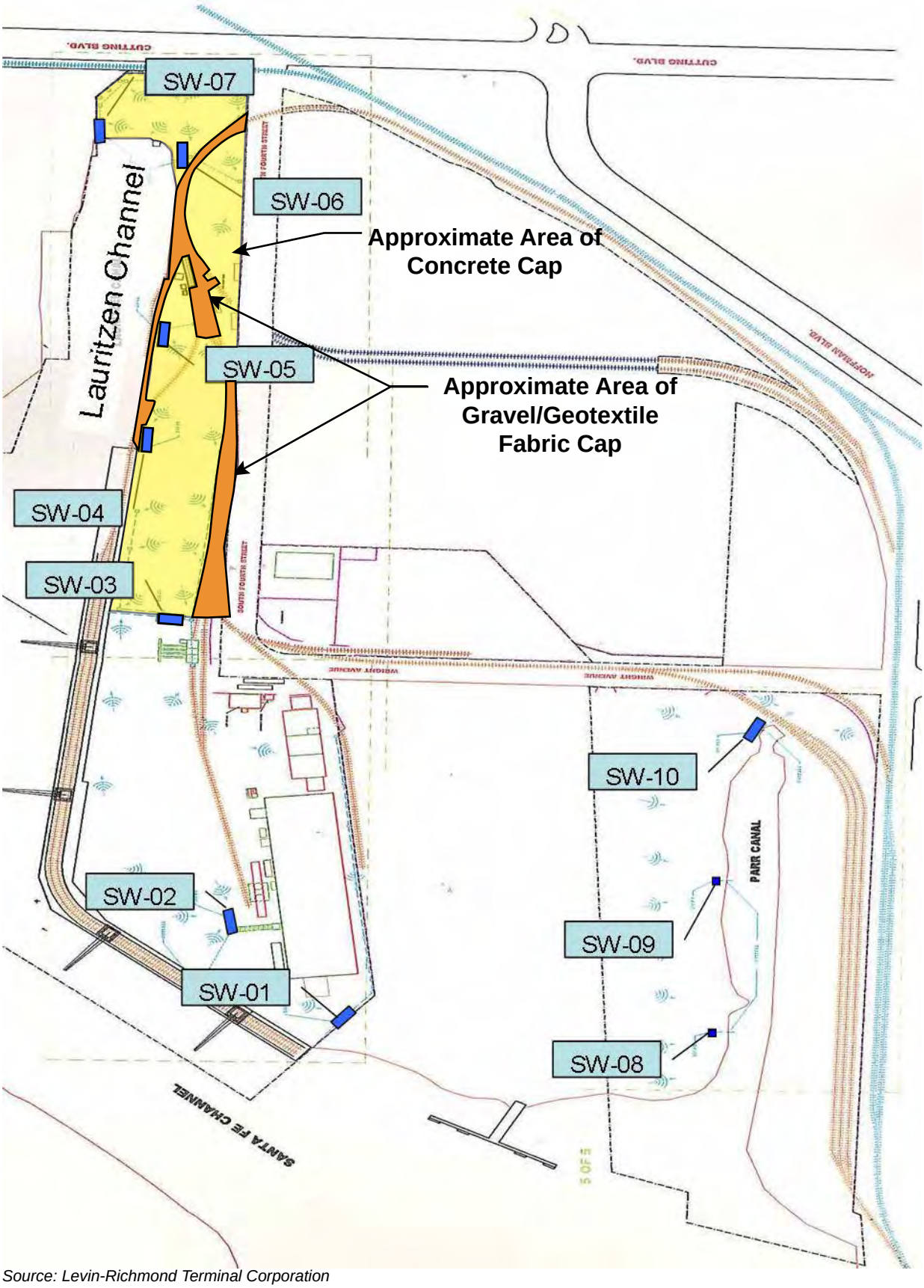


*Source: Levin-Richmond Terminal Corporation*

SW-0#
Stormwater Interceptor

1" = 385'
Approximate Scale

North

FIGURE B-2
Location of Stormwater Interceptors at Levin Richmond Terminal
*United Heckathorn Superfund Site*
*Richmond, California*

CH2MHILL

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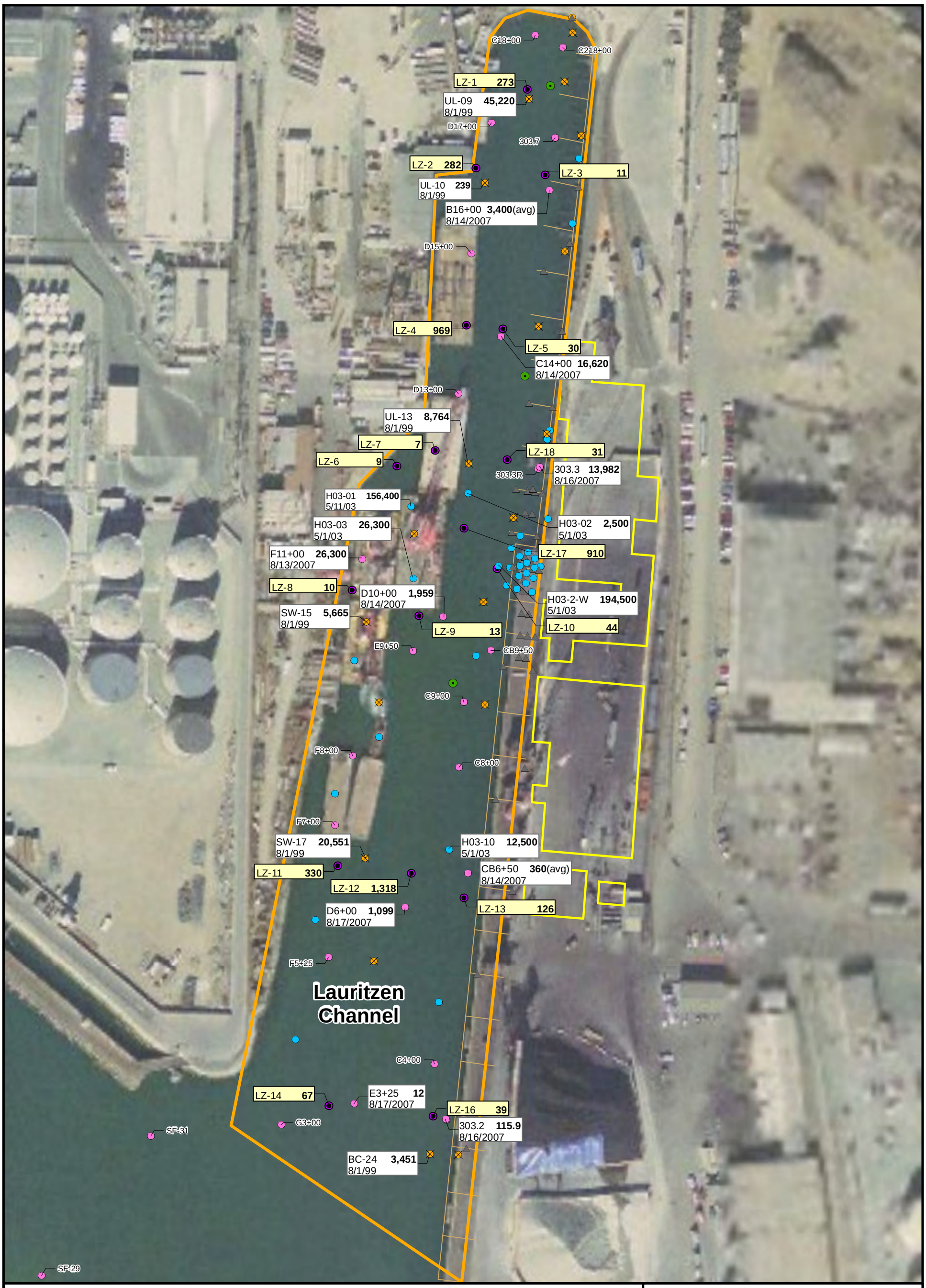



**LEGEND**

- Sample collected in 1997
- Sample collected in 1998
- Sample collected in 1999
- Sample collected in 2002
- Sample collected in 2003
- Sediment sample collected in 2007
- Lauritzen Channel Project Boundary
- Former Buildings
- Embankment Pilings
- Embankment Pier

Sample ID — Total DDT in confimation sediment sample (µg/kg)

Sample ID — Comparison DDT concentration in surface sediment post remedy. (µg/kg) Investigation 1998-2007

N

0 62.5 125 250 Feet

Note: (avg) is average of laboratory results from USEPA lab and USEPA Contract Laboratory for surface sample.

FIGURE B-3
Comparison of Post-Remediation DDT Concentrations in Lauritzen Channel Sediment:
1997 Confirmation Results vs. 1999-2007 Investigation Results

*United Heckathorn Superfund Site*
*Richmond, California*

CH2MHILL

D:\Projects\EPA_UnitedHeckathorn\MapFiles\2011\DDT_Conc_Loc

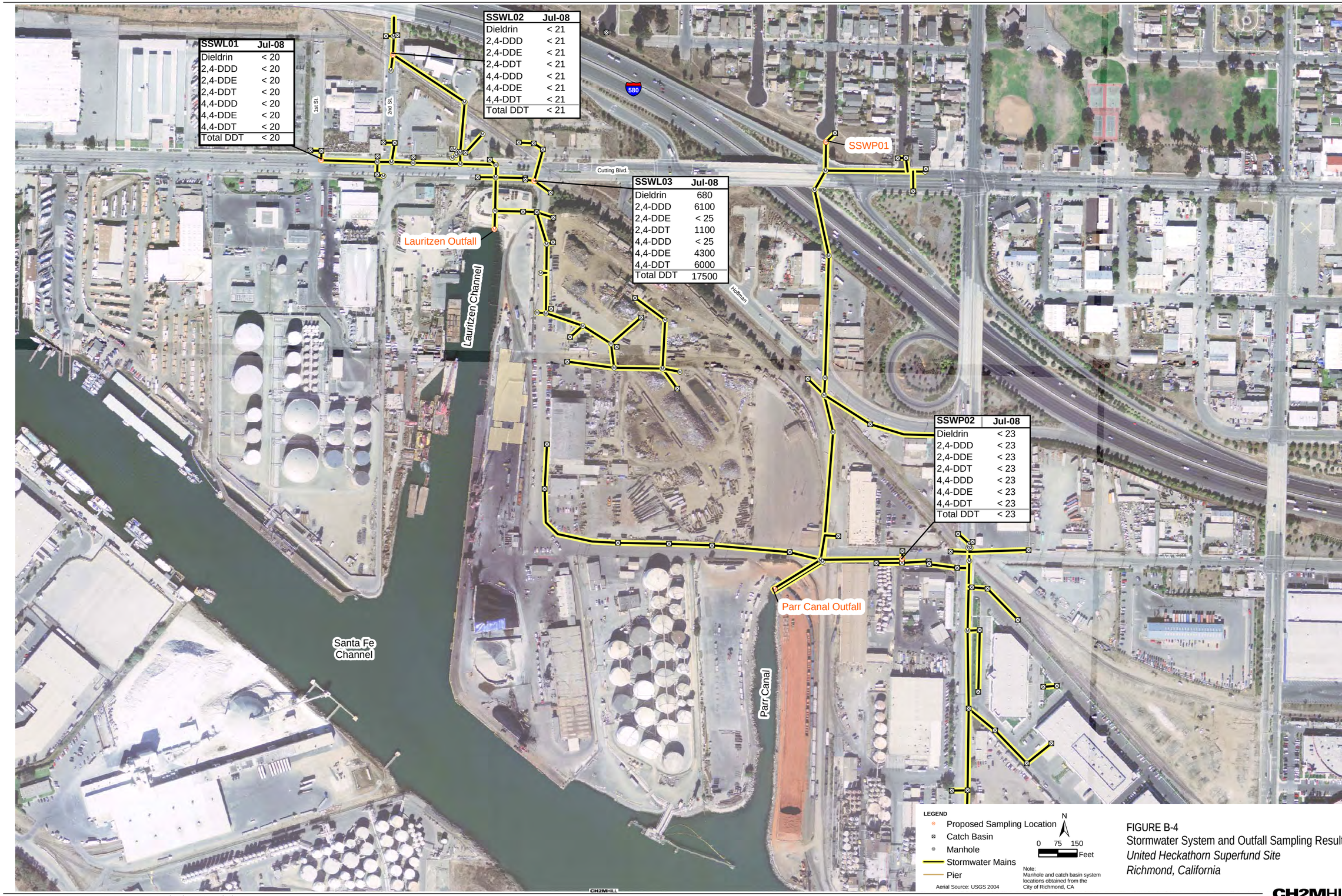
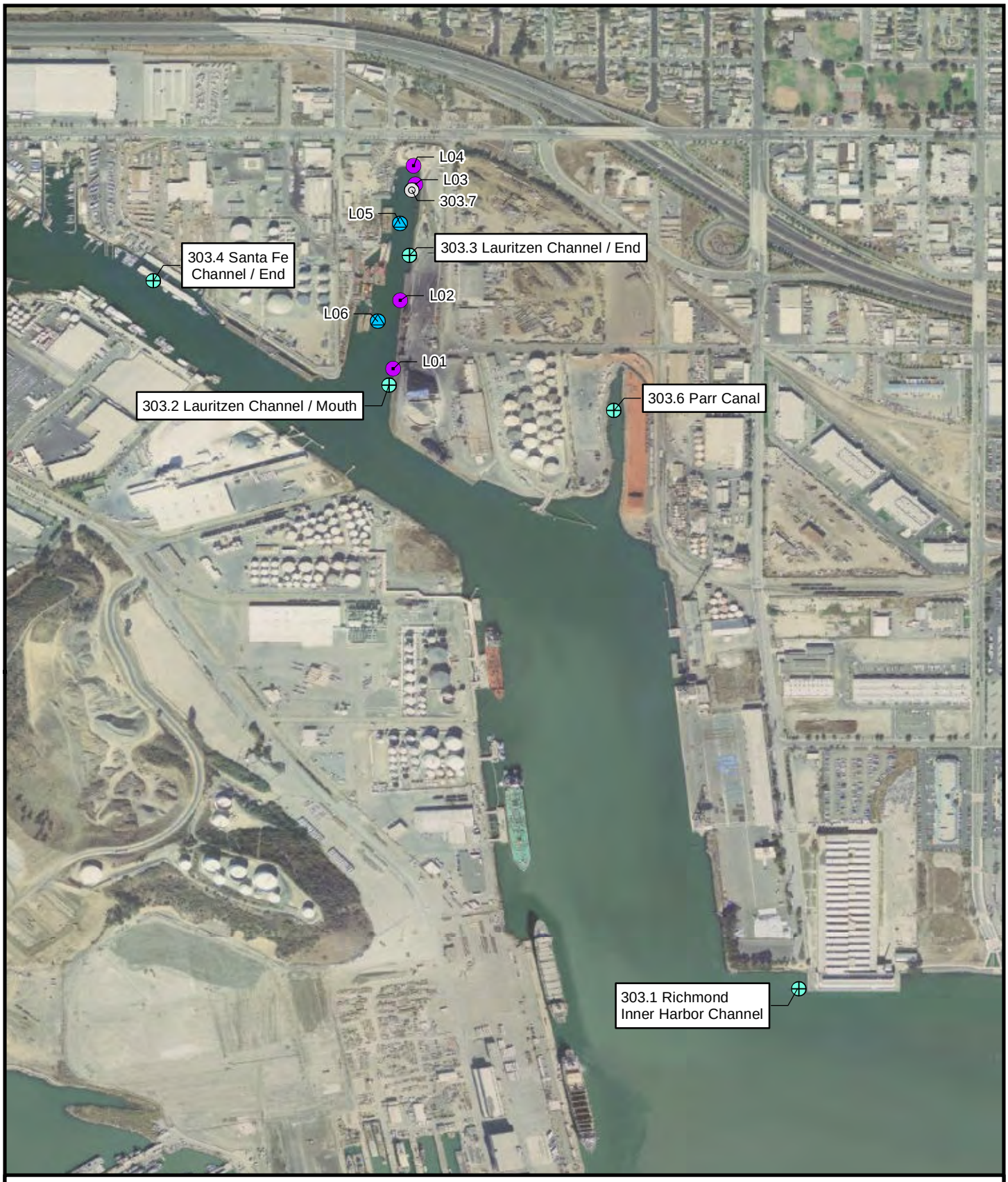



FIGURE B-4
Stormwater System and Outfall Sampling Results
*United Heckathorn Superfund Site*
*Richmond, California*

CH2MHILL

ES061611063729BAO stormwater_system_results.ai 07-22-11 dash




**LEGEND**

- Mussel Sample Only (2009)
- Marine Monitoring Program Stations (2007)
- Water and Mussel Sample (2007)
- Water Sample (2007)

N

0 300 600 1,200 Feet

FIGURE B-5
Sampling Locations for Marine Monitoring Program and Additional Sampling 2007 and 2009
*United Heckathorn Superfund Site*
*Richmond, California*

CH2MHILL

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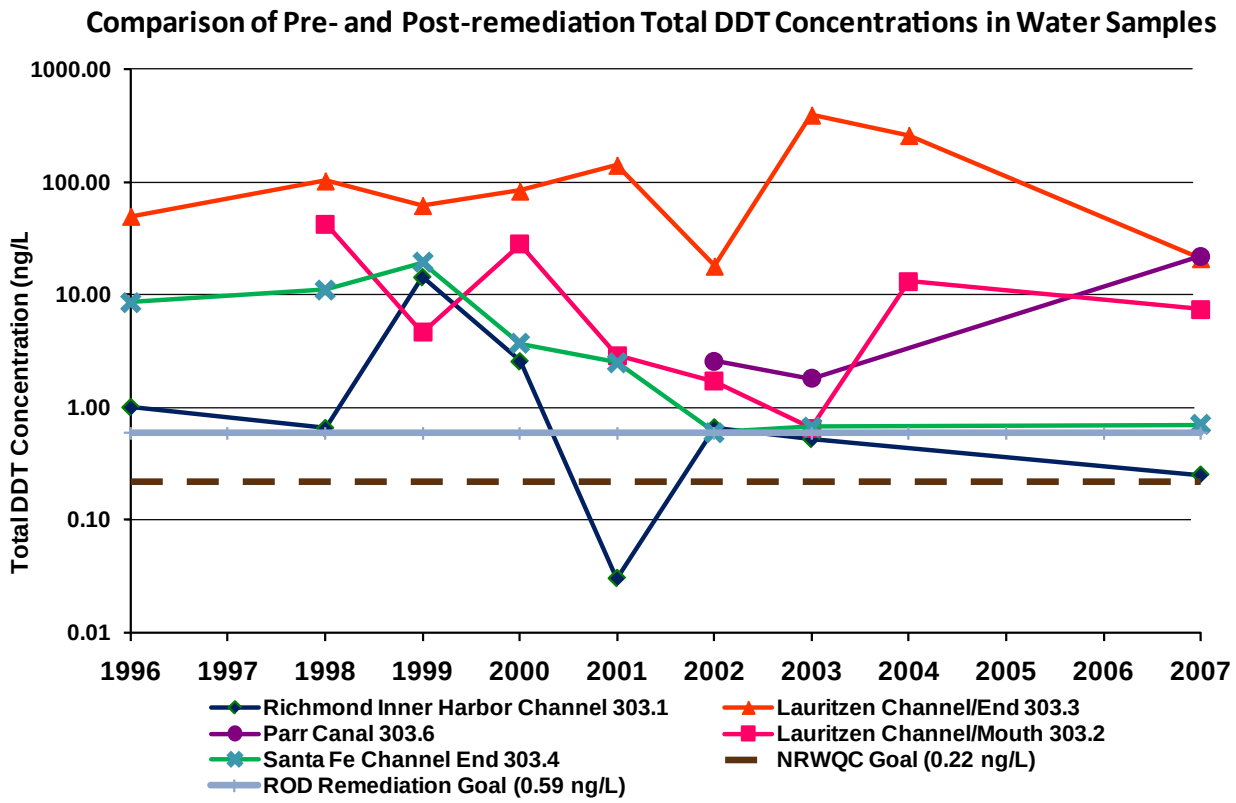


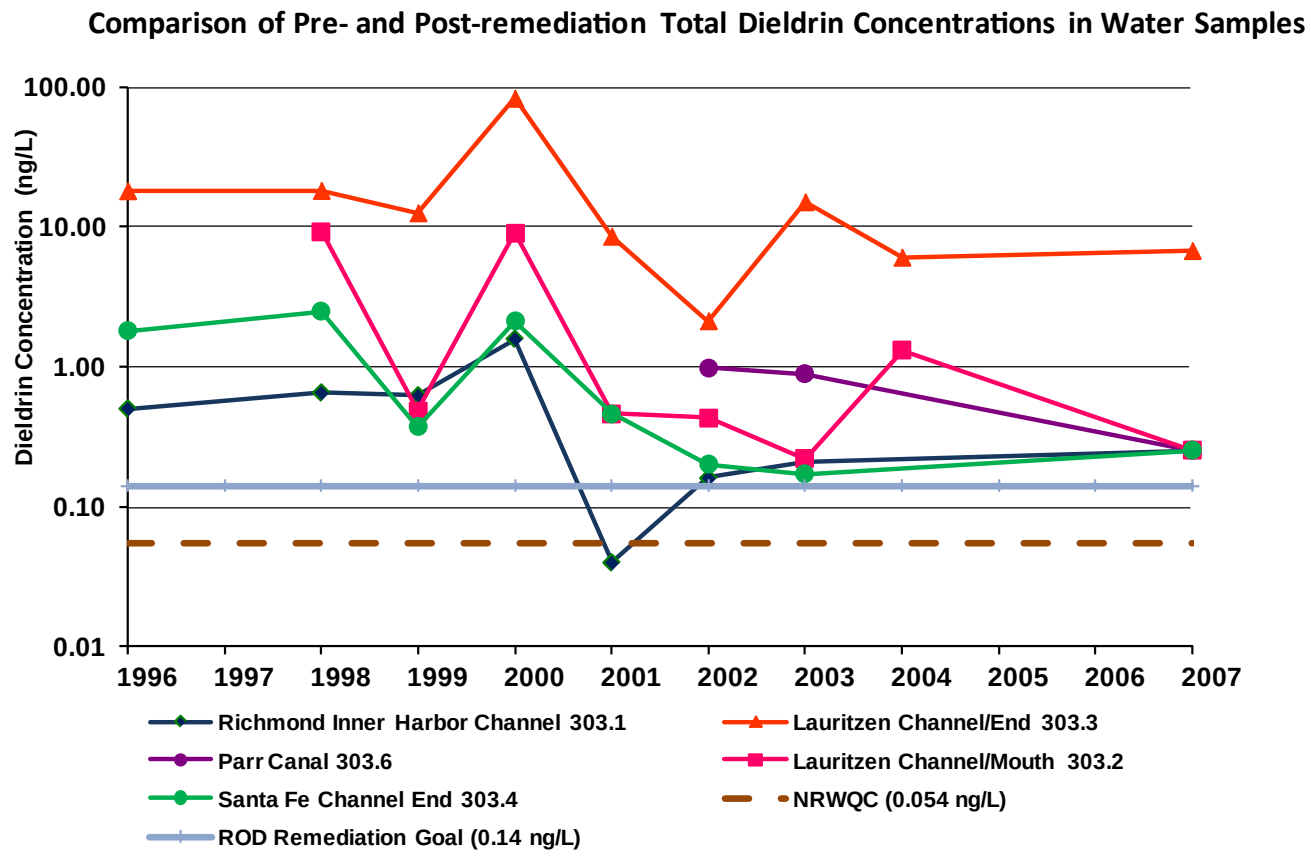
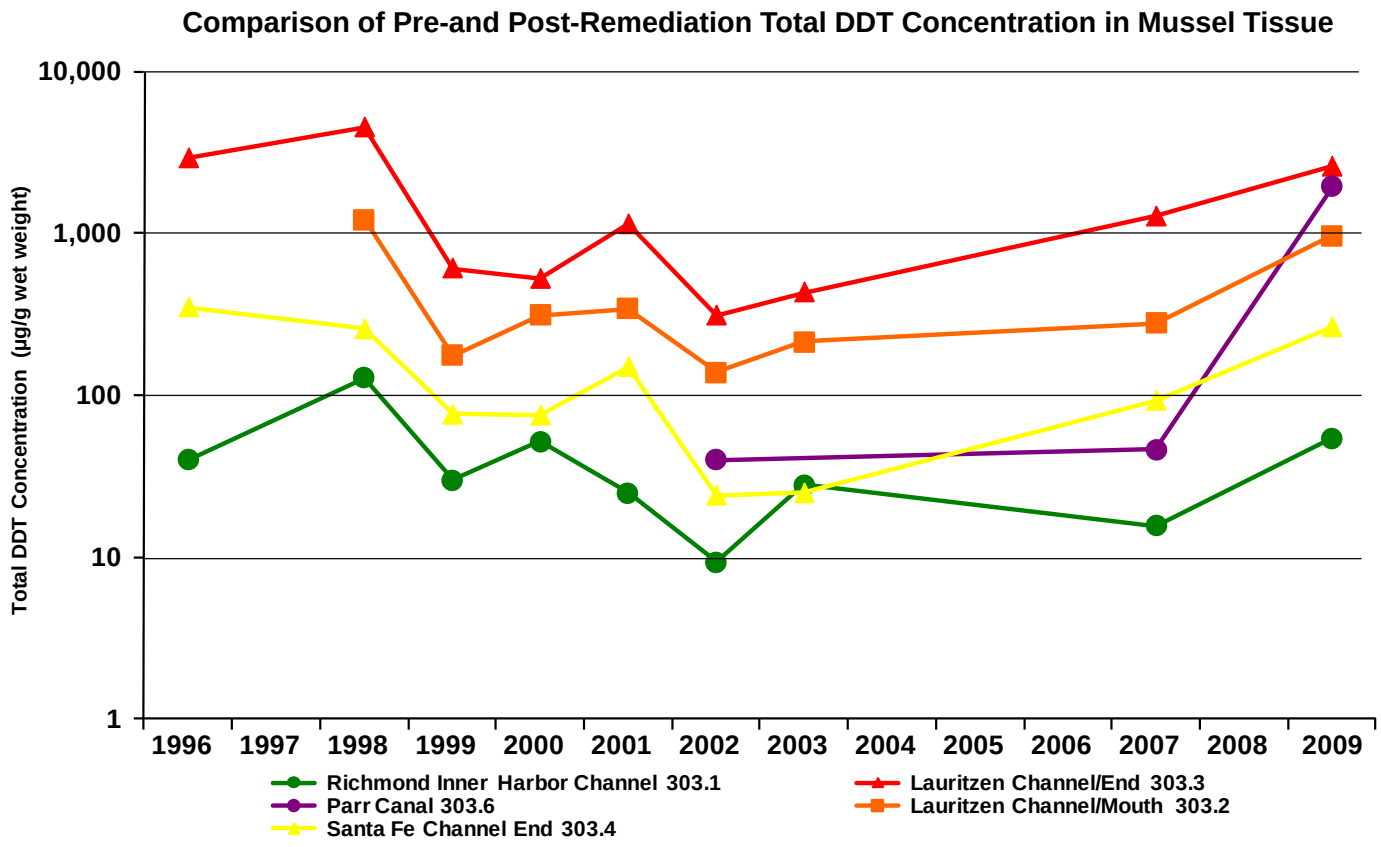




FIGURE B-6
Comparison of Pre- and Post-Remediation Total DDT and Dieldrin Concentrations in Water Samples
*United Heckathorn Superfund Site*
*Richmond, California*



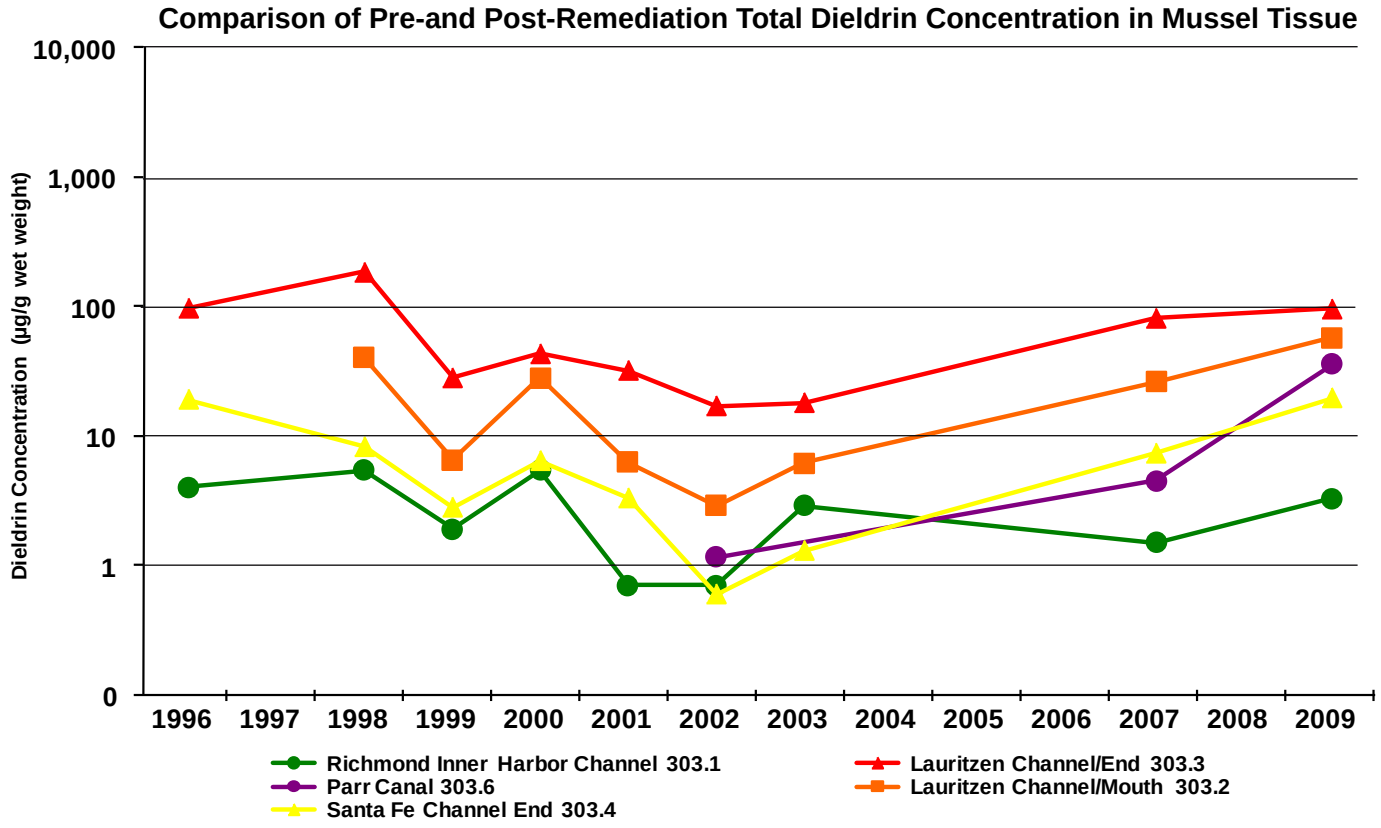




FIGURE B-7
Comparison of Pre- and Post-Remediation Total DDT and Dieldrin Concentrations in Mussel Tissue
*United Heckathorn Superfund Site*
*Richmond, California*

CH2MHILL

ES061611063729BAOMusselTissue_Samples.ai 07-22-11 dash

# Attachment 1:
# Summary of LRTC Stormwater Sampling for DDT and Dieldrin, 2006 through 2010

Table 1. Summary of DDT and Dieldrin in Stormwater Samples 2006-2011
United Heckathorn Site, Richmond California

| Date | Sample Description | Results (ug/L) | |
|---|---|---|---|
| | | DDT | Dieldrin |
| 11/29/2005 | Composite water from Stormwater Interceptors SW-3 through SW-7 | NT | NT |
| 3/8/2006 | Composite water from Stormwater Interceptors SW-3 through SW-7 | NT | NT |
| 5/23/2006 | Composite water from Stormwater Interceptors SW-3 through SW-7 | NT | NT |
| 11/15/2006 | Composite water from Stormwater Interceptors SW-3 through SW-7 | NT | NT |
| 2/27/2007 | Composite water from Stormwater Interceptors SW-3 through SW-7 | NT | NT |
| 6/28/2007 | Composite water from Stormwater Interceptors SW-3 through SW-7 | NT | NT |
| 11/15/2007 | Composite water from Stormwater Interceptors SW-3 through SW-7 | ND (0.040) | ND (0.040) |
| 1/10/2008 | Composite water from Stormwater Interceptors SW-3 through SW-7 | ND (0.039) | ND (0.039) |
| 3/27/2008 | Composite water from Stormwater Interceptors SW-3 through SW-7 | ND (0.038) | ND (0.038) |
| 4/28/2008 | Composite water from Stormwater Interceptors SW-3 through SW-7 | ND (0.038) | ND (0.038) |
| 3/05/2009 | Composite water from Stormwater Interceptors SW-3 through SW-7 | ND (0.050) | ND (0.050) |
| 4/07/2009 | Composite water from Stormwater Interceptors SW-3 through SW-7 | ND (0.025) | ND (0.025) |
| 11/19/2009 | Water in Stormwater Interceptor SW-3 | ND (0.047) | ND (0.047) |
| | Water in Stormwater Interceptor SW-4 | ND (0.047) | ND (0.047) |
| | Water in Stormwater Interceptor SW-5 | ND (0.024) | ND (0.024) |
| | Water in Stormwater Interceptor SW-7 | ND (0.024) | ND (0.024) |
| 1/27/2010 | Water in Stormwater Interceptor SW-3 | ND (0.47) | ND (0.47) |
| | Water in Stormwater Interceptor SW-4 | ND (0.47) | ND (0.47) |
| | Water in Stormwater Interceptor SW-5 | ND (0.047) | ND (0.047) |
| | Water in Stormwater Interceptor SW-6 | ND (0.047) | ND (0.047) |
| 4/29/2010 | Composite water from Stormwater Interceptors SW-3 through SW-7 | ND (0.025) | ND (0.025) |

Notes:

1. NT = Not tested. Samples from 2006-2007 were tested in accordance with California Regional Water Quality Control Board requirement under the General Stormwater Permit and the Stormwater Pollution Prevention Plan which did not specify analysis for organo-chlorine pesticides (DDT and Dieldrin, in particular).
2. ND = not detected
3. ug/L = micrograms per liter
4. Samples were analyzed for organo-chlorine pesticides using EPA Test method 8081
5. DDT is total of 4,4'-DDD, 4,4-DDE and 4,4-DDT
6. Value is parentheses is laboratory reporting limit or detection limit as reported on laboratory reports.
7. Results are compiled from Operation and Maintenance Plan Reports prepared by Environmental Technical Services for Levin-Richmond Terminal.

# Attachment 2:
# Summary of Investigation and Monitoring Data
# (2006 through 2010)

**LEGEND**

● Sample Locations

N

0 370 740 1,480 Feet

**FIGURE 1**
**SAMPLE LOCATIONS 2006-2011**

United Heckathorn Superfund site
Richmond, California

D:\Projects\EPA_UnitedHeckathorn\MapFiles\2011

# Table 1B. Summary of Sediment Sample Depths United Heckathorn Superfund Site
## Focused Feasibility Study

| Sample Type | Sample Location | Sample Identification | SDG No. | Approx. Depth (ft) | CLP ID | Proposed Sample Depth Interval | Collection Date | Time | Collection Method | EDD Received | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Channel Sediment Northern Reach | B 16+00 | B1600a0807 | Y3DP5 | 0-0.25 | Y3DP5 | sediment surface | 8/14/2007 | 9:54 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | B 16+00 | B1600b0807 | Y3DP5 | 1.5-2.25 | Y3DP6 | between surface and interface | 8/14/2007 | 9:54 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | B 16+00 | B1600c0807 | Y3DP5 | 3-3.25 | Y3DP7 | YBM/OBM interface | 8/14/2007 | 9:54 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | B 16+00 | B1600d0807 | Y3DP5 | 4-4.25 | Y3DP8 | 1 foot below YBM/OBM | 8/14/2007 | 9:54 | CC | 9/24/2007 | MS/MSD |
| Channel Sediment Southern Reach | C 4+00 | C0400a0807 | | 0-0.25 | Y3DK7 | sediment surface | 8/15/2007 | 13:30 | CC | | N |
| Channel Sediment Southern Reach | C 4+00 | C0400b0807 | Y3DJ7 | 0-0.25 | Y3DK9 | -41 MLLW | 8/15/2007 | 13:30 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | C 4+00 | C0400c0808 | Y3DJ7 | 5-5.25 | Y3DL0 | | | | | 9/24/2007 | |
| Channel Sediment Southern Reach | C 8+00 | C0800a0807 | Y3DH4 | 0-0.25 | Y3DJ4 | sediment surface | 8/14/2007 | 15:45 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | C 8+00 | C0800b0807 | Y3DH4 | 4.5-4.75 | Y3DJ5 | -41 MLLW | 8/14/2007 | 15:45 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | C 8+00 | C0800c0807 | Y3DH4 | 5.25-5.5 | Y3DJ6 | 1 foot below -41 MLLW | 8/14/2007 | 15:45 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | C 9+00 | C0900a0807 | Y3DH4 | 0-0.25 | Y3DH7 | sediment surface | 8/14/2007 | 15:05 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | C 9+00 | C0900b0807 | Y3DH4 | 1.5-1.75 | Y3DH8 | -41 MLLW | 8/14/2007 | 15:05 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | C 9+00 | C0900c0807 | Y3DH4 | 3.0-3.25 | Y3DJ0 | 1 foot below -41 MLLW | 8/14/2007 | 15:05 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | C 14+00 | C1400a0807 | Y3DH4 | 0-0.25 | Y3DN6 | sediment surface | 8/14/2007 | 10:45 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | C 14+00 | C1400b0807 | | | Y3DN8 | between surface and interface | 8/14/2007 | 10:45 | CC | | N |
| Channel Sediment Northern Reach | C 14+00 | C1400c0807 | Y3DH4 | 1-1.25 | Y3DN9 | YBM/OBM interface | 8/14/2007 | 10:45 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | C 14+00 | C1400d0807 | Y3DH4 | 2-2.25 | Y3DP0 | 1 foot below YBM/OBM interface | 8/14/2007 | 10:45 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | C 18+00 | C1800a0807 | Y3DM8 | 0-0.25 | Y3DQ4 | sediment surface | 8/13/2007 | 16:15 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | C 18+00 | C1800b0807 | Y3DM8 | 2-2.25 | Y3DQ5 | between surface and interface | 8/13/2007 | 16:15 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | C 18+00 | C1800c0807 | Y3DM8 | 4-4.25 | Y3DQ6 | YBM/OBM interface | 8/13/2007 | 16:15 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | C2 18+00 | C2 1800a0807 | Y3DP5 | 0-0.25 | Y3DW1 | sediment surface | 8/14/2007 | 8:40 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | C2 18+00 | C2 1800b0807 | Y3DP5 | 3-3.25 | Y3DW2 | between surface and interface | 8/14/2007 | 8:40 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | C2 18+00 | C2 1800c0807 | Y3DP5 | 6.75-7.0 | Y3DW3 | YBM/OBM interface | 8/14/2007 | 8:40 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | C 14+00 | C8600a0807 | Y3DH4 | 0-0.25 | Y3DN7 | sediment surface | 8/14/2007 | 10:45 | CC | 9/24/2007 | FD |
| Channel Sediment Southern Reach | C 9+00 | C9100b0807 | Y3DH4 | 1.5-1.75 | Y3DH9 | -41 MLLW | 8/14/2007 | 15:05 | CC | 9/24/2007 | FD |
| Channel Sediment Southern Reach | C 4+00 | C9600a0807 | Y3DJ7 | 0-0.25 | Y3DK8 | sediment surface | 8/15/2007 | 13:30 | CC | 9/24/2007 | FD |
| Channel Sediment Southern Reach | CB 6+50 | CB650a0807 | Y3DJ7 | 0-0.25 | Y3DM1 | sediment surface | 8/15/2007 | 12:25 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | CB 6+50 | CB650b0807 | Y3DJ7 | 4-4.25 | Y3DM2 | -41 MLLW | 8/15/2007 | 12:25 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | CB 6+50 | CB650c0807 | Y3DJ7 | 5-5.25 | Y3DM3 | 1 foot below -41 MLLW | 8/15/2007 | 12:25 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | CB 6+50 | CB9350c0807 | Y3DJ7 | 5-5.25 | Y3DM4 | 1 foot below -41 MLLW | 8/15/2007 | 12:25 | CC | 9/24/2007 | FD |
| Channel Sediment Southern Reach | CB 9+50 | CB950a0807 | Y3DH4 | 0-0.25 | Y3DL8 | sediment surface | 8/14/2007 | 11:30 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | CB 9+50 | CB950b0807 | Y3DH4 | 2-2.25 | Y3DL9 | -41 MLLW | 8/14/2007 | 11:30 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | CB 9+50 | CB950c0807 | Y3DH4 | 4-4.25 | Y3DM0 | 1 foot below -41 MLLW | 8/14/2007 | 11:30 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | D 6+00 | D0600a0807 | Y3DJ7 | 0-0.25 | Y3DK1 | sediment surface | 8/17/2007 | 10:50 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | D 6+00 | D0600b0807 | Y3DJ7 | 4.5-4.75 | Y3DK2 | -41 MLLW | 8/17/2007 | 10:50 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | D 6+00 | D0600c0807 | Y3DJ7 | 5.25-5.5 | Y3DK3 | 1 foot below -41 MLLW | 8/17/2007 | 10:50 | CC | 9/24/2007 | MS/MSD |

## Table 1B. Summary of Sediment Sample Depths United Heckathorn Superfund Site
## Focused Feasibility Study

| Sample Type | Sample Location | Sample Identification | SDG No. | Approx. Depth (ft) | CLP ID | Proposed Sample Depth Interval | Collection Date | Time | Collection Method | EDD Received | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Channel Sediment Southern Reach | D 10+00 | D1000a0807 | Y3DH4 | 0-0.25 | Y3DH4 | sediment surface | 8/14/2007 | 13:50 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | D 10+00 | D1000b0807 | Y3DH4 | 2-2.25 | Y3DH5 | -41 MLLW | 8/14/2007 | 13:50 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | D 10+00 | D1000c0807 | Y3DH4 | 3-3.25 | Y3DH6 | 1 foot below -41 MLLW | 8/14/2007 | 13:50 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | D 13+00 | D1300a0807 | Y3DM8 | 0-0.25 | Y3DN2 | sediment surface | 8/13/2007 | 14:00 | CC | 9/24/2007 | MS/MSD |
| Channel Sediment Northern Reach | D 13+00 | D1300b0807 | Y3DM8 | 2.5-2.75 | Y3DN3 | between surface and interface | 8/13/2007 | 14:00 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | D 13+00 | D1300c0807 | Y3DM8 | 3-3.25 | Y3DN4 | YBM/OBM interface | 8/13/2007 | 14:00 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | D 13+00 | D1300d0807 | Y3DM8 | 4.25-4.5 | Y3DN5 | 1 foot below YBM/OBM interface | 8/13/2007 | 14:00 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | D 15+00 | D1500a0807 | Y3DM8 | 0-0.25 | Y3DP1 | sediment surface | 8/13/2007 | 15:00 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | D 15+00 | D1500b0807 | Y3DM8 | 3-3.25 | Y3DP2 | between surface and interface | 8/13/2007 | 15:30 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | D 15+00 | D1500c0807 | Y3DM8 | 4.5-4.75 | Y3DP3 | YBM/OBM interface | 8/13/2007 | 15:30 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | D 15+00 | D1500d0807 | Y3DM8 | 5.5-5.75 | Y3DP4 | 1 foot below YBM/OBM interface | 8/13/2007 | 15:00 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | D 17+00 | D1700a0807 | Y3DM8 | 0-0.25 | Y3DP9 | sediment surface | 8/13/2007 | 15:45 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | D 17+00 | D1700c0807 | Y3DM8 | 1.75-2.0 | Y3DQ1 | YBM/OBM interface | 8/13/2007 | 15:45 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | D 17+00 | D1700d0807 | Y3DM8 | 2.75-3 | Y3DQ3 | 1 foot below YBM/OBM interface | 8/13/2007 | 15:45 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | D 17+00 | D8300c0807 | Y3DM8 | 1.75-2 | Y3DQ2 | YBM/OBM interface | 8/13/2007 | 15:45 | CC | 9/24/2007 | FD |
| Channel Sediment Southern Reach | E 3+25 | E0325a0807 | Y3DM5 | 0-0.25 | Y3DM5 | sediment surface | 8/17/2007 | 10:15 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | E 3+25 | E0325b0807 | Y3DM5 | 2.5-2.75 | Y3DM6 | -41 MLLW | 8/17/2007 | 10:15 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | E 3+25 | E0325c0807 | Y3DM5 | 3.75-4.0 | Y3DM7 | 1 foot below -41 MLLW | 8/17/2007 | 10:15 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | E 9+50 | E0950a0807 | Y3DH4 | 0-0.25 | Y3DL5 | sediment surface | 8/14/2007 | 14:15 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | E 9+50 | E0950b0807 | Y3DH4 | 1-1.25 | Y3DL6 | -41 MLLW | 8/14/2007 | 14:15 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | E 9+50 | E0950c0807 | Y3DH4 | 3-3.25 | Y3DL7 | 1 foot below -41 MLLW | 8/14/2007 | 14:15 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | F 5+25 | F0525a0807 | Y3DJ7 | 0-0.25 | Y3DK4 | sediment surface | 8/15/2007 | 16:25 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | F 5+25 | F0525c0807 | Y3DJ7 | 0.75-1.0 | Y3DK6 | 1 foot below -41 MLLW | 8/15/2007 | 16:25 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | F 7+00 | F0700a0807 | Y3DJ7 | 0-0.25 | Y3DJ7 | sediment surface | 8/15/2007 | 15:40 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | F 7+00 | F0700b0807 | Y3DJ7 | 1-1.25 | Y3DJ9 | -41 MLLW | 8/15/2007 | 15:40 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | F 7+00 | F0700c0807 | Y3DJ7 | 1.75-2.0 | Y3DK0 | 1 foot below -41 MLLW | 8/15/2007 | 15:40 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | F 8+00 | F0800a0807 | Y3DF6 | 0-0.25 | Y3DJ1 | sediment surface | 8/15/2007 | 11:47 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | F 8+00 | F0800c0807 | Y3DF6 | 2-2.25 | Y3DJ3 | 1 foot below -41 MLLW | 8/15/2007 | 11:47 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | F 11+00 | F1100a0807 | Y3DM8 | 0-0.25 | Y3DM8 | sediment surface | 8/13/2007 | 13:15 | CC | 9/24/2007 | N |
| Channel Sediment Northern Reach | F 11+00 | F1100b0807 | Y3DM8 | 1-1.25 | Y3DM9 | between surface and | 8/13/2007 | 13:15 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | F 7+00 | F9300a0807 | Y3DJ7 | 0-0.25 | Y3DJ8 | sediment surface | 8/15/2007 | 15:40 | CC | 9/24/2007 | FD |
| Channel Sediment Southern Reach | G 3+00 | G0300a0807 | Y3DJ7 | 0-0.25 | Y3DL1 | sediment surface | 8/17/2007 | 8:35 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | G 3+00 | G0300b0807 | Y3DJ7 | 3.5-3.75 | Y3DL3 | -41 MLLW | 8/17/2007 | 8:35 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | G 3+00 | G0300c0807 | Y3DJ7 | 5.5-5.75 | Y3DL4 | 1 foot below -41 MLLW | 8/17/2007 | 8:35 | CC | 9/24/2007 | N |
| Channel Sediment Southern Reach | G 3+00 | G9700a0807 | Y3DJ7 | 0-0.25 | Y3DL2 | sediment surface | 8/17/2007 | 8:35 | CC | 9/24/2007 | FD |
| Baseline Sediment Samples | 303.1 | M30310807 | Y3DF6 | 0-0.25 | Y3DF6 | sediment surface | 8/16/2007 | 14:30 | Grab | 9/24/2007 | N |

## Table 1B. Summary of Sediment Sample Depths United Heckathorn Superfund Site
## Focused Feasibility Study

| Sample Type | Sample Location | Sample Identification | SDG No. | Approx. Depth (ft) | CLP ID | Proposed Sample Depth Interval | Collection Date | Time | Collection Method | EDD Received | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Baseline Sediment Samples | 303.2 | M30320807 | Y3DF6 | 0-0.25 | Y3DF8 | sediment surface | 8/16/2007 | 15:35 | Grab | 9/24/2007 | N |
| Baseline Sediment Samples | 303.3 | M30330807 | Y3DF6 | 0-0.25 | Y3DF9 | sediment surface | 8/16/2007 | 16:05 | Grab | 9/24/2007 | N |
| Baseline Sediment Samples | 303.4 | M30340807 | Y3DF6 | 0-0.25 | Y3DG0 | sediment surface | 8/16/2007 | 15:15 | Grab | 9/24/2007 | N |
| Baseline Sediment Samples | 303.1 | M69690807 | Y3DF6 | 0-0.25 | Y3DF7 | sediment surface | 8/16/2007 | 14:30 | Grab | 9/24/2007 | FD |
| Baseline Sediment Samples | PCW | MPCW0807 | Y3DF6 | 0-0.25 | Y3DG1 | sediment surface | 8/16/2007 | 14:50 | Grab | 9/24/2007 | N |
| Parr Canal | PC-1 | PC01a0807 | Y3DM5 | 0-0.25 | Y3DQ8 | sediment surface | 8/17/2007 | 13:00 | CC | 9/24/2007 | N |
| Parr Canal | PC-1 | PC01b0807 | Y3DM5 | 3.25-3.5 | Y3DQ9 | YBM/OBM interface | 8/17/2007 | 13:00 | CC | 9/24/2007 | N |
| Parr Canal | PC-1 | PC01c0807 | Y3DM5 | 4.75-5.0 | Y3DR0 | 1 foot below YBM/OBM interface | 8/17/2007 | 13:00 | CC | 9/24/2007 | N |
| Parr Canal | PC-2 | PC02a0807 | Y3DM5 | 0-0.25 | Y3DR1 | sediment surface | 8/17/2007 | 12:17 | CC | 9/24/2007 | N |
| Parr Canal | PC-2 | PC02b0807 | Y3DM5 | 3.25-3.5 | Y3DR3 | YBM/OBM interface | 8/17/2007 | 12:17 | CC | 9/24/2007 | N |
| Parr Canal | PC-2 | PC02c0807 | Y3DM5 | 5.25-5.5 | Y3DR4 | 1 foot below YBM/OBM | 8/17/2007 | 12:17 | CC | 9/24/2007 | MS/MSD |
| Parr Canal | PC-3 | PC03a0807 | Y3DM5 | 0-0.25 | Y3DR5 | sediment surface | 8/17/2007 | 11:40 | CC | 9/24/2007 | N |
| Parr Canal | PC-3 | PC03b0807 | Y3DM5 | 3.75-4.0 | Y3DR6 | YBM/OBM interface | 8/17/2007 | 11:40 | CC | 9/24/2007 | N |
| Parr Canal | PC-3 | PC03c0807 | Y3DM5 | 5.0-5.25 | Y3DR7 | 1 foot below YBM/OBM | 8/17/2007 | 11:40 | CC | 9/24/2007 | N |
| Parr Canal | PC-2 | PC98a0807 | Y3DM5 | 0-0.25 | Y3DR2 | sediment surface | 8/17/2007 | 12:17 | CC | 9/24/2007 | FD |
| Channel Sediment Sante Fe Channel | SF-29 | SF29a0807 | Y3DF6 | 0-0.25 | Y3DG2 | sediment surface | 8/15/2007 | 9:50 | CC | 9/24/2007 | N |
| Channel Sediment Sante Fe Channel | SF-29 | SF29b0807 | Y3DF6 | 2.5-2.75 | Y3DG3 | -41 MLLW | 8/15/2007 | 9:50 | CC | 9/24/2007 | N |
| Channel Sediment Sante Fe Channel | SF-29 | SF29c0807 | Y3DF6 | 3.5-3.75 | Y3DG4 | 1 foot below -41 MLLW | 8/15/2007 | 9:50 | CC | 9/24/2007 | N |
| Channel Sediment Sante Fe Channel | SF-31 | SF31a0807 | Y3DF6 | 0-0.25 | Y3DG5 | sediment surface | 8/17/2007 | 9:40 | CC | 9/24/2007 | N |
| Channel Sediment Sante Fe Channel | SF-31 | SF31b0807 | Y3DF6 | 2.5-2.75 | Y3DG6 | -41 MLLW | 8/17/2007 | 9:40 | CC | 9/24/2007 | N |
| Channel Sediment Sante Fe Channel | SF-31 | SF31c0807 | Y3DF6 | 3.5-3.75 | Y3DG7 | 1 foot below -41 MLLW | 8/17/2007 | 9:40 | CC | 9/24/2007 | N |
| Channel Sediment Sante Fe Channel | SF-32 | SF32a0807 | Y3DF6 | 0-0.25 | Y3DG8 | sediment surface | 8/15/2007 | 10:50 | CC | 9/24/2007 | MS/MSD |
| Channel Sediment Sante Fe Channel | SF-32 | SF32b0807 | Y3DF6 | 2-2.25 | Y3DG9 | -41 MLLW | 8/15/2007 | 10:50 | CC | 9/24/2007 | N |
| Channel Sediment Sante Fe Channel | SF-32 | SF32c0807 | Y3DF6 | 3-3.25 | Y3DH0 | 1 foot below -41 MLLW | 8/15/2007 | 10:50 | CC | 9/24/2007 | N |
| Channel Sediment Sante Fe Channel | SF-34 | SF34a0807 | Y3DF6 | 0-0.25 | Y3DH1 | sediment surface | 8/15/2007 | 14:40 | CC | 9/24/2007 | N |
| Channel Sediment Sante Fe Channel | SF-34 | SF34b0807 | Y3DF6 | 0.75-1.0 | Y3DH2 | -41 MLLW | 8/15/2007 | 14:40 | CC | 9/24/2007 | N |
| Channel Sediment Sante Fe Channel | SF-34 | SF34c0807 | Y3DF6 | 1.75-2.0 | Y3DH3 | 1 foot below -41 MLLW | 8/15/2007 | 14:40 | CC | 9/24/2007 | N |
| Embankment Transect | Embankment Transect 100 | T1001a0807 | Y3DM5 | 0-0.5 | Y3DR8 | 0-0.5' | 8/16/2007 | 10:22 | CC | 9/24/2007 | N |
| Embankment Transect | Embankment Transect 100 | T1002a0807 | Y3DM5 | 0-0.5 | Y3DS0 | 0-0.5' | 8/16/2007 | 10:28 | CC | 9/24/2007 | N |
| Embankment Transect | Embankment Transect 100 | T1003a0807 | Y3DM5 | 0-0.5 | Y3DS2 | 0-0.5' | 8/16/2007 | 10:35 | CC | 9/24/2007 | N |
| Embankment Transect | Embankment Transect 300 | T3001a0807 | Y3DM5 | 0-0.5 | Y3DS5 | 0-0.5' | 8/16/2007 | 11:05 | CC | 9/24/2007 | N |
| Embankment Transect | Embankment Transect 300 | T3001b0807 | Y3DM5 | 0.5-1.0 | Y3DS6 | 0.5-1.0' | 8/16/2007 | 11:05 | CC | 9/24/2007 | N |
| Embankment Transect | Embankment Transect 300 | T3002a0807 | Y3DM5 | 0-0.5 | Y3DS7 | 0-0.5' | 8/16/2007 | 11:19 | CC | 9/24/2007 | N |
| Embankment Transect | Embankment Transect 300 | T3002b0807 | Y3DM5 | 0.5-0.9 | Y3DS8 | 0.5-0.9' | 8/16/2007 | 11:19 | CC | 9/24/2007 | N |
| Embankment Transect | Embankment Transect 300 | T3003a0807 | Y3DP5 | 0-0.5 | Y3DS9 | 0-0.5' | 8/16/2007 | 11:29 | CC | 9/24/2007 | N |
| Embankment Transect | Embankment Transect 300 | T3003b0807 | Y3DP5 | 0.5-0.9 | Y3DT0 | 0.5-0.9' | 8/16/2007 | 11:29 | CC | 9/24/2007 | N |
| Embankment Transect | Embankment Transect 500 | T5001a0807 | Y3DP5 | 0-0.4 | Y3DT1 | 0-0.4' | 8/16/2007 | 11:34 | CC | 9/24/2007 | N |
| Embankment Transect | Embankment Transect 500 | T5001b0807 | Y3DP5 | 0.4-0.75 | Y3DT2 | 0.4-0.75' | 8/16/2007 | 11:34 | CC | 9/24/2007 | N |
| Embankment Transect | Embankment Transect 500 | T5002a0807 | Y3DP5 | 0-0.4 | Y3DT3 | 0-0.4' | 8/16/2007 | 11:40 | CC | 9/24/2007 | N |
| Embankment Transect | Embankment Transect 500 | T5002b0807 | Y3DP5 | 0.4-0.75 | Y3DT5 | 0.4-0.75' | 8/16/2007 | 11:40 | CC | 9/24/2007 | N |

## Table 1B. Summary of Sediment Sample Depths United Heckathorn Superfund Site
## Focused Feasibility Study

| Sample Type | Sample Location | Sample Identification | SDG No. | Approx. Depth (ft) | CLP ID | Proposed Sample Depth Interval | Collection Date | Time | Collection Method | EDD Received | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Embankment Transect | Embankment Transect 500 | T5003a0807 | Y3DP5 | 0-0.4 | Y3DT6 | 0-0.4' | 8/16/2007 | 11:44 | CC | 9/24/2007 | N |
| Embankment Transect | Embankment Transect 500 | T5003b0807 | Y3DP5 | 0.4-0.75 | Y3DT7 | 0.4-0.75' | 8/16/2007 | 11:44 | CC | 9/24/2007 | N |

Notes: CC: Continuous Core
TOC: Total Organic Carbon
N: Normal
FD: Field Duplicate
TB: Trip Blank
L: Liter
EB: Equipment Blank

| | |
|---|---|
| Field Duplicates | 9 |
| Samples | 99 |

Depth of Sample is approximate as the interface between water and sediment is not a distinctive boundary due to the high percentage fines and clays in young bay mud.

TABLE 1
Marine Sediment Results
*United Heckathorn Superfund Site*

| Location ID | 303_1 | 303_1 | 303_2 | 303_3 | 303_4 | B16+00 | B16+00 | B16+00 | B16+00 | B16+00 | B16+00 | B16+00 | B16+00 | C4+00 | C4+00 | C4+00 | C4+00 | C4+00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | M30310807 | M69690807 | M30320807 | M30330807 | M30340807 | B1600A | B1600a0807 | B1600B | B1600b0807 | B1600c0807 | B1600C | B1600d0807 | B1600D | C0400A | C0400B | C0400b0807 | C0400C | C0400c0807 |
| Sediment Type | YBM | YBM | YBM | YBM | YBM | YBM | YBM | sand | sand | Interface | Interface | OBM | OBM | Surface | Interface | Interface | OBM | OBM |
| Sample Date | 8/16/2007 | 8/16/2007 | 8/16/2007 | 8/16/2007 | 8/16/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/15/2007 | 8/15/2007 | 8/15/2007 | 8/15/2007 | 8/15/2007 |
| Lab | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | EPAR9 | LIBRTY | EPAR9 | LIBRTY | LIBRTY | EPAR9 | LIBRTY | EPAR9 | EPAR9 | EPAR9 | LIBRTY | EPAR9 | LIBRTY |
| **Analyte** | **All Analytical Results in dry weight ug/kg** | | | | | | | | | | | | | | | | | |
| **Pesticides** | | | | | | | | | | | | | | | | | | |
| 2,4-DDD | 8.3 U | 8 U | 8.9 NJ | 370 | 3.3 NJ | 310 | 440 | 300 | 1,200 | 1,700 | 1,700 | 8.4 | 2.2 U | 13 | 2.5 U | 12 | 2.3 U | 4.4 U |
| 2,4-DDE | 8.3 U | 8 U | 2 NJ | 22 NJ | 2.7 NJ | 9.1 | 40 NJ | 13 | 67 NJ | 150 NJ | 62 | 2.2 NJ | 2.2 U | 4.6 U | 2.5 U | 5.2 U | 2.3 U | 4.4 U |
| 2,4-DDT | 8.3 U | 8 U | 11 | 1,500 | 3.3 J | 82 | 110 | 36 | 200 | 250 NJ | 45 | 4.2 U | 2.2 U | 4.6 U | 2.5 U | 5.2 U | 2.3 U | 4.4 U |
| 4,4-DDD | 1.7 NJ | 3.4 J | 32 | 850 | 16 | 1,700 | 1,900 | 1,300 | 5,100 | 6,700 | 6,500 | 33 | 2.9 J | 51 | 3.4 J | 46 | 2.3 U | 2 J |
| 4,4-DDE | 8.3 U | 8 U | 9 J | 240 | 7.2 J | 100 | 150 | 60 | 250 | 810 | 220 | 2.1 J | 2.2 U | 8.8 J | 2.5 U | 4.7 J | 2.3 U | 4.4 U |
| 4,4-DDT | 4.4 J | 4.3 J | 53 | 11,000 | 120 | 460 | 1,500 | 640 | 4,400 | 11,000 | 1,600 | 12 | 4.4 | 43 | 2.5 U | 30 | 2.3 U | 4.4 U |
| **Total DDT** | **6.1** | **7.7** | **115.9** | **13,982** | **152.5** | **2,661** | **4,140** | **2,349** | **11,217** | **20,610** | **10,127** | **57.7** | **7.3** | **115.8** | **3.4** | **92.7** | **2.3 U** | **2** |
| Dieldrin | 8.3 U | 8 U | 6.2 NJ | 490 | 2.4 NJ | 67 | 70 NJ | 33 | 140 | 320 | 190 | 1.5 J | 2.2 U | 7.2 J | 2.5 U | 1.8 NJ | 2.3 U | 4.4 U |
| Aldrin | 4.3 U | 4.1 U | 4.9 U | 66 | 5.3 U | 2 U | 7.9 NJ | 1.3 J | 13 J | 12 NJ | 2.7 | 2.2 U | 1.1 U | 2.3 U | 1.3 U | 2.7 U | 1.1 U | 2.3 U |
| alpha-BHC | 4.3 U | 4.1 U | 4.9 U | 47 U | 5.3 U | 2 U | 8.7 U | 1.1 U | 14 U | 45 U | 4.5 | 2.2 U | 1.1 U | 2.3 U | 1.3 U | 2.7 U | 1.1 U | 2.3 U |
| alpha-Chlordane | 4.3 U | 4.1 U | 4.9 U | 17 NJ | 5.3 U | 2 U | 7.8 NJ | 1.2 J | 11 NJ | 20 J | 6.8 | 0.63 NJ | 1.1 U | 2.3 U | 1.3 U | 2.7 U | 1.1 U | 2.3 U |
| beta-BHC | 4.3 U | 4.1 U | 6.4 NJ | 47 U | 1.8 NJ | 2 U | 12 NJ | 1.1 U | 9.1 NJ | 45 U | 1.3 J | 2.2 U | 1.1 U | 2.3 U | 1.3 U | 2.7 U | 1.1 U | 2.3 U |
| Chlordane (technical) | --- | --- | --- | --- | --- | 200 U | --- | 110 U | --- | --- | 110 U | --- | 110 U | 230 U | 130 U | --- | 110 U | --- |
| delta-BHC | 4.3 U | 4.1 U | 4.9 U | 47 U | 5.3 U | 2 U | 8.7 U | 1.1 U | 14 U | 45 U | 2.7 | 2.2 U | 1.1 U | 2.3 U | 1.3 U | 2.7 U | 1.1 U | 2.3 U |
| Endosulfan I | 4.3 U | 4.1 U | 4.9 U | 47 U | 5.3 U | 2 U | 8.7 U | 1.1 U | 2.8 NJ | 45 U | 1.1 U | 2.2 U | 1.1 U | 2.3 U | 1.3 U | 2.7 U | 1.1 U | 2.3 U |
| Endosulfan II | 8.3 U | 8 U | 9.4 U | 92 U | 10 U | 13 | 17 U | 2.2 U | 27 U | 87 U | 2.2 U | 4.2 U | 2.2 U | 4.6 U | 2.5 U | 5.2 U | 2.3 U | 4.4 U |
| Endosulfan sulfate | 8.3 U | 8 U | 9.4 U | 92 U | 10 U | 4 U | 17 U | 2.2 U | 27 U | 87 U | 2.2 U | 4.2 U | 2.2 U | 4.6 U | 2.5 U | 5.2 U | 2.3 U | 4.4 U |
| Endrin | 8.3 U | 8 U | 9.4 U | 28 J | 10 U | 4 U | 8 J | 2.2 U | 8.1 NJ | 39 J | 2.2 U | 4.2 U | 2.2 U | 4.6 U | 2.5 U | 5.2 U | 2.3 U | 4.4 U |
| Endrin aldehyde | 8.3 U | 8 U | 9.4 U | 92 U | 10 U | 4 U | 17 U | 2.2 U | 27 U | 87 U | 2.2 U | 4.2 U | 2.2 U | 4.6 U | 2.5 U | 5.2 U | 2.3 U | 4.4 U |
| Endrin ketone | 2.8 NJ | 2 NJ | 4.8 NJ | 86 NJ | 10 U | 4 U | 3.9 NJ | 2.2 U | 27 U | 87 U | 2.2 U | 4.2 U | 2.2 U | 4.6 U | 2.5 U | 5.2 U | 2.3 U | 4.4 U |
| Gamma-BHC (Lindane) | 4.3 U | 4.1 U | 4.9 U | 47 U | 5.3 U | 2 U | 8.7 U | 1.1 J | 14 U | 45 U | 1.3 J | 2.2 U | 1.1 U | 2.3 U | 1.3 U | 2.7 U | 1.1 U | 2.3 U |
| gamma-Chlordane | 4.3 U | 4.1 U | 1.2 J | 21 J | 1.6 NJ | 7.3 | 14 NJ | 1.1 U | 23 NJ | 50 NJ | 1.1 U | 0.5 NJ | 1.1 U | 2.3 U | 1.3 U | 0.73 NJ | 1.1 U | 2.3 U |
| Heptachlor | 4.3 U | 4.1 U | 4.9 U | 47 U | 5.3 U | 3.8 J | 8.7 U | 1.1 U | 14 U | 45 U | 1.1 U | 2.2 U | 1.1 U | 2.3 U | 1.3 U | 2.7 U | 1.1 U | 2.3 U |
| Heptachlor epoxide | 4.3 U | 4.1 U | 4.9 U | 47 U | 5.3 U | 2 U | 24 NJ | 1.1 U | 26 NJ | 45 U | 1.1 U | 2.2 U | 1.1 U | 2.3 U | 1.3 U | 1.2 NJ | 1.1 U | 2.3 U |
| Methoxychlor | 43 U | 41 U | 49 U | 470 U | 53 U | 20 U | 87 U | 11 U | 140 U | 450 U | 11 U | 22 U | 11 U | 23 U | 13 U | 27 U | 11 U | 23 U |
| Total Organic Carbon | 1.3 | 1.1 | 2.4 J | 1.3 | 2.2 | --- | 3.5 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Toxaphene | 430 U | 420 U | 490 U | 4,700 U | 530 U | 200 U | 870 U | 110 U | 1,400 U | 4,500 U | 110 U | 220 U | 110 U | 230 U | 130 U | 270 U | 110 U | 230 U |

Notes:

OBM: Old bay mud
YBM: Young bay mud
ug/kg: micrograms per kilogram (ppb)
FD: Field dupllicate
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

TABLE 1
Marine Sediment Results
*United Heckathorn Superfund Site*

| Location ID | C4+00 | C8+00 | C8+00 | C8+00 | C9+00 | C9+00 | C9+00 | C9+00 | C14+00 | C14+00 | C14+00 | C14+00 | C18+00 | C18+00 | C18+00 | C218+00 | C218+00 | C218+00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | C9600a0807 | C0800a0807 | C0800b0807 | C0800c0807 | C0900a0807 | C0900b0807 | C0900c0807 | C9100b0807 | C1400a0807 | C1400c0807 | C1400d0807 | C8600a0807 | C1800a0807 | C1800b0807 | C1800c0807 | C2 1800a0807 | C2 1800b0807 | C2 1800c0807 |
| Sediment Type | YBM | YBM | Interface | OBM | YBM | Interface | OBM | Interface | YBM | Interface | OBM | YBM | YBM | YBM | Sand | YBM | YBM | YBM |
| Sample Date | 8/15/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/13/2007 | 8/13/2007 | 8/13/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 |
| Lab | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY |
| **Analyte** | **All Analytical Results in dry weight ug/kg** | | | | | | | | | | | | | | | | | |
| **Pesticides** | | | | | | | | | | | | | | | | | | |
| 2,4-DDD | 1,300 | 65 | 350 | 8.6 | 37 | 130 | 41 | 110 | 3,900 | 23 | 1.1 NJ | 570 | 14,000 | 2,300 | 110 | 2,700 | 58 | 5,600 NJ |
| 2,4-DDE | 94 U | 19 NJ | 64 J | 3.8 NJ | 9.8 NJ | 15 NJ | 9.3 J | 17 NJ | 590 U | 3.1 J | 4.2 U | 63 NJ | 730 NJ | 820 NJ | 3.5 NJ | 230 NJ | 12 NJ | 930 NJ |
| 2,4-DDT | 94 U | 21 NJ | 120 | 4.3 U | 18 NJ | 53 NJ | 1.9 NJ | 35 J | 510 NJ | 4.1 U | 4.2 U | 390 NJ | 1,800 NJ | 92 U | 8.7 NJ | 45 NJ | 2.8 NJ | 100 U |
| 4,4-DDD | 6,000 | 350 J | 1,500 | 36 | 260 | 510 | 170 | 440 | 17,000 | 100 | 3.6 J | 3,600 J | 51,000 | 4,100 | 440 J | 9,000 | 330 | 1,000 |
| 4,4-DDE | 100 NJ | 37 | 76 | 3.1 J | 22 | 30 J | 9.3 | 27 J | 310 J | 2.8 J | 4.2 U | 160 NJ | 4,300 | 11,000 | 19 | 1,100 | 17 | 25,000 |
| 4,4-DDT | 150 | 340 J | 1,100 | 17 | 390 | 1,400 | 160 | 1,100 | 4,900 | 24 | 4.2 U | 4,600 J | 17,000 | 480 | 96 | 1,900 | 7.1 | 3,300 |
| **Total DDT** | **7,550** | **832** | **3,210** | **68.5** | **736.8** | **2,138** | **391.5** | **1,729** | **26,620** | **152.9** | **4.7** | **9,383** | **88,830** | **18,700** | **677.2** | **14,975** | **426.9** | **35,830** |
| Dieldrin | 40 J | 62 | 32 | 1.9 J | 15 | 19 J | 8.1 | 16 J | 260 J | 3.9 J | 4.2 U | 110 | 2,800 | 660 | 15 J | 590 | 11 | 1,100 NJ |
| Aldrin | 49 U | 4.9 NJ | 15 | 2.2 U | 2.1 J | 23 U | 1 NJ | 24 U | 300 U | 1.8 J | 2.2 U | 12 J | 170 U | 86 | 8.1 U | 13 NJ | 2 U | 190 |
| alpha-BHC | 49 U | 4.6 U | 4.8 U | 2.2 U | 4 U | 23 U | 2.2 U | 24 U | 300 U | 2.1 U | 2.2 U | 30 U | 170 U | 47 U | 8.1 U | 39 U | 2 U | 53 U |
| alpha-Chlordane | 51 | 2.1 NJ | 3 NJ | 0.51 NJ | 1.2 NJ | 23 U | 0.68 NJ | 24 U | 300 U | 2.1 U | 2.2 U | 7.3 NJ | 190 | 93 NJ | 8.1 U | 72 | 1.4 NJ | 190 NJ |
| beta-BHC | 49 U | 4.6 U | 4.8 U | 2.2 U | 2.1 NJ | 23 U | 2.2 U | 24 U | 300 U | 2.1 U | 2.2 U | 13 J | 170 U | 47 U | 8.1 U | 39 U | 2 U | 53 U |
| Chlordane (technical) | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| delta-BHC | 49 U | 4.6 U | 4.8 U | 2.2 U | 4 U | 23 U | 2.2 U | 24 U | 300 U | 2.1 U | 2.2 U | 30 U | 170 U | 47 U | 8.1 U | 39 U | 2 U | 17 NJ |
| Endosulfan I | 49 U | 4.6 U | 4.8 U | 2.2 U | 4 U | 23 U | 2.2 U | 24 U | 300 U | 2.1 U | 2.2 U | 30 U | 42 NJ | 37 NJ | 8.1 U | 13 NJ | 2 U | 70 NJ |
| Endosulfan II | 94 UJ | 8.9 U | 9.3 U | 4.3 U | 7.9 U | 44 U | 4.3 U | 46 U | 590 U | 4.1 U | 4.2 U | 58 U | 330 U | 92 U | 16 U | 75 U | 3.9 U | 100 U |
| Endosulfan sulfate | 94 U | 8.9 U | 9.3 U | 4.3 U | 7.9 U | 44 U | 4.3 U | 46 U | 590 U | 4.1 U | 4.2 U | 58 U | 330 U | 92 U | 16 U | 75 U | 3.9 U | 100 U |
| Endrin | 94 UJ | 8.9 U | 11 NJ | 4.3 U | 7.9 U | 44 U | 1.7 J | 46 U | 590 U | 4.1 U | 4.2 U | 58 U | 330 U | 150 NJ | 4.1 J | 17 NJ | 2.8 J | 59 NJ |
| Endrin aldehyde | 94 U | 8.9 U | 9.3 U | 4.3 U | 7.9 U | 44 U | 4.3 U | 46 U | 590 U | 4.1 U | 4.2 U | 58 U | 330 U | 92 U | 16 U | 75 U | 3.9 U | 100 U |
| Endrin ketone | 94 U | 2.2 J | 2.1 NJ | 4.3 U | 7.9 U | 44 U | 4.3 U | 46 U | 590 U | 4.1 U | 4.2 U | 16 NJ | 330 U | 92 U | 16 U | 75 U | 3.9 U | 100 U |
| Gamma-BHC (Lindane) | 49 U | 4.6 U | 4.8 U | 2.2 U | 4 U | 23 U | 2.2 U | 24 U | 300 U | 2.1 U | 2.2 U | 30 U | 170 U | 47 U | 8.1 U | 39 U | 2 U | 53 U |
| gamma-Chlordane | 71 NJ | 2.7 NJ | 6 NJ | 0.97 NJ | 1.6 NJ | 23 U | 1.4 NJ | 24 U | 300 U | 0.74 NJ | 2.2 U | 14 NJ | 470 NJ | 350 NJ | 5 NJ | 160 NJ | 2.6 NJ | 580 NJ |
| Heptachlor | 49 U | 4.6 U | 4.8 U | 2.2 U | 4 U | 23 U | 2.2 U | 24 U | 300 U | 2.1 U | 2.2 U | 30 U | 170 U | 47 U | 8.1 U | 39 U | 2 U | 53 U |
| Heptachlor epoxide | 49 U | 2.8 NJ | 4.8 U | 1 NJ | 1.7 NJ | 23 U | 0.59 NJ | 24 U | 300 U | 2.1 U | 2.2 U | 9.8 NJ | 51 NJ | 47 U | 8.1 U | 79 NJ | 1 NJ | 15 NJ |
| Methoxychlor | 490 U | 46 U | 48 U | 22 U | 40 U | 230 U | 22 U | 240 U | 3,000 U | 21 U | 22 U | 300 U | 1,700 U | 470 U | 81 U | 390 U | 20 U | 530 U |
| Total Organic Carbon | --- | --- | --- | --- | --- | --- | --- | --- | 1.1 | --- | 0.11 J | --- | 4.7 | --- | --- | 4.5 | --- | --- |
| Toxaphene | 4,900 U | 460 U | 480 U | 220 U | 410 U | 2,300 U | 220 U | 2,400 U | 30,000 U | 210 U | 220 U | 3,000 U | 17,000 U | 4,700 U | 810 U | 3,900 U | 200 U | 5,300 U |

Notes:

OBM: Old bay mud
YBM: Young bay mud
ug/kg: micrograms per kilogram (ppb)
FD: Field dupllicate
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

TABLE 1
Marine Sediment Results
*United Heckathorn Superfund Site*

| Location ID | CB6+50 | CB6+50 | CB6+50 | CB6+50 | CB6+50 | CB6+50 | CB6+50 | CB9+50 | CB9+50 | CB9+50 | CB9+50 | CB9+50 | CB9+50 | D10+00 | D10+00 | D10+00 | D13+00 | D13+00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | CB0650A | CB650a0807 | CB0650B | CB650b0807 | CB0650C | CB650c0807 | CB9350c0807 | CB950A | CB950a0807 | CB950B | CB950b0807 | CB950C | CB950c0807 | D1000a0807 | D1000b0807 | D1000c0807 | D1300a0807 | D1300b0807 |
| Sediment Type | YBM | YBM | Interface | Interface | OBM | OBM | OBM | YBM | YBM | YBM | YBM | OBM | OBM | YBM | Interface | OBM | YBM | YBM |
| Sample Date | 8/15/2007 | 8/15/2007 | 8/15/2007 | 8/15/2007 | 8/15/2007 | 8/15/2007 | 8/15/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/13/2007 | 8/13/2007 |
| Lab | EPAR9 | LIBRTY | EPAR9 | LIBRTY | EPAR9 | LIBRTY | LIBRTY | EPAR9 | LIBRTY | EPAR9 | LIBRTY | EPAR9 | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY |
| **Analyte** | **All Analytical Results in dry weight ug/kg** | | | | | | | | | | | | | | | | | |
| **Pesticides** | | | | | | | | | | | | | | | | | | |
| 2,4-DDD | 8.5 J | 50 | 80 | 290 | 59 | 41 | 11 | 110 | 1,500 J | 120 | 860 | 1,700 | 2,100 | 150 | 4.5 U | 4.3 U | 240 | 140 |
| 2,4-DDE | 4.7 U | 3.7 NJ | 6.9 | 36 NJ | 3.7 J | 4.6 NJ | 1.5 NJ | 7 J | 110 NJ | 22 | 190 | 180 | 330 NJ | 36 NJ | 4.5 U | 4.3 U | 12 NJ | 6.4 NJ |
| 2,4-DDT | 4.7 U | 36 | 11 | 100 NJ | 2.2 U | 3.2 NJ | 4.3 U | 140 | 4,600 J | 310 | 1,500 J | 1,600 | 910 | 24 J | 4.5 U | 4.3 U | 52 | 7.4 NJ |
| 4,4-DDD | 31 | 170 J | 330 | 1,700 | 240 | 190 | 44 | 460 | 3,000 J | 520 | 3,300 | 6,500 | 7,300 | 780 | 3.2 J | 1.2 J | 1,000 | 510 |
| 4,4-DDE | 4.7 U | 34 NJ | 27 | 120 | 11 | 13 | 4 J | 51 | 640 | 44 | 390 | 490 | 960 | 59 | 4.5 U | 4.3 U | 64 | 21 |
| 4,4-DDT | 47 | 340 J | 140 | 2,400 | 95 | 180 | 47 | 2,000 | 23,000 J | 1,900 | 11,000 | 13,000 | 26,000 | 910 | 3.6 J | 4.3 U | 980 J | 150 |
| **Total DDT** | **86.5** | **633.7** | **594.9** | **4,646** | **408.7** | **431.8** | **107.5** | **2,768** | **32,850** | **2,916** | **17,240** | **23,470** | **37,600** | **1,959** | **6.8** | **1.2** | **2,348** | **834.8** |
| Dieldrin | 9.7 | 75 | 12 | 55 | 8.3 | 6.5 | 2.6 J | 15 | 610 | 22 | 160 | 110 | 130 J | 25 NJ | 4.5 U | 4.3 U | 33 | 14 |
| Aldrin | 2.4 U | 4.1 NJ | 1.3 U | 6 J | 1.1 U | 1 J | 2.2 U | 2.1 J | 17 NJ | 3.6 J | 33 J | 100 | 190 J | 16 U | 2.3 U | 2.2 U | 4.9 J | 5.6 |
| alpha-BHC | 2.4 U | 4.5 U | 1.3 U | 26 U | 1.1 U | 2.3 U | 2.2 U | 1.9 U | 39 U | 1.8 U | 37 U | 6.2 | 250 U | 16 U | 2.3 U | 2.2 U | 5.7 U | 2.2 U |
| alpha-Chlordane | 2.4 U | 4.5 U | 1.3 U | 26 U | 1.1 U | 2.3 U | 2.2 U | 1.9 U | 15 NJ | 1.8 U | 9.4 NJ | 5.3 | 250 U | 16 U | 2.3 U | 2.2 U | 1.8 J | 2.2 U |
| beta-BHC | 2.4 U | 2.2 NJ | 1.3 U | 26 U | 1.1 U | 2.3 U | 2.2 U | 1.9 U | 39 U | 1.8 U | 16 NJ | 1.4 U | 250 U | 5 NJ | 2.3 U | 2.2 U | 10 | 2.2 U |
| Chlordane (technical) | 240 U | --- | 130 U | --- | 110 U | --- | --- | 190 U | --- | 180 U | --- | 140 U | --- | --- | --- | --- | --- | --- |
| delta-BHC | 2.4 U | 4.5 U | 1.3 U | 26 U | 1.1 U | 2.3 U | 2.2 U | 1.9 U | 39 U | 1.8 U | 37 U | 3.1 | 250 U | 16 U | 2.3 U | 2.2 U | 5.7 U | 2.2 U |
| Endosulfan I | 2.4 U | 4.5 U | 1.3 U | 26 U | 1.1 U | 2.3 U | 2.2 U | 1.9 U | 12 NJ | 1.8 U | 37 U | 1.4 U | 250 U | 16 U | 2.3 U | 2.2 U | 5.7 U | 2.2 U |
| Endosulfan II | 4.7 U | 8.7 U | 2.5 U | 50 U | 2.2 U | 4.5 U | 4.3 U | 3.9 U | 75 U | 3.7 U | 72 U | 2.7 U | 490 U | 31 U | 4.5 U | 4.3 U | 11 U | 4.3 U |
| Endosulfan sulfate | 4.7 U | 8.7 U | 2.5 U | 50 U | 2.2 U | 4.5 U | 4.3 U | 3.9 U | 75 U | 3.7 U | 72 U | 13 | 490 U | 31 U | 4.5 U | 4.3 U | 11 U | 4.3 U |
| Endrin | 4.7 U | 3.1 NJ | 2.5 U | 50 U | 2.2 U | 1.7 NJ | 4.3 U | 3.9 U | 75 U | 3.7 U | 31 NJ | 2.7 U | 490 U | 31 U | 4.5 U | 4.3 U | 11 U | 4.8 |
| Endrin aldehyde | 4.7 U | 8.7 U | 2.5 U | 50 U | 2.2 U | 4.5 U | 4.3 U | 3.9 U | 75 U | 3.7 U | 72 U | 2.7 U | 490 U | 31 U | 4.5 U | 4.3 U | 11 U | 4.3 U |
| Endrin ketone | 4.7 U | 8.7 U | 2.5 U | 50 U | 2.2 U | 4.5 U | 4.3 U | 3.9 U | 75 U | 3.7 U | 72 U | 3.5 J | 490 U | 31 U | 4.5 U | 4.3 U | 11 U | 4.3 U |
| Gamma-BHC (Lindane) | 2.4 U | 4.5 U | 1.3 U | 26 U | 1.1 U | 2.3 U | 2.2 U | 1.9 U | 39 U | 1.8 U | 37 U | 1.4 U | 250 U | 16 U | 2.3 U | 2.2 U | 5.7 U | 2.2 U |
| gamma-Chlordane | 2.4 U | 2.5 NJ | 1.3 U | 5.5 NJ | 1.1 U | 1.1 NJ | 0.51 NJ | 1.9 U | 21 NJ | 1.8 U | 15 NJ | 1.4 U | 250 U | 3.9 NJ | 2.3 U | 2.2 U | 6.7 NJ | 2.8 NJ |
| Heptachlor | 2.4 U | 4.5 U | 1.3 U | 26 U | 1.1 U | 2.3 U | 2.2 U | 1.9 U | 39 U | 1.8 U | 37 U | 1.4 U | 250 U | 16 U | 2.3 U | 2.2 U | 5.7 U | 2.2 U |
| Heptachlor epoxide | 2.4 U | 4.5 U | 1.3 U | 26 U | 1.1 U | 2.3 U | 2.2 U | 1.9 U | 12 NJ | 1.8 U | 37 U | 1.4 U | 250 U | 5.1 NJ | 2.3 U | 2.2 U | 3.5 NJ | 2.2 U |
| Methoxychlor | 24 U | 9.1 NJ | 13 U | 260 U | 11 U | 23 U | 22 U | 19 U | 390 U | 18 U | 370 U | 14 U | 2,500 U | 160 U | 23 U | 22 U | 57 U | 22 U |
| Total Organic Carbon | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 0.83 | --- |
| Toxaphene | 240 U | 450 U | 130 U | 2,600 U | 110 U | 230 U | 220 U | 190 U | 3,900 U | 180 U | 3,700 U | 140 U | 25,000 U | 1,600 U | 230 U | 220 U | 570 U | 220 U |

Notes:

OBM: Old bay mud
YBM: Young bay mud
ug/kg: micrograms per kilogram (ppb)
FD: Field dupllicate
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

TABLE 1
Marine Sediment Results
*United Heckathorn Superfund Site*

| Location ID | D13+00 | D13+00 | D15+00 | D15+00 | D15+00 | D15+00 | D17+00 | D17+00 | D17+00 | D17+00 | D6+00 | D6+00 | D6+00 | E3+25 | E3+25 | E3+25 | E9+50 | E9+50 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | D1300c0807 | D1300d0807 | D1500a0807 | D1500b0807 | D1500c0807 | D1500d0807 | D1700a0807 | D1700c0807 | D1700d0807 | D8300c0807 | D0600a0807 | D0600b0807 | D0600c0807 | E0325a0807 | E0325b0807 | E0325c0807 | E0950a0807 | E0950b0807 |
| Sediment Type | Interface | OBM | YBM | YBM | Interface | OBM | YBM | sand | OBM | sand | YBM | Interface | OBM | YBM | YBM | OBM | YBM | Sand |
| Sample Date | 8/13/2007 | 8/13/2007 | 8/13/2007 | 8/13/2007 | 8/13/2007 | 8/13/2007 | 8/13/2007 | 8/13/2007 | 8/13/2007 | 8/13/2007 | 8/17/2007 | 8/17/2007 | 8/17/2007 | 8/17/2007 | 8/17/2007 | 8/17/2007 | 8/14/2007 | 8/14/2007 |
| Lab | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY |
| **Analyte** | **All Analytical Results in dry weight ug/kg** | | | | | | | | | | | | | | | | | |
| **Pesticides** | | | | | | | | | | | | | | | | | | |
| 2,4-DDD | 6.9 | 4.3 | 340 | 2,500 | 330 | 91 NJ | 1,700 | 210 | 4.1 U | 160 | 30 | 190 | 110 | 12 | 47 | 4.6 U | 1,400 | 20 |
| 2,4-DDE | 0.92 NJ | 4.2 U | 38 NJ | 120 NJ | 10 NJ | 25 NJ | 88 NJ | 16 NJ | 4.1 U | 11 NJ | 6.7 NJ | 96 | 6 NJ | 4.8 NJ | 17 NJ | 4.6 U | 83 NJ | 4.4 NJ |
| 2,4-DDT | 4.1 U | 4.2 U | 68 | 440 NJ | 11 NJ | 2.2 NJ | 140 NJ | 8.6 U | 4.1 U | 4.3 U | 42 | 120 | 3.1 NJ | 4.1 NJ | 28 | 4.6 U | 360 | 4.1 U |
| 4,4-DDD | 26 | 14 | 1,500 | 9,700 | 1,300 | 220 | 6,800 | 710 | 4.1 U | 600 | 220 | 1,000 | 430 | 38 | 170 | 3.8 J | 7,100 | 93 |
| 4,4-DDE | 1.3 J | 4.2 U | 120 | 560 | 35 | 310 | 680 | 59 | 4.1 U | 33 | 20 | 110 | 19 | 8.1 NJ | 29 | 4.6 U | 320 | 4.1 U |
| 4,4-DDT | 7 | 4.8 | 1,400 | 12,000 | 120 | 40 | 4,800 | 81 | 4.1 U | 21 | 780 | 1,900 | 140 | 45 | 150 | 2.9 J | 8,800 | 43 |
| **Total DDT** | **42.12** | **23.1** | **3,466** | **25,320** | **1,806** | **688.2** | **14,208** | **1,076** | **4.1 U** | **825** | **1,099** | **3,416** | **708.1** | **112** | **441** | **6.7** | **18,063** | **160.4** |
| Dieldrin | 0.97 NJ | 4.2 U | 53 NJ | 320 | 36 | 44 NJ | 220 | 39 | 4.1 U | 21 | 19 | 51 | 12 | 6.1 J | 9 NJ | 4.6 U | 200 | 3.3 J |
| Aldrin | 2.1 U | 2.2 U | 6.9 NJ | 23 NJ | 4.4 | 5.2 | 8.9 NJ | 4.4 U | 2.1 U | 2.2 U | 1.4 NJ | 21 J | 2.2 J | 4.4 U | 3.9 U | 2.4 U | 31 J | 0.44 NJ |
| alpha-BHC | 2.1 U | 2.2 U | 7.4 U | 62 U | 4.4 U | 2.2 U | 14 U | 4.4 U | 2.1 U | 2.2 U | 4.3 U | 23 U | 2.8 U | 4.4 U | 3.9 U | 2.4 U | 54 U | 2.1 U |
| alpha-Chlordane | 2.1 U | 2.2 U | 4.7 NJ | 23 NJ | 1.9 J | 3.6 | 16 | 2.4 NJ | 2.1 U | 1.5 J | 4.3 U | 5.5 J | 0.69 NJ | 0.87 NJ | 2.8 NJ | 0.48 NJ | 54 U | 0.59 NJ |
| beta-BHC | 2.1 U | 2.2 U | 14 | 26 NJ | 4.4 U | 1.4 NJ | 9.8 J | 4.4 U | 2.1 U | 2.2 U | 1.5 NJ | 23 U | 2.8 U | 1.8 NJ | 3.9 U | 2.4 U | 54 U | 2.1 U |
| Chlordane (technical) | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| delta-BHC | 2.1 U | 2.2 U | 7.4 U | 62 U | 4.4 U | 2.2 U | 14 U | 4.4 U | 2.1 U | 2.2 U | 4.3 U | 23 U | 2.8 U | 4.4 U | 3.9 U | 2.4 U | 54 U | 2.1 U |
| Endosulfan I | 2.1 U | 2.2 U | 2.3 NJ | 12 NJ | 4.4 U | 2.6 NJ | 3 NJ | 4.4 U | 2.1 U | 2.2 U | 4.3 U | 23 U | 2.8 U | 4.4 U | 3.9 U | 2.4 U | 54 U | 2.1 U |
| Endosulfan II | 4.1 U | 4.2 U | 14 U | 120 U | 8.5 U | 4.2 U | 27 U | 8.6 U | 4.1 U | 4.3 U | 8.3 U | 45 U | 5.5 U | 8.5 U | 7.5 U | 4.6 U | 110 U | 4.1 U |
| Endosulfan sulfate | 4.1 U | 4.2 U | 14 U | 120 U | 8.5 U | 4.2 U | 27 U | 8.6 U | 4.1 U | 4.3 U | 8.3 U | 45 U | 5.5 U | 8.5 U | 7.5 U | 4.6 U | 110 U | 4.1 U |
| Endrin | 4.1 U | 4.2 U | 5.7 NJ | 120 U | 10 | 6.2 NJ | 6.6 NJ | 5 NJ | 4.1 U | 3.1 NJ | 8.3 U | 45 U | 3.4 J | 8.5 U | 7.5 U | 4.6 U | 49 J | 1 J |
| Endrin aldehyde | 4.1 U | 4.2 U | 14 U | 120 U | 8.5 U | 4.2 U | 27 U | 8.6 U | 4.1 U | 4.3 U | 8.3 U | 45 U | 5.5 U | 8.5 U | 7.5 U | 4.6 U | 110 U | 4.1 U |
| Endrin ketone | 4.1 U | 4.2 U | 14 U | 120 U | 8.5 U | 4.2 U | 27 U | 8.6 U | 4.1 U | 4.3 U | 8.3 U | 45 U | 5.5 U | 5.3 NJ | 2.7 NJ | 4.6 U | 110 U | 4.1 U |
| Gamma-BHC (Lindane) | 2.1 U | 2.2 U | 7.4 U | 62 U | 4.4 U | 2.2 U | 14 U | 4.4 U | 2.1 U | 2.2 U | 4.3 U | 23 U | 2.8 U | 4.4 U | 3.9 U | 2.4 U | 54 U | 2.1 U |
| gamma-Chlordane | 2.1 U | 0.45 NJ | 9.4 NJ | 49 NJ | 7.3 NJ | 16 NJ | 40 NJ | 7.3 NJ | 2.1 U | 3.9 NJ | 1.9 NJ | 11 NJ | 1.7 NJ | 1.1 NJ | 2.8 NJ | 2.4 U | 18 NJ | 0.9 NJ |
| Heptachlor | 2.1 U | 2.2 U | 7.4 U | 62 U | 4.4 U | 2.2 U | 14 U | 4.4 U | 2.1 U | 2.2 U | 4.3 U | 23 U | 2.8 U | 4.4 U | 3.9 U | 2.4 U | 54 U | 2.1 U |
| Heptachlor epoxide | 2.1 U | 2.2 U | 16 NJ | 76 NJ | 1.3 NJ | 2.2 U | 18 NJ | 4.4 U | 2.1 U | 0.61 NJ | 6.6 NJ | 23 U | 2.8 U | 1.4 NJ | 10 NJ | 2.4 U | 54 U | 2.1 U |
| Methoxychlor | 21 U | 22 U | 74 U | 620 U | 44 U | 22 U | 140 U | 44 U | 21 U | 22 U | 43 U | 230 U | 28 U | 420 NJ | 39 U | 24 U | 540 U | 21 U |
| Total Organic Carbon | --- | 0.1 J | 1.2 | --- | --- | --- | 2.5 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Toxaphene | 210 U | 220 U | 740 U | 6,200 U | 440 U | 220 U | 1,400 U | 440 U | 210 U | 220 U | 430 U | 2,300 U | 280 U | 440 U | 390 U | 240 U | 5,400 U | 210 U |

Notes:

OBM: Old bay mud
YBM: Young bay mud
ug/kg: micrograms per kilogram (ppb)
FD: Field dupllicate
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

TABLE 1

Marine Sediment Results

*United Heckathorn Superfund Site*

| Location ID | E9+50 | Embankment Transect 100 | Embankment Transect 100 | Embankment Transect 100 | Embankment Transect 300 | Embankment Transect 300 | Embankment Transect 300 | Embankment Transect 300 | Embankment Transect 300 | Embankment Transect 300 | Embankment Transect 500 | Embankment Transect 500 | Embankment Transect 500 | Embankment Transect 500 | Embankment Transect 500 | Embankment Transect 500 | F11+00 | F11+00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | E0950c0807 | T1001a0807 | T1002a0807 | T1003a0807 | T3001a0807 | T3001b0807 | T3002a0807 | T3002b0807 | T3003a0807 | T3003b0807 | T5001a0807 | T5001b0807 | T5002a0807 | T5002b0807 | T5003a0807 | T5003b0807 | F1100a0807 | F1100b0807 |
| Sediment Type | OBM | Shell hash | Shell hash | Shell hash | Shell hash | Shell hash | Shell hash | Shell hash | Shell hash | Shell hash | Shell hash | Shell hash | Shell hash | Shell hash | Shell hash | Shell hash | OBM | OBM |
| Sample Date | 8/14/2007 | 8/16/2007 | 8/16/2007 | 8/16/2007 | 8/16/2007 | 8/16/2007 | 8/16/2007 | 8/16/2007 | 8/16/2007 | 8/16/2007 | 8/16/2007 | 8/16/2007 | 8/16/2007 | 8/16/2007 | 8/16/2007 | 8/16/2007 | 8/13/2007 | 8/13/2007 |
| Lab | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY |
| **Analyte** | **All Analytical Results in dry weight ug/kg** | | | | | | | | | | | | | | | | | |
| **Pesticides** | | | | | | | | | | | | | | | | | | |
| 2,4-DDD | 4.3 U | 23 NJ | 16 NJ | 8.1 | 30 NJ | 39 NJ | 22 | 41 | 99 | 2 J | 400 | 130 | 320 | 270 | 16 | 180 NJ | 19 | 23 |
| 2,4-DDE | 4.3 U | 12 NJ | 6.3 NJ | 6.4 NJ | 19 NJ | 22 NJ | 14 NJ | 18 J | 35 | 1.1 NJ | 65 NJ | 80 J | 65 NJ | 57 NJ | 13 NJ | 73 | 1.9 NJ | 2.6 NJ |
| 2,4-DDT | 4.3 U | 4.1 NJ | 1.8 NJ | 5.7 U | 4.3 NJ | 1.8 NJ | 6.6 | 4.7 U | 4.3 NJ | 5 U | 12 U | 45 | 4.9 NJ | 7.2 NJ | 4.5 U | 70 NJ | 4 U | 2.6 J |
| 4,4-DDD | 4.3 U | 69 | 50 | 22 | 100 | 210 | 130 | 190 | 490 | 7.1 | 1,300 | 760 J | 1,100 | 1,000 | 53 | 630 | 79 | 110 |
| 4,4-DDE | 4.3 U | 21 | 13 | 8.5 NJ | 37 | 38 | 23 | 51 NJ | 57 | 1.5 J | 220 | 110 NJ | 340 | 250 | 18 | 270 | 3 J | 6.9 |
| 4,4-DDT | 4.3 U | 67 | 12 | 14 NJ | 85 | 170 | 36 | 23 | 17 | 15 | 91 J | 3,400 J | 260 | 80 | 7.9 NJ | 450 | 4.6 NJ | 130 |
| **Total DDT** | **4.3 U** | **196.1** | **99.1** | **59** | **275.3** | **480.8** | **231.6** | **323** | **702.3** | **26.7** | **2,076** | **4,525** | **2,090** | **1,664** | **107.9** | **1,673** | **107.5** | **275.1** |
| Dieldrin | 4.3 U | 8.9 NJ | 4.8 NJ | 6.3 NJ | 24 | 24 | 8.7 NJ | 15 NJ | 25 | 5 U | 55 | 26 NJ | 97 | 49 NJ | 4.1 NJ | 56 NJ | 6.1 | 5.9 |
| Aldrin | 2.2 U | 0.63 NJ | 0.72 J | 2.9 U | 4.6 U | 2.5 U | 2.4 U | 2.4 U | 3.4 U | 2.6 U | 3.1 NJ | 2.1 NJ | 2.5 NJ | 2.5 NJ | 2.3 U | 1.5 NJ | 2.1 U | 2.1 U |
| alpha-BHC | 2.2 U | 2.9 U | 2.3 U | 2.9 U | 4.6 U | 2.5 UJ | 2.4 U | 2.4 U | 3.4 U | 2.6 U | 6 U | 9.2 U | 1.9 NJ | 3.2 NJ | 2.3 U | 2.7 U | 2.1 U | 2.1 U |
| alpha-Chlordane | 0.53 NJ | 5.7 | 2.7 | 1.6 NJ | 4.3 NJ | 1.8 NJ | 1.8 NJ | 2.2 J | 2.7 NJ | 1.1 NJ | 8.7 J | 11 NJ | 6 | 7.4 NJ | 1.4 NJ | 7.6 NJ | 2.1 U | 2.1 U |
| beta-BHC | 2.2 U | 3.8 NJ | 2.3 U | 2.9 U | 1.7 NJ | 1.3 NJ | 2.4 U | 2.2 NJ | 3.4 U | 2.6 U | 13 NJ | 9.2 U | 5.2 U | 2.7 NJ | 0.82 NJ | 2.7 U | 2.1 U | 2.1 U |
| Chlordane (technical) | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| delta-BHC | 2.2 U | 2.9 U | 2.3 U | 2.9 U | 4.6 U | 2.5 U | 2.4 U | 0.54 NJ | 3.4 U | 2.6 U | 1.2 NJ | 9.2 U | 1.3 NJ | 3.3 U | 2.3 U | 2.7 U | 2.1 U | 2.1 U |
| Endosulfan I | 2.2 U | 2.9 U | 2.3 U | 1 NJ | 4.6 U | 2.5 U | 2.4 U | 2.4 U | 3.4 U | 2.6 U | 6 U | 9.2 U | 5.2 U | 3.3 U | 2.3 U | 1.3 NJ | 2.1 U | 2.1 U |
| Endosulfan II | 4.3 U | 1.2 NJ | 1.2 NJ | 5.7 U | 8.9 U | 4.9 U | 4.7 U | 4.7 U | 6.6 U | 5 U | 12 U | 18 U | 10 U | 1.3 NJ | 4.5 U | 6.8 NJ | 4 U | 4.1 U |
| Endosulfan sulfate | 4.3 U | 5.7 U | 4.5 U | 1.4 NJ | 8.9 U | 1.1 NJ | 4.7 U | 1.2 NJ | 6.6 U | 5 U | 12 U | 18 U | 10 U | 6.5 U | 4.5 U | 5.2 U | 4 U | 4.1 U |
| Endrin | 4.3 U | 5.7 U | 4.5 U | 1.3 NJ | 8.9 U | 4.9 U | 4.7 U | 1 NJ | 2.1 NJ | 5 U | 12 U | 18 U | 4.3 NJ | 4.2 NJ | 4.5 U | 12 | 4 U | 4.1 U |
| Endrin aldehyde | 4.3 U | 5.7 U | 4.5 U | 5.7 U | 8.9 U | 4.9 U | 4.7 U | 4.7 U | 6.6 U | 5 U | 3 NJ | 18 U | 10 U | 3.2 J | 4.5 U | 6.8 NJ | 4 U | 4.1 U |
| Endrin ketone | 4.3 U | 4 NJ | 3.2 NJ | 7.7 NJ | 5.5 NJ | 4.6 NJ | 1.1 NJ | 1.7 NJ | 1.5 J | 5 U | 11 J | 18 U | 4.7 NJ | 17 NJ | 4.5 U | 8.2 NJ | 4 U | 4.1 U |
| Gamma-BHC (Lindane) | 2.2 U | 2.9 U | 2.3 U | 2.9 U | 4.6 U | 2.5 U | 2.4 U | 2.4 U | 3.4 U | 2.6 U | 9 NJ | 9.2 U | 5.2 U | 1.2 NJ | 2.3 U | 2.7 U | 2.1 U | 2.1 U |
| gamma-Chlordane | 2.2 U | 4.7 | 3.2 NJ | 2.6 NJ | 1.3 NJ | 1.9 NJ | 0.83 NJ | 1.8 NJ | 4.8 NJ | 2.6 U | 11 NJ | 4.7 NJ | 11 NJ | 11 NJ | 1 NJ | 9.3 NJ | 2.1 NJ | 0.98 NJ |
| Heptachlor | 2.2 U | 1.1 NJ | 2.3 U | 2.9 U | 4.6 U | 2.5 U | 2.4 U | 2.4 U | 3.4 U | 2.6 U | 6 U | 9.2 U | 5.2 U | 3.3 U | 2.3 U | 2.7 U | 2.1 U | 2.1 U |
| Heptachlor epoxide | 2.2 U | 5.4 NJ | 2.9 NJ | 3.9 | 6.5 NJ | 3.8 NJ | 2.3 NJ | 4.2 NJ | 4.2 NJ | 2.6 U | 16 NJ | 13 NJ | 8 NJ | 9.7 NJ | 6 NJ | 18 NJ | 2.1 U | 2.1 U |
| Methoxychlor | 22 U | 14 NJ | 4.9 NJ | 29 U | 46 U | 25 U | 24 U | 24 U | 34 U | 26 U | 60 U | 92 U | 52 U | 18 J | 23 U | 25 NJ | 21 U | 21 U |
| Total Organic Carbon | --- | --- | --- | 3 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 0.09 J | --- |
| Toxaphene | 220 U | 290 U | 230 U | 290 U | 460 U | 250 U | 240 U | 240 U | 340 U | 260 U | 600 U | 920 U | 520 U | 330 U | 230 U | 270 U | 210 U | 210 U |

Notes:

OBM: Old bay mud
YBM: Young bay mud
ug/kg: micrograms per kilogram (ppb)
FD: Field dupllicate
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

TABLE 1
Marine Sediment Results
*United Heckathorn Superfund Site*

| Location ID | F5+25 | F5+25 | F7+00 | F7+00 | F7+00 | F7+00 | F8+00 | F8+00 | G3+00 | G3+00 | G3+00 | G3+00 | PC-1 | PC-1 | PC-1 | PC-2 | PC-2 | PC-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | F0525a0807 | F0525c0807 | F0700a0807 | F0700b0807 | F0700c0807 | F9300a0807 | F0800a0807 | F0800c0807 | G0300a0807 | G0300b0807 | G0300c0807 | G9700a0807 | PC01a0807 | PC01b0807 | PC01c0807 | PC02a0807 | PC02b0807 | PC02c0807 |
| Sediment Type | YBM | OBM | Sand | OBM | OBM | Sand | YBM | Interface | YBM | Sand | OBM | YBM | Sand | Sand | Sand | Sand | Interface | OBM |
| Sample Date | 8/15/2007 | 8/15/2007 | 8/15/2007 | 8/15/2007 | 8/15/2007 | 8/15/2007 | 8/15/2007 | 8/15/2007 | 8/17/2007 | 8/17/2007 | 8/17/2007 | 8/17/2007 | 8/17/2007 | 8/17/2007 | 8/17/2007 | 8/17/2007 | 8/17/2007 | 8/17/2007 |
| Lab | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY |
| **Analyte** | **All Analytical Results in dry weight ug/kg** | | | | | | | | | | | | | | | | | |
| **Pesticides** | | | | | | | | | | | | | | | | | | |
| 2,4-DDD | 2.2 J | 4.3 U | 6 | 4.4 U | 4.3 U | 9.3 | 130 | 230 | 35 | 79 | 1.2 J | 42 | 7 NJ | 4.2 U | 150 NJ | 23 NJ | 150 NJ | 800 |
| 2,4-DDE | 4.7 U | 4.3 U | 2.1 J | 4.4 U | 4.3 U | 3.4 J | 11 NJ | 25 NJ | 4.1 NJ | 13 NJ | 4.3 U | 8.2 NJ | 9.3 NJ | 4.2 U | 9.7 U | 13 | 12 U | 11 U |
| 2,4-DDT | 4.7 U | 4.3 U | 4.9 U | 4.4 U | 4.3 U | 5 U | 7.9 NJ | 26 NJ | 19 | 53 NJ | 4.3 U | 5.2 NJ | 5.4 U | 4.2 U | 19 NJ | 2.6 NJ | 27 NJ | 11 U |
| 4,4-DDD | 9.2 | 1.5 J | 26 | 1.1 J | 2.9 J | 35 | 640 | 1,400 | 120 | 370 | 5 | 250 | 28 | 3 NJ | 1,000 NJ | 97 | 790 | 2,500 |
| 4,4-DDE | 1.1 J | 4.3 U | 2.2 J | 4.4 U | 4.3 U | 2.8 J | 40 | 71 | 26 | 51 | 4.3 U | 24 | 19 | 4.2 U | 120 NJ | 22 NJ | 120 | 520 |
| 4,4-DDT | 11 | 2.7 J | 4.8 J | 4.4 U | 4.3 U | 3.6 J | 400 | 300 | 140 | 320 | 4.3 U | 280 | 16 NJ | 4.2 U | 220 NJ | 12 NJ | 52 NJ | 550 |
| **Total DDT** | **23.5** | **4.2** | **41.1** | **1.1** | **2.9** | **54.1** | **1,229** | **2,052** | **344.1** | **886** | **6.2** | **609.4** | **79.3** | **3** | **1,509** | **169.6** | **1,139** | **4,370** |
| Dieldrin | 4.7 U | 4.3 U | 1.3 J | 4.4 U | 4.3 U | 2.4 J | 34 | 61 | 9.6 NJ | 18 | 4.3 U | 7.7 | 6.8 NJ | 4.2 U | 58 NJ | 10 NJ | 81 NJ | 72 NJ |
| Aldrin | 2.4 U | 2.2 U | 2.5 U | 2.3 U | 2.2 U | 2.6 U | 2 J | 2.8 J | 1.1 NJ | 0.99 NJ | 2.2 U | 0.87 NJ | 2.8 U | 2.2 U | 5 U | 1.2 NJ | 6.4 U | 3.9 NJ |
| alpha-BHC | 2.4 U | 2.2 U | 2.5 U | 2.3 U | 2.2 U | 2.6 U | 4.9 U | 13 U | 3.3 U | 3.4 U | 2.2 U | 3.4 U | 2.8 U | 2.2 U | 5 U | 3.3 U | 6.4 U | 1.7 NJ |
| alpha-Chlordane | 2.4 U | 2.2 U | 2.5 U | 2.3 U | 2.2 U | 2.6 U | 1.4 J | 13 U | 3.3 U | 0.85 J | 2.2 U | 0.8 NJ | 7.7 | 0.88 NJ | 25 NJ | 9 | 36 | 14 |
| beta-BHC | 2.4 U | 2.2 U | 2.5 U | 2.3 U | 2.2 U | 1.3 NJ | 1.5 J | 13 U | 1.9 NJ | 1 NJ | 2.2 U | 1.1 NJ | 4.1 NJ | 0.86 NJ | 5 U | 1.8 NJ | 4 NJ | 6.2 NJ |
| Chlordane (technical) | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| delta-BHC | 2.4 U | 2.2 U | 2.5 U | 2.3 U | 2.2 U | 2.6 U | 4.9 U | 13 U | 3.3 U | 3.4 U | 2.2 U | 3.4 U | 2.8 U | 2.2 U | 1.2 NJ | 3.3 U | 6.4 U | 1.2 NJ |
| Endosulfan I | 2.4 U | 2.2 U | 2.5 U | 2.3 U | 2.2 U | 2.6 U | 4.9 U | 13 U | 3.3 U | 3.4 U | 2.2 U | 3.4 U | 2.8 U | 2.2 U | 20 | 3.3 U | 6.4 U | 5.8 U |
| Endosulfan II | 4.7 U | 4.3 U | 4.9 U | 4.4 U | 4.3 U | 5 U | 9.6 U | 24 U | 6.3 U | 6.6 U | 4.3 U | 6.6 U | 5.4 U | 4.2 U | 26 NJ | 2.6 NJ | 12 U | 8.1 NJ |
| Endosulfan sulfate | 4.7 U | 4.3 U | 4.9 U | 4.4 U | 4.3 U | 5 U | 9.6 U | 24 U | 6.3 U | 6.6 U | 4.3 U | 6.6 U | 5.4 U | 4.2 U | 63 NJ | 3.7 NJ | 22 NJ | 14 NJ |
| Endrin | 4.7 U | 4.3 U | 4.9 U | 4.4 U | 4.3 U | 5 U | 4.2 J | 8 J | 1.5 NJ | 1.7 NJ | 4.3 U | 6.6 U | 5.4 U | 4.2 U | 50 J | 2 NJ | 18 NJ | 12 NJ |
| Endrin aldehyde | 4.7 U | 4.3 U | 4.9 U | 4.4 U | 4.3 U | 5 U | 9.6 U | 24 U | 6.3 U | 6.6 U | 4.3 U | 6.6 U | 5.4 U | 4.2 U | 8.1 NJ | 4.4 NJ | 42 | 6 NJ |
| Endrin ketone | 4.7 U | 4.3 U | 4.9 U | 4.4 U | 4.3 U | 5 U | 9.6 U | 24 U | 6.3 U | 5.3 NJ | 4.3 U | 2.3 NJ | 1.3 NJ | 0.97 NJ | 50 J | 4.3 NJ | 12 U | 11 U |
| Gamma-BHC (Lindane) | 2.4 U | 2.2 U | 2.5 U | 2.3 U | 2.2 U | 2.6 U | 4.9 U | 13 U | 3.3 U | 3.4 U | 2.2 U | 3.4 U | 2.8 U | 2.2 U | 5 U | 3.3 U | 6.4 U | 5.8 U |
| gamma-Chlordane | 2.4 UJ | 2.2 U | 2.5 UJ | 2.3 U | 2.2 U | 0.54 NJ | 2.4 NJ | 5 NJ | 1.2 NJ | 2.5 NJ | 2.2 U | 1.5 NJ | 14 NJ | 0.63 NJ | 26 NJ | 6.7 NJ | 44 NJ | 17 NJ |
| Heptachlor | 2.4 U | 2.2 U | 2.5 U | 2.3 U | 2.2 U | 2.6 U | 4.9 U | 13 U | 3.3 U | 3.4 U | 2.2 U | 3.4 U | 2.8 U | 2.2 U | 2.1 NJ | 3.3 U | 6.4 U | 5.8 U |
| Heptachlor epoxide | 2.4 U | 2.2 U | 1.3 NJ | 2.3 U | 2.2 U | 2.1 NJ | 4.9 U | 13 U | 2 NJ | 3.9 NJ | 2.2 U | 3.4 U | 5.6 | 2.2 U | 210 NJ | 7.8 | 46 | 43 NJ |
| Methoxychlor | 24 U | 22 U | 25 U | 23 U | 22 U | 26 U | 49 U | 130 U | 33 U | 34 U | 22 U | 34 U | 6.8 NJ | 22 U | 100 NJ | 7.9 NJ | 110 NJ | 98 NJ |
| Total Organic Carbon | --- | 0.09 J | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 3.7 | --- | 7.8 | 4.2 | --- | --- |
| Toxaphene | 240 U | 220 U | 250 U | 230 U | 220 U | 260 U | 490 U | 1,300 U | 330 U | 340 U | 220 U | 340 U | 280 U | 220 U | 500 U | 330 U | 640 U | 580 U |

Notes:

OBM: Old bay mud
YBM: Young bay mud
ug/kg: micrograms per kilogram (ppb)
FD: Field dupllicate
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

TABLE 1
Marine Sediment Results
*United Heckathorn Superfund Site*

| Location ID | PC-2 | PC-3 | PC-3 | PC-3 | PCW | SF-29 | SF-29 | SF-29 | SF-31 | SF-31 | SF-31 | SF-32 | SF-32 | SF-32 | SF-34 | SF-34 | SF-34 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | PC98a0807 | PC03a0807 | PC03b0807 | PC03c0807 | MPCW0807 | SF29a0807 | SF29b0807 | SF29c0807 | SF31a0807 | SF31b0807 | SF31c0807 | SF32a0807 | SF32b0807 | SF32c0807 | SF34a0807 | SF34b0807 | SF34c0807 |
| Sediment Type | Sand | Sand | Sand | YBM | YBM | YBM | Interface | OBM | YBM | Interface | OBM | YBM | Interface | OBM | YBM | OBM | OBM |
| Sample Date | 8/17/2007 | 8/17/2007 | 8/17/2007 | 8/17/2007 | 8/16/2007 | 8/15/2007 | 8/15/2007 | 8/15/2007 | 8/17/2007 | 8/17/2007 | 8/17/2007 | 8/15/2007 | 8/15/2007 | 8/15/2007 | 8/15/2007 | 8/15/2007 | 8/15/2007 |
| Lab | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY |
| **Analyte** | **All Analytical Results in dry weight ug/kg** | | | | | | | | | | | | | | | | |
| **Pesticides** | | | | | | | | | | | | | | | | | |
| 2,4-DDD | 24 | 2.7 NJ | 3.2 J | 310 | 19 | 11 NJ | 15 | 4.3 U | 7.9 NJ | 28 | 4.3 U | 11 | 4.9 NJ | 4.5 U | 6.6 J | 11 NJ | 4.2 U |
| 2,4-DDE | 16 NJ | 1.4 NJ | 1 NJ | 45 NJ | 6.5 U | 1.9 NJ | 2.8 NJ | 4.3 U | 18 UJ | 7.2 NJ | 4.3 U | 4 NJ | 2.6 NJ | 1.8 J | 4.5 NJ | 5.7 NJ | 0.88 NJ |
| 2,4-DDT | 6.4 NJ | 4.2 U | 4.2 U | 60 NJ | 3.8 NJ | 3.8 NJ | 6 U | 4.3 U | 9 J | 5.1 NJ | 4.3 U | 7.2 U | 5 U | 4.5 U | 8.7 U | 1.6 NJ | 4.2 U |
| 4,4-DDD | 120 | 9.9 | 5.4 | 1,600 | 55 | 49 | 63 | 4.3 U | 55 | 110 | 1.8 J | 38 | 21 | 13 | 21 | 42 | 4.2 U |
| 4,4-DDE | 35 NJ | 2.7 NJ | 4.2 U | 110 | 20 NJ | 7.9 J | 9 | 4.3 U | 11 NJ | 22 | 4.3 U | 8.7 | 4.9 J | 2.4 J | 9.9 NJ | 23 | 4.2 U |
| 4,4-DDT | 72 | 8.7 | 22 | 910 | 30 NJ | 60 | 140 | 4.3 U | 830 | 30 | 4.3 U | 17 | 2.5 NJ | 23 | 14 NJ | 31 | 1.7 J |
| **Total DDT** | **273.4** | **25.4** | **31.6** | **3,035** | **127.8** | **133.6** | **229.8** | **4.3 U** | **912.9** | **202.3** | **1.8** | **78.7** | **35.9** | **40.2** | **56** | **114.3** | **2.58** |
| Dieldrin | 18 NJ | 0.93 NJ | 4.2 U | 46 NJ | 14 NJ | 4 NJ | 3.5 J | 4.3 U | 18 U | 8.4 NJ | 4.3 U | 4.3 NJ | 2.7 J | 4.5 U | 5.4 NJ | 4.3 NJ | 4.2 U |
| Aldrin | 1.3 NJ | 2.2 U | 2.2 U | 11 U | 3.3 U | 4.1 U | 3.1 U | 2.2 U | 9.4 U | 1 NJ | 2.2 U | 3.7 U | 2.6 U | 2.3 U | 4.5 U | 2.7 U | 2.2 U |
| alpha-BHC | 3.3 U | 2.2 U | 2.2 U | 11 U | 3.3 U | 4.1 U | 3.1 U | 2.2 U | 9.4 U | 3.8 U | 2.2 U | 3.7 U | 2.6 U | 2.3 U | 4.5 U | 2.7 U | 2.2 U |
| alpha-Chlordane | 13 | 0.71 NJ | 2.2 U | 4.7 J | 2 NJ | 4.1 U | 3.1 U | 2.2 U | 9.4 U | 0.97 NJ | 2.2 U | 3.7 U | 2.6 U | 2.3 U | 0.98 NJ | 0.64 NJ | 2.2 U |
| beta-BHC | 2.9 NJ | 0.87 NJ | 2.2 U | 11 U | 1 NJ | 5.5 | 1 NJ | 2.2 U | 2.9 NJ | 2.6 NJ | 2.2 U | 1.8 NJ | 2.6 U | 2.3 U | 3.1 NJ | 1.7 NJ | 2.2 U |
| Chlordane (technical) | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| delta-BHC | 3.3 U | 2.2 U | 2.2 U | 11 U | 3.3 U | 4.1 U | 3.1 U | 2.2 U | 9.4 U | 3.8 U | 2.2 U | 3.7 U | 2.6 U | 2.3 U | 4.5 U | 2.7 U | 2.2 U |
| Endosulfan I | 3.3 U | 0.43 NJ | 2.2 U | 11 U | 1.6 NJ | 4.1 U | 3.1 U | 2.2 U | 9.4 U | 3.8 U | 2.2 U | 3.7 U | 2.6 U | 2.3 U | 4.5 U | 2.7 U | 2.2 U |
| Endosulfan II | 6.5 U | 4.2 U | 4.2 U | 22 U | 3.6 NJ | 8 U | 6 U | 4.3 U | 18 U | 7.3 U | 4.3 U | 7.2 U | 5 U | 4.5 U | 8.7 U | 5.2 U | 4.2 U |
| Endosulfan sulfate | 5.8 NJ | 4.2 U | 4.2 U | 9.3 NJ | 6.5 U | 8 U | 6 U | 4.3 U | 18 U | 7.3 U | 4.3 U | 7.2 U | 5 U | 4.5 U | 8.7 U | 5.2 U | 4.2 U |
| Endrin | 3.5 NJ | 4.2 U | 4.2 U | 22 U | 4.5 NJ | 8 U | 6 U | 4.3 U | 18 U | 7.3 U | 4.3 U | 7.2 U | 5 U | 4.5 U | 8.7 U | 1.3 J | 4.2 U |
| Endrin aldehyde | 6.5 U | 4.2 U | 4.2 U | 22 U | 1.9 NJ | 8 U | 6 U | 4.3 U | 18 U | 7.3 U | 4.3 U | 7.2 U | 5 U | 4.5 U | 8.7 U | 5.2 U | 4.2 U |
| Endrin ketone | 13 NJ | 4.2 U | 4.2 U | 22 U | 1.7 NJ | 2.2 NJ | 1.9 NJ | 4.3 U | 18 U | 7.3 U | 4.3 U | 7.2 U | 1.5 NJ | 4.5 U | 8.7 U | 1.8 NJ | 4.1 NJ |
| Gamma-BHC (Lindane) | 3.3 U | 2.2 U | 2.2 U | 11 U | 3.3 U | 4.1 U | 3.1 U | 2.2 U | 9.4 U | 3.8 U | 2.2 U | 3.7 U | 2.6 U | 2.3 U | 4.5 U | 2.7 U | 2.2 U |
| gamma-Chlordane | 11 NJ | 2.2 U | 0.5 J | 5.2 NJ | 8.1 NJ | 2.1 NJ | 3.7 | 2.2 U | 9.4 U | 4.5 NJ | 2.2 U | 1.2 NJ | 0.51 NJ | 0.46 NJ | 2.1 NJ | 3.9 NJ | 2.2 U |
| Heptachlor | 3.3 U | 2.2 U | 2.2 U | 11 U | 3.3 U | 4.1 U | 3.1 U | 2.2 U | 9.4 U | 3.8 U | 2.2 U | 3.7 U | 2.6 U | 2.3 U | 4.5 U | 2.7 U | 2.2 U |
| Heptachlor epoxide | 9.6 NJ | 0.85 NJ | 1.4 J | 16 NJ | 8.8 NJ | 4.1 U | 3.1 U | 2.2 U | 9.4 U | 3.8 U | 2.2 U | 1.2 NJ | 2.6 U | 2.3 U | 4 NJ | 2 NJ | 2.2 U |
| Methoxychlor | 130 NJ | 44 NJ | 6.5 NJ | 110 U | 17 J | 68 NJ | 31 U | 22 U | 94 U | 38 U | 22 U | 37 U | 26 U | 23 U | 45 U | 27 U | 22 U |
| Total Organic Carbon | --- | 0.12 J | --- | 1.6 | 1.2 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Toxaphene | 330 U | 220 U | 220 U | 1,100 U | 330 U | 420 U | 310 U | 220 U | 940 U | 380 U | 220 U | 370 U | 260 U | 230 U | 450 U | 270 U | 220 U |

Notes:

OBM: Old bay mud
YBM: Young bay mud
ug/kg: micrograms per kilogram (ppb)
FD: Field dupllicate
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

TABLE 1
Marine Sediment Results
*United Heckathorn Superfund Site*

| Location ID | B16+00 | B16+00 | B16+00 | B16+00 | C4+00 | C4+00 | C4+00 | C18+00 | C18+00 | C18+00 | C218+00 | C218+00 | C218+00 | CB6+50 | CB6+50 | CB6+50 | CB9+50 | CB9+50 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | B1600A | B1600B | B1600C | B1600D | C0400A | C0400B | C0400C | C1800a0807 | C1800b0807 | C1800c0807 | C2 1800a0807 | C2 1800b0807 | C2 1800c0807 | CB0650A | CB0650B | CB0650C | CB950A | CB950B |
| Sediment Type | YBM | sand | Interface | OBM | Surface | Interface | OBM | YBM | YBM | Sand | YBM | YBM | YBM | YBM | Interface | OBM | YBM | YBM |
| Sample Date | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/15/2007 | 8/15/2007 | 8/15/2007 | 8/13/2007 | 8/13/2007 | 8/13/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/15/2007 | 8/15/2007 | 8/15/2007 | 8/14/2007 | 8/14/2007 |
| Lab | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 |
| **Analyte** | **All Analytical Results in dry weight ug/kg** | | | | | | | | | | | | | | | | | |
| **Polychlorinated Byphenals** | | | | | | | | | | | | | | | | | | |
| Aroclor 1016 | 40 U | 22 U | 22 U | 22 U | 46 U | 25 U | 23 U | --- | --- | --- | --- | --- | --- | 47 U | 25 U | 22 U | 39 U | 37 U |
| Aroclor 1221 | 79 U | 43 U | 42 U | 42 U | 89 U | 49 U | 45 U | --- | --- | --- | --- | --- | --- | 92 U | 49 U | 43 U | 75 U | 72 U |
| Aroclor 1232 | 40 U | 22 U | 22 U | 22 U | 46 U | 25 U | 23 U | --- | --- | --- | --- | --- | --- | 47 U | 25 U | 22 U | 39 U | 37 U |
| Aroclor 1242 | 40 U | 22 U | 22 U | 22 U | 46 U | 25 U | 23 U | --- | --- | --- | --- | --- | --- | 47 U | 25 U | 22 U | 39 U | 37 U |
| Aroclor 1248 | 40 U | 22 U | 22 U | 22 U | 46 U | 25 U | 23 U | --- | --- | --- | --- | --- | --- | 47 U | 25 U | 22 U | 39 U | 37 U |
| Aroclor 1254 | 40 U | 22 U | 22 U | 22 U | 46 U | 25 U | 23 U | --- | --- | --- | --- | --- | --- | 47 U | 25 U | 22 U | 39 U | 37 U |
| Aroclor 1260 | 40 U | 22 U | 22 U | 22 U | 46 U | 25 U | 23 U | --- | --- | --- | --- | --- | --- | 47 U | 25 U | 22 U | 39 U | 37 U |
| Aroclor 1262 | 40 U | 22 U | 22 U | 22 U | 46 U | 25 U | 23 U | --- | --- | --- | --- | --- | --- | 47 U | 25 U | 22 U | 39 U | 37 U |
| **Polyaromatic Hydrocarbons** | | | | | | | | | | | | | | | | | | |
| 2-Methylnaphthalene | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 330 J | 850 UJ | 1,200 U | 200 U | 760 J | --- | --- | --- | --- | --- |
| Acenaphthalene | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| Acenaphthene | --- | --- | --- | --- | --- | --- | --- | 840 J | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 320 J | --- | --- | --- | --- | --- |
| Anthracene | --- | --- | --- | --- | --- | --- | --- | 1,100 J | 1,000 UJ | 850 UJ | 240 J | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| benzo(a) anthracene | --- | --- | --- | --- | --- | --- | --- | 1,200 J | 1,000 UJ | 850 UJ | 720 J | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| benzo(a) pyrene | --- | --- | --- | --- | --- | --- | --- | 1,800 | 1,000 UJ | 850 UJ | 1,400 | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| benzo(b) fluoranthene | --- | --- | --- | --- | --- | --- | --- | 3,000 | 1,000 UJ | 850 UJ | 2,000 | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| benzo(g,h,i) perylene | --- | --- | --- | --- | --- | --- | --- | 710 J | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| benzo(k) fluoranthene | --- | --- | --- | --- | --- | --- | --- | 3,000 | 1,000 UJ | 850 UJ | 1,500 | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| chrysene | --- | --- | --- | --- | --- | --- | --- | 2,100 | 1,000 UJ | 850 UJ | 1,000 J | 200 U | 230 J | --- | --- | --- | --- | --- |
| dibenzo(a,h) anthracene | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 180 J | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| indeno(1,2,3-cd) pyrene | --- | --- | --- | --- | --- | --- | --- | 940 J | 1,000 UJ | 850 UJ | 520 J | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| Phenanthrene | --- | --- | --- | --- | --- | --- | --- | 1,100 J | 1,100 J | 360 J | 440 J | 200 U | 1,600 J | --- | --- | --- | --- | --- |
| Pyrene | --- | --- | --- | --- | --- | --- | --- | 9,000 | 320 J | 850 UJ | 3,800 | 200 U | 560 J | --- | --- | --- | --- | --- |
| **Semi-Volatile Organic Compounds** | | | | | | | | | | | | | | | | | | |
| 1,1'-Biphenyl | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| 1,2,4,5-Tetrachlorobenzene | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| 2,2'-Oxybis(1-chloropropane) | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| 2,3,4,6-Tetrachlorophenol | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| 2,4,5-Trichlorophenol | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| 2,4,6-Trichlorophenol | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| 2,4-Dichlorophenol | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| 2,4-Dimethylphenol | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| 2,4-Dinitrophenol | --- | --- | --- | --- | --- | --- | --- | 2,600 U | 1,900 UJ | 1,700 UJ | 2,300 U | 390 U | 2,200 UJ | --- | --- | --- | --- | --- |
| 2,4-Dinitrotoluene | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| 2,6-Dinitrotoluene | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| 2-Chloronaphthalene | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| 2-Chlorophenol | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| 2-Methylphenol | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| 2-Nitroaniline | --- | --- | --- | --- | --- | --- | --- | 2,600 U | 1,900 UJ | 1,700 UJ | 2,300 U | 390 U | 2,200 UJ | --- | --- | --- | --- | --- |
| 2-Nitrophenol | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| 3,3'-Dichlorobenzidine | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |

TABLE 1
Marine Sediment Results
*United Heckathorn Superfund Site*

| Location ID | B16+00 | B16+00 | B16+00 | B16+00 | C4+00 | C4+00 | C4+00 | C18+00 | C18+00 | C18+00 | C218+00 | C218+00 | C218+00 | CB6+50 | CB6+50 | CB6+50 | CB9+50 | CB9+50 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | B1600A | B1600B | B1600C | B1600D | C0400A | C0400B | C0400C | C1800a0807 | C1800b0807 | C1800c0807 | C2 1800a0807 | C2 1800b0807 | C2 1800c0807 | CB0650A | CB0650B | CB0650C | CB950A | CB950B |
| Sediment Type | YBM | sand | Interface | OBM | Surface | Interface | OBM | YBM | YBM | Sand | YBM | YBM | YBM | YBM | Interface | OBM | YBM | YBM |
| Sample Date | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/15/2007 | 8/15/2007 | 8/15/2007 | 8/13/2007 | 8/13/2007 | 8/13/2007 | 8/14/2007 | 8/14/2007 | 8/14/2007 | 8/15/2007 | 8/15/2007 | 8/15/2007 | 8/14/2007 | 8/14/2007 |
| Lab | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | LIBRTY | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 |
| **Analyte** | **All Analytical Results in dry weight ug/kg** | | | | | | | | | | | | | | | | | |
| **Semi-Volatile Organic Compounds** | | | | | | | | | | | | | | | | | | |
| 3-Nitroaniline | --- | --- | --- | --- | --- | --- | --- | 2,600 U | 1,900 UJ | 1,700 UJ | 2,300 U | 390 U | 2,200 UJ | --- | --- | --- | --- | --- |
| 4,6-Dinitro-2-methylphenol | --- | --- | --- | --- | --- | --- | --- | 2,600 U | 1,900 UJ | 1,700 UJ | 2,300 U | 390 U | 2,200 UJ | --- | --- | --- | --- | --- |
| 4-Bromophenyl phenyl ether | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| 4-Chloro-3-methylphenol | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| 4-Chloroaniline | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| 4-Chlorophenyl phenyl ether | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| 4-Methylphenol | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| 4-Nitroaniline | --- | --- | --- | --- | --- | --- | --- | 2,600 U | 1,900 UJ | 1,700 UJ | 2,300 U | 390 U | 2,200 UJ | --- | --- | --- | --- | --- |
| 4-Nitrophenol | --- | --- | --- | --- | --- | --- | --- | 2,600 U | 1,900 UJ | 1,700 UJ | 2,300 U | 390 U | 2,200 UJ | --- | --- | --- | --- | --- |
| Acetophenone | --- | --- | --- | --- | --- | --- | --- | 1,500 | 1,600 J | 1,700 J | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| Atrazine | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| Benzaldehyde | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| Bis(2-chloroethoxy)methane | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| Bis(2-chloroethyl)ether | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| bis(2-ethylhexyl)phthalate | --- | --- | --- | --- | --- | --- | --- | 2,500 | 1,000 UJ | 850 UJ | 4,600 | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| Butyl benzyl phthalate | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 600 J | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| Caprolactam | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| Carbazole | --- | --- | --- | --- | --- | --- | --- | 580 J | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| Dibenzofuran | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 190 J | --- | --- | --- | --- | --- |
| Diethyl phthalate | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| Dimethyl phthalate | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,800 | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| Di-n-butyl phthalate | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 200 J | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| Di-n-octyl phthalate | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 64 J | 1,100 UJ | --- | --- | --- | --- | --- |
| Fluoranthene | --- | --- | --- | --- | --- | --- | --- | 3,200 | 360 J | 170 J | 1,000 J | 200 U | 650 J | --- | --- | --- | --- | --- |
| Fluorene | --- | --- | --- | --- | --- | --- | --- | 470 J | 260 J | 850 UJ | 1,200 U | 200 U | 430 J | --- | --- | --- | --- | --- |
| Hexachlorobenzene | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| Hexachlorobutadiene | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| Hexachlorocyclopentadiene | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| Hexachloroethane | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| Isophorone | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| naphthalene | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 340 J | 850 UJ | 1,200 U | 200 U | 500 J | --- | --- | --- | --- | --- |
| Nitrobenzene | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| N-Nitroso-di-n-propylamine | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| N-Nitrosodiphenylamine | --- | --- | --- | --- | --- | --- | --- | 1,300 U | 1,000 UJ | 850 UJ | 1,200 U | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |
| Pentachlorophenol | --- | --- | --- | --- | --- | --- | --- | 2,600 U | 1,900 UJ | 1,700 UJ | 2,300 U | 390 U | 2,200 UJ | --- | --- | --- | --- | --- |
| Phenol | --- | --- | --- | --- | --- | --- | --- | 410 J | 470 J | 390 J | 630 J | 200 U | 1,100 UJ | --- | --- | --- | --- | --- |

TABLE 1
Marine Sediment Results
*United Heckathorn Superfund Site*

| | |
|---|---|
| **Location ID** | **CB9+50** |
| **Sample ID** | **CB950C** |
| **Sediment Type** | **OBM** |
| **Sample Date** | **8/14/2007** |
| **Lab** | **EPAR9** |
| **Analyte** | **All Analytical Results in dry weight ug/kg** |
| **Polychlorinated Byphenals** | |
| Aroclor 1016 | 27 U |
| Aroclor 1221 | 53 U |
| Aroclor 1232 | 27 U |
| Aroclor 1242 | 27 U |
| Aroclor 1248 | 27 U |
| Aroclor 1254 | 27 U |
| Aroclor 1260 | 27 U |
| Aroclor 1262 | 27 U |
| **Polyaromatic Hydrocarbons** | |
| 2-Methylnaphthalene | --- |
| Acenaphthalene | --- |
| Acenaphthene | --- |
| Anthracene | --- |
| benzo(a) anthracene | --- |
| benzo(a) pyrene | --- |
| benzo(b) fluoranthene | --- |
| benzo(g,h,i) perylene | --- |
| benzo(k) fluoranthene | --- |
| chrysene | --- |
| dibenzo(a,h) anthracene | --- |
| indeno(1,2,3-cd) pyrene | --- |
| Phenanthrene | --- |
| Pyrene | --- |
| **Semi-Volatile Organic Compounds** | |
| 1,1'-Biphenyl | --- |
| 1,2,4,5-Tetrachlorobenzene | --- |
| 2,2'-Oxybis(1-chloropropane) | --- |
| 2,3,4,6-Tetrachlorophenol | --- |
| 2,4,5-Trichlorophenol | --- |
| 2,4,6-Trichlorophenol | --- |
| 2,4-Dichlorophenol | --- |
| 2,4-Dimethylphenol | --- |
| 2,4-Dinitrophenol | --- |
| 2,4-Dinitrotoluene | --- |
| 2,6-Dinitrotoluene | --- |
| 2-Chloronaphthalene | --- |
| 2-Chlorophenol | --- |
| 2-Methylphenol | --- |
| 2-Nitroaniline | --- |
| 2-Nitrophenol | --- |
| 3,3'-Dichlorobenzidine | --- |

TABLE 1

Marine Sediment Results

*United Heckathorn Superfund Site*

Notes:

OBM: Old bay mud
YBM: Young bay mud
ug/kg: micrograms per kilogram (ppb)
FD: Field dupllicate
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit

TABLE 2
Storm Drain Sediment Results
*United Heckathorn Superfund Site*

| Location ID | A-4 | SSWL03 | SSWL03 | SSWP02 | B-1 | B-3 | LC-05 | LC-06 | PC-01 | PC-01 (FD) | SSWL01 | SSWL02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | A-4_09152008 | SSWL03 | SSWL03_09152008 | SSWP02 | B-1_09152008 | B-3_09152008 | LC-05-0609 | LC-06-0609 | PC-01-0609 | PC-99-0609 | SSWL01 | SSWL02 |
| Sediment Type | | | | | | | | | | | | |
| Sample Date | 9/15/2008 | 7/15/2008 | 9/15/2008 | 7/15/2008 | 9/15/2008 | 9/15/2008 | 6/26/2009 | 6/26/2009 | 6/26/2009 | 6/26/2009 | 7/15/2008 | 7/15/2008 |
| Lab | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 |
| **Analyte** | **All Analytical Results in dry weight ug/kg** | | | | | | | | | | | |
| **Pesticides** | | | | | | | | | | | | |
| 2,4-DDD | 310 | 6,100 | 9,500 | 23 U | 13 U | 170 | 52 J | 2.2 UJ | 4 UJ | 3.5 U | 20 U | 21 U |
| 2,4-DDE | 25 U | 25 U | 21 U | 23 U | 13 U | 25 U | 3.4 UJ | 4.1 J | 4 UJ | 3.5 UJ | 20 U | 21 U |
| 2,4-DDT | 25 U | 1,100 | 1,000 | 23 U | 13 U | 25 U | 3.5 J | 2.2 UJ | 4 UJ | 3.5 U | 20 U | 21 U |
| 4,4-DDD | 1,300 | 21,000 | 29,000 | 23 U | 13 U | 580 | 130 | 2.2 UJ | 5.4 J | 5.9 J | 20 U | 21 U |
| 4,4-DDE | 470 | 4,300 | 7,000 | 23 U | 13 U | 210 | 70 J | 2.2 UJ | 4.3 J | 4.6 J | 20 U | 21 U |
| 4,4-DDT | 120 | 6,000 | 5,600 | 23 U | 17 J | 110 | 18 J | 4.2 J | 14 J | 11 J | 20 U | 21 U |
| **Total DDT** | **2,200** | **38,500** | **52,100** | **ND** | **17** | **1,070** | **273.5** | **8.3** | **23.7** | **21.5** | **ND** | **ND** |
| Dieldrin | 70 | 680 | 640 | 23 U | 13 U | 150 | 26 J | 2.2 UJ | 4 UJ | 3.5 U | 20 U | 21 U |
| Aldrin | 13 U | 24 J | 67 | 11 U | 6.3 U | 12 U | 6.2 J | 1.1 UJ | 2 UJ | 1.7 U | 9.9 U | 11 U |
| alpha-BHC | 13 U | 12 U | 10 U | 11 U | 6.3 U | 12 U | 1.7 U | 1.1 UJ | 2 UJ | 1.7 U | 9.9 U | 11 U |
| alpha-Chlordane | 16 J | 2,900 | 3,900 | 11 U | 6.3 U | 12 U | 7 J | 1.1 UJ | 2 UJ | 1.7 U | 9.9 U | 11 U |
| beta-BHC | 13 U | 12 U | 10 U | 11 U | 6.3 U | 12 U | 1.7 UJ | 3.1 J | 2 UJ | 1.7 U | 9.9 U | 11 U |
| Chlordane (technical) | 1,300 U | 1,200 U | 1,000 U | 1,100 U | 630 U | 1,200 U | 170 U | 110 UJ | 200 UJ | 170 U | 990 U | 1,100 U |
| delta-BHC | 13 U | 12 U | 10 U | 11 U | 6.3 U | 100 | 1.7 U | 1.1 UJ | 2 UJ | 1.7 U | 9.9 U | 11 U |
| Endosulfan I | 13 U | 61 | 35 | 11 U | 6.3 U | 12 U | 1.7 UJ | 1.1 UJ | 2 UJ | 1.7 U | 9.9 U | 11 U |
| Endosulfan II | 25 U | 200 | 190 | 23 U | 13 U | 100 | 3.4 U | 2.2 UJ | 4 UJ | 3.5 U | 20 U | 21 U |
| Endosulfan sulfate | 25 J | 25 U | 21 U | 23 U | 13 U | 25 U | 3.4 UJ | 3.7 J | 4 UJ | 3.5 U | 20 U | 21 U |
| Endrin | 25 U | 610 | 360 | 23 U | 13 U | 25 U | 8.8 J | 2.2 UJ | 4 UJ | 3.5 U | 20 U | 21 U |
| Endrin aldehyde | 25 U | 25 U | 21 U | 23 U | 13 U | 25 U | 3.4 UJ | 2.2 UJ | 4 UJ | 3.5 UJ | 20 U | 21 U |
| Endrin ketone | 25 U | 330 | 180 | 23 U | 13 U | 25 U | 3.4 UJ | 5.4 J | 4 UJ | 3.5 U | 20 U | 21 U |
| Gamma-BHC (Lindane) | 26 | 12 U | 10 U | 11 U | 6.3 U | 20 J | 1.7 U | 1.1 UJ | 2 UJ | 1.7 U | 9.9 U | 11 U |
| gamma-Chlordane | 25 J | 3,200 | 4,500 | 11 U | 6.3 U | 28 | 1.7 UJ | 1.1 UJ | 2 UJ | 1.7 UJ | 9.9 U | 11 U |
| Heptachlor | 13 U | 23 J | 15 J | 11 U | 6.3 U | 12 U | 1.7 U | 1.1 UJ | 2 UJ | 1.7 U | 9.9 U | 11 U |
| Heptachlor epoxide | 13 U | 12 U | 10 U | 11 U | 6.3 U | 12 U | 1.7 UJ | 1.1 UJ | 2 UJ | 1.7 UJ | 9.9 U | 11 U |
| Methoxychlor | 130 U | 120 U | 100 U | 110 U | 63 U | 120 U | 17 U | 11 UJ | 20 UJ | 17 U | 99 U | 110 U |
| Total Organic Carbon | 7.2 J | 3.4 J | 5.2 J | 3.7 J | 2.3 J | 15 J | --- | --- | --- | --- | 1.7 J | 2.3 J |
| Toxaphene | 1,300 U | 1,200 U | 1,000 U | 1,100 U | 630 U | 1,200 U | 170 U | 110 UJ | 200 UJ | 170 U | 990 U | 1,100 U |
| **Polyaromatic Hydrocarbons** | | | | | | | | | | | | |
| 2-Methylnaphthalene | --- | --- | --- | --- | --- | --- | 46 J | 1,600 J | 40 U | 35 U | --- | --- |
| Acenaphthalene | --- | --- | --- | --- | --- | --- | 34 UJ | 220 U | 40 U | 35 U | --- | --- |
| Acenaphthene | --- | --- | --- | --- | --- | --- | 34 UJ | 220 U | 40 U | 35 U | --- | --- |
| Anthracene | --- | --- | --- | --- | --- | --- | 39 J | 960 | 40 U | 35 U | --- | --- |
| benzo(a) anthracene | --- | --- | --- | --- | --- | --- | 200 J | 6,400 J | 64 J | 47 J | --- | --- |
| benzo(a) pyrene | --- | --- | --- | --- | --- | --- | 170 J | 5,500 J | 57 J | 46 J | --- | --- |
| benzo(b) fluoranthene | --- | --- | --- | --- | --- | --- | 200 J | 3,300 J | 81 | 59 J | --- | --- |
| benzo(g,h,i) perylene | --- | --- | --- | --- | --- | --- | 100 J | 3,100 J | 40 UJ | 35 UJ | --- | --- |
| benzo(k) fluoranthene | --- | --- | --- | --- | --- | --- | 68 J | 750 J | 40 U | 35 U | --- | --- |
| chrysene | --- | --- | --- | --- | --- | --- | 310 J | 9,600 J | 110 | 80 | --- | --- |
| indeno(1,2,3-cd) pyrene | --- | --- | --- | --- | --- | --- | 77 J | 1,200 J | 40 U | 35 U | --- | --- |
| Phenanthrene | --- | --- | --- | --- | --- | --- | 180 J | 2,900 J | 86 | 70 | --- | --- |
| Pyrene | --- | --- | --- | --- | --- | --- | 330 J | 5,500 J | 140 | 98 | --- | --- |

TABLE 2
Storm Drain Sediment Results
*United Heckathorn Superfund Site*

| Location ID | A-4 | SSWL03 | SSWL03 | SSWP02 | B-1 | B-3 | LC-05 | LC-06 | PC-01 | PC-01 (FD) | SSWL01 | SSWL02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | A-4_09152008 | SSWL03 | SSWL03_09152008 | SSWP02 | B-1_09152008 | B-3_09152008 | LC-05-0609 | LC-06-0609 | PC-01-0609 | PC-99-0609 | SSWL01 | SSWL02 |
| Sediment Type | | | | | | | | | | | | |
| Sample Date | 9/15/2008 | 7/15/2008 | 9/15/2008 | 7/15/2008 | 9/15/2008 | 9/15/2008 | 6/26/2009 | 6/26/2009 | 6/26/2009 | 6/26/2009 | 7/15/2008 | 7/15/2008 |
| Lab | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 |
| **Analyte** | **All Analytical Results in dry weight ug/kg** | | | | | | | | | | | |
| **Semi-Volatile Organic Compounds** | | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | --- | --- | --- | --- | --- | --- | 34 UJ | 220 U | 40 U | 35 U | --- | --- |
| 1,2-Dichlorobenzene | --- | --- | --- | --- | --- | --- | 34 UJ | 220 UJ | 40 U | 35 U | --- | --- |
| 1,3-Dichlorobenzene | --- | --- | --- | --- | --- | --- | 34 UJ | 220 UJ | 40 UJ | 35 UJ | --- | --- |
| 1,4-Dichlorobenzene | --- | --- | --- | --- | --- | --- | 34 UJ | 220 UJ | 40 U | 35 U | --- | --- |
| 1,4-Dioxane | --- | --- | --- | --- | --- | --- | 34 UJ | 220 U | 40 UJ | 35 U | --- | --- |
| 2,4,5-Trichlorophenol | --- | --- | --- | --- | --- | --- | 160 UJ | 1,000 U | 190 U | 160 U | --- | --- |
| 2,4,6-Trichlorophenol | --- | --- | --- | --- | --- | --- | 160 UJ | 1,000 U | 190 U | 160 U | --- | --- |
| 2,4-Dichlorophenol | --- | --- | --- | --- | --- | --- | 160 UJ | 1,000 U | 190 U | 160 U | --- | --- |
| 2,4-Dimethylphenol | --- | --- | --- | --- | --- | --- | 160 UJ | 1,000 UJ | 190 UJ | 160 UJ | --- | --- |
| 2,4-Dinitrophenol | --- | --- | --- | --- | --- | --- | 160 UJ | 1,000 UJ | 190 UJ | 160 UJ | --- | --- |
| 2,4-Dinitrotoluene | --- | --- | --- | --- | --- | --- | 34 UJ | 220 UJ | 40 U | 35 U | --- | --- |
| 2,6-Dinitrotoluene | --- | --- | --- | --- | --- | --- | 34 UJ | 220 U | 40 U | 35 U | --- | --- |
| 2-Chloronaphthalene | --- | --- | --- | --- | --- | --- | 34 UJ | 220 U | 40 U | 35 U | --- | --- |
| 2-Chlorophenol | --- | --- | --- | --- | --- | --- | 160 UJ | 1,000 U | 190 U | 160 U | --- | --- |
| 2-Methylphenol | --- | --- | --- | --- | --- | --- | 160 UJ | 1,000 UJ | 190 UJ | 160 UJ | --- | --- |
| 2-Nitroaniline | --- | --- | --- | --- | --- | --- | 160 UJ | 1,000 U | 190 U | 160 U | --- | --- |
| 2-Nitrophenol | --- | --- | --- | --- | --- | --- | 160 UJ | 1,000 UJ | 190 U | 160 U | --- | --- |
| 3&4-Methylphenol | --- | --- | --- | --- | --- | --- | 160 UJ | 1,000 U | 190 U | 160 U | --- | --- |
| 3,3'-Dichlorobenzidine | --- | --- | --- | --- | --- | --- | 34 UJ | 220 UJ | 40 UJ | 35 UJ | --- | --- |
| 3-Nitroaniline | --- | --- | --- | --- | --- | --- | 160 UJ | 1,000 UJ | 190 UJ | 160 UJ | --- | --- |
| 4,6-Dinitro-2-methylphenol | --- | --- | --- | --- | --- | --- | 160 UJ | 1,000 UJ | 190 U | 160 U | --- | --- |
| 4-Bromophenyl phenyl ether | --- | --- | --- | --- | --- | --- | 34 UJ | 220 U | 40 U | 35 U | --- | --- |
| 4-Chloro-3-methylphenol | --- | --- | --- | --- | --- | --- | 160 UJ | 1,000 U | 190 U | 160 U | --- | --- |
| 4-Chloroaniline | --- | --- | --- | --- | --- | --- | 160 UJ | 1,000 UJ | 190 UJ | 160 UJ | --- | --- |
| 4-Chlorophenyl phenyl ether | --- | --- | --- | --- | --- | --- | 34 UJ | 220 U | 40 U | 35 U | --- | --- |
| 4-Nitroaniline | --- | --- | --- | --- | --- | --- | 160 UJ | 1,000 UJ | 190 U | 160 U | --- | --- |
| 4-Nitrophenol | --- | --- | --- | --- | --- | --- | 160 UJ | 1,000 UJ | 190 U | 160 U | --- | --- |
| Benzyl alcohol | --- | --- | --- | --- | --- | --- | 160 UJ | 1,000 UJ | 190 UJ | 160 UJ | --- | --- |
| Bis(2-chloroethoxy)methane | --- | --- | --- | --- | --- | --- | 34 UJ | 220 U | 40 U | 35 U | --- | --- |
| Bis(2-chloroethyl)ether | --- | --- | --- | --- | --- | --- | 34 UJ | 220 U | 40 U | 35 U | --- | --- |
| bis(2-ethylhexyl)phthalate | --- | --- | --- | --- | --- | --- | 1,300 J | 5,700 J | 610 | 610 | --- | --- |
| Butyl benzyl phthalate | --- | --- | --- | --- | --- | --- | 220 J | 990 J | 44 J | 41 J | --- | --- |
| Carbazole | --- | --- | --- | --- | --- | --- | 35 J | 530 J | 40 UJ | 35 UJ | --- | --- |
| Dibenzofuran | --- | --- | --- | --- | --- | --- | 34 UJ | 220 J | 40 U | 35 U | --- | --- |
| Diethyl phthalate | --- | --- | --- | --- | --- | --- | 34 UJ | 220 U | 40 U | 35 U | --- | --- |
| Dimethyl phthalate | --- | --- | --- | --- | --- | --- | 150 J | 670 J | 40 U | 35 U | --- | --- |
| Di-n-butyl phthalate | --- | --- | --- | --- | --- | --- | 91 J | 560 J | 210 | 170 | --- | --- |
| Di-n-octyl phthalate | --- | --- | --- | --- | --- | --- | 45 J | 220 UJ | 40 U | 35 U | --- | --- |
| Diphenyl amine | --- | --- | --- | --- | --- | --- | 34 UJ | 220 UJ | 40 UJ | 35 UJ | --- | --- |
| Fluoranthene | --- | --- | --- | --- | --- | --- | 270 J | 1,800 J | 150 | 110 | --- | --- |
| Fluorene | --- | --- | --- | --- | --- | --- | 34 UJ | 260 J | 40 U | 35 U | --- | --- |

TABLE 2

Storm Drain Sediment Results

*United Heckathorn Superfund Site*

| Location ID | A-4 | SSWL03 | SSWL03 | SSWP02 | B-1 | B-3 | LC-05 | LC-06 | PC-01 | PC-01 (FD) | SSWL01 | SSWL02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | A-4_09152008 | SSWL03 | SSWL03_09152008 | SSWP02 | B-1_09152008 | B-3_09152008 | LC-05-0609 | LC-06-0609 | PC-01-0609 | PC-99-0609 | SSWL01 | SSWL02 |
| Sediment Type | | | | | | | | | | | | |
| Sample Date | 9/15/2008 | 7/15/2008 | 9/15/2008 | 7/15/2008 | 9/15/2008 | 9/15/2008 | 6/26/2009 | 6/26/2009 | 6/26/2009 | 6/26/2009 | 7/15/2008 | 7/15/2008 |
| Lab | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 | EPAR9 |
| **Analyte** | **All Analytical Results in dry weight ug/kg** | | | | | | | | | | | |
| **Semi-Volatile Organic Compounds** | | | | | | | | | | | | |
| Hexachlorobenzene | --- | --- | --- | --- | --- | --- | 34 UJ | 220 U | 40 U | 35 U | --- | --- |
| Hexachlorobutadiene | --- | --- | --- | --- | --- | --- | 34 UJ | 220 U | 40 U | 35 U | --- | --- |
| Hexachlorocyclopentadiene | --- | --- | --- | --- | --- | --- | 160 UJ | 1,000 UJ | 190 UJ | 160 UJ | --- | --- |
| Hexachloroethane | --- | --- | --- | --- | --- | --- | 34 UJ | 220 UJ | 40 UJ | 35 UJ | --- | --- |
| Isophorone | --- | --- | --- | --- | --- | --- | 34 UJ | 220 U | 40 U | 35 U | --- | --- |
| naphthalene | --- | --- | --- | --- | --- | --- | 41 J | 790 J | 40 U | 35 U | --- | --- |
| Nitrobenzene | --- | --- | --- | --- | --- | --- | 34 UJ | 220 U | 40 U | 35 U | --- | --- |
| N-Nitrosodipropylamine | --- | --- | --- | --- | --- | --- | 34 UJ | 220 UJ | 40 UJ | 35 UJ | --- | --- |
| Pentachlorophenol | --- | --- | --- | --- | --- | --- | 160 UJ | 1,000 UJ | 190 U | 160 U | --- | --- |
| Phenol | --- | --- | --- | --- | --- | --- | 160 UJ | 1,000 U | 410 | 270 J | --- | --- |

Notes:

OBM: Old bay mud
YBM: Young bay mud
ug/kg: micrograms per kilogram (ppb)
FD: Field dupllicate
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

TABLE 3
Surface Water Results
*United Heckathorn Superfund Site*

| Location ID | | 303_1 | 303_1 | 303_1 | 303_1 | 303_2 | 303_2 | 303_2 | 303_2 | 303_2 | 303_2 | 303_3 | 303_3 | 303_3 | 303_3 | 303_4 | 303_4 | 303_4 | 303_4 (FD) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date | | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/7/2007 | 8/7/2007 | 8/7/2007 | 8/7/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 |
| Sample Type | | Deep | Deep filtered | Shallow | Shallow filtered | Deep | Deep filtered | Mid | Mid filtered | Shallow | Shallow filtered | Deep | Deep filtered | Shallow | Shallow filtered | Deep | Deep filtered | Mid | Mid |
| Lab | | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL |
| **Analyte** | **Units** | **Analytical Results** | | | | | | | | | | | | | | | | | |
| **Pesticides** | | | | | | | | | | | | | | | | | | | |
| 2,4-DDD | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0048 | 0.0005 U | 0.0037 | 0.0006 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0009 |
| 2,4-DDE | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0077 NJ | 0.0005 UJ | 0.0005 U | 0.0005 UJ | 0.0005 UJ | 0.0005 U | 0.0027 NJ | 0.0037 NJ | 0.0005 U |
| 2,4-DDT | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0034 J | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0016 NJ |
| 4,4-DDD | ug/L | 0.0005 UJ | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0025 NJ | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.034 | 0.0054 | 0.012 | 0.0016 NJ | 0.0032 NJ | 0.0005 U | 0.0005 UJ | 0.0005 UJ |
| 4,4-DDE | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0007 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0035 | 0.0005 U | 0.0012 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 NJ |
| 4,4-DDT | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0074 NJ | 0.0005 U | 0.014 J | 0.0005 U | 0.0041 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| **Total DDT** | ug/L | **0.0005 U** | **0.0005 U** | **0.0005 U** | **0.0005 U** | **0.0005 U** | **0.0005 U** | **0.0032** | **0.0005 U** | **0.0074** | **0.0077** | **0.0597** | **0.0054** | **0.021** | **0.0022** | **0.0032** | **0.0027** | **0.0037** | **0.0035** |
| Dieldrin | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0025 | 0.011 | 0.0005 U | 0.0067 NJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Aldrin | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 UJ | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.001 NJ | 0.0005 U |
| alpha-BHC | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0017 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 UJ | 0.0005 UJ | 0.002 J | 0.0018 NJ | 0.0057 NJ | 0.0028 NJ |
| alpha-Chlordane | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0007 NJ | 0.0005 U | 0.0005 U | 0.0011 NJ |
| beta-BHC | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 UJ | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| delta-BHC | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 UJ | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0014 NJ |
| Endosulfan I | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0007 NJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Endosulfan II | ug/L | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 UJ | 0.0005 UJ | 0.0005 UJ | 0.0005 UJ | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Endosulfan sulfate | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Endrin | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0006 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Endrin aldehyde | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Endrin ketone | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | --- | --- | --- | --- | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Gamma-BHC (Lindane) | ug/L | 0.0005 U | 0.0021 NJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 UJ | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| gamma-Chlordane | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0017 NJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Heptachlor | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0037 NJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 UJ | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Heptachlor epoxide | ug/L | 0.0038 UJ | 0.0063 UJ | 0.0061 UJ | 0.018 UJ | 0.03 UJ | 0.0062 UJ | 0.045 UJ | 0.026 UJ | 0.0037 UJ | 0.0031 UJ | 0.0005 UJ | 0.0005 U | 0.0005 UJ | 0.0005 UJ | 0.02 UJ | 0.0035 UJ | 0.0026 UJ | 0.0093 UJ |
| Methoxychlor | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Toxaphene | ug/L | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U |
| **General Chemistry** | | | | | | | | | | | | | | | | | | | |
| Suspended solids | mg/L | 76 | --- | 100 | --- | 140 | --- | 80 | --- | 74 | --- | --- | --- | --- | --- | 88 | --- | --- | 74 |

Notes:

FD: Field dupllicate
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

TABLE 3
Surface Water Results
*United Heckathorn Superfund Site*

| Location ID | | 303_4 | 303_4 (FD) | 303_4 | 303_4 | 303_6 | 303_6 | 303_6 | 303_6 (FD) | 303_6 | 303_6 (FD) | L01 | L01 | L01 | L01 | L01 | L01 | L02 | L02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date | | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/7/2007 | 8/7/2007 |
| Sample Type | | Mid filtered | Mid filtered | Shallow | Shallow filtered | Deep | Deep filtered | Shallow | Shallow | Shallow filtered | Shallow filtered | Deep | Deep filtered | Mid | Mid filtered | Shallow | Shallow filtered | Deep | Deep filtered |
| Lab | | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL |
| **Analyte** | **Units** | **Analytical Results** | | | | | | | | | | | | | | | | | |
| **Pesticides** | | | | | | | | | | | | | | | | | | | |
| 2,4-DDD | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.002 | 0.0005 U | 0.0025 | 0.0021 NJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.003 U | 0.0005 U | 0.0033 | 0.0005 U |
| 2,4-DDE | ug/L | 0.0024 NJ | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.004 | 0.0005 U | 0.0005 U | 0.0005 U | 0.011 | 0.0005 U | 0.0005 U | 0.0005 U |
| 2,4-DDT | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0037 | 0.0005 U | 0.0036 NJ | 0.0032 NJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.003 U | 0.0005 U | 0.0025 NJ | 0.0005 U |
| 4,4-DDD | ug/L | 0.0005 UJ | 0.0005 UJ | 0.0005 UJ | 0.0005 UJ | 0.0039 NJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0042 NJ | 0.0005 U | 0.0005 U | 0.0043 | 0.0064 J | 0.0005 U | 0.0091 J | 0.0005 U |
| 4,4-DDE | ug/L | 0.0005 U | 0.0005 U | 0.0007 | 0.0005 U | 0.0022 NJ | 0.0005 U | 0.0005 U | 0.0015 NJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.003 U | 0.0005 U | 0.0016 NJ | 0.0005 U |
| 4,4-DDT | ug/L | 0.0005 U | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.021 J | 0.0005 U | 0.016 | 0.012 | 0.0005 U | 0.0005 U | 0.0039 | 0.0005 U | 0.0005 U | 0.003 | 0.0034 | 0.0005 U | 0.0077 NJ | 0.0005 U |
| **Total DDT** | ug/L | **0.0024** | **0.0005 U** | **0.0007** | **0.0005 U** | **0.0328** | **0.0005 U** | **0.0221** | **0.0188** | **0.0005 U** | **0.0005 U** | **0.0121** | **0.0005 U** | **0.0005 U** | **0.0073** | **0.0208** | **0.0005 U** | **0.0242** | **0.0005 U** |
| Dieldrin | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.003 U | 0.0005 U | 0.0059 NJ | 0.0005 U |
| Aldrin | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0009 NJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.003 U | 0.0005 U | 0.0005 U | 0.0005 U |
| alpha-BHC | ug/L | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.003 U | 0.0005 U | 0.0005 U | 0.0005 U |
| alpha-Chlordane | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.003 U | 0.0005 U | 0.0005 U | 0.0005 U |
| beta-BHC | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.003 U | 0.0005 U | 0.0005 U | 0.0005 U |
| delta-BHC | ug/L | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.003 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Endosulfan I | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.003 U | 0.0005 U | 0.0005 UJ | 0.0005 U |
| Endosulfan II | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.003 U | 0.0005 U | 0.0005 UJ | 0.0005 U |
| Endosulfan sulfate | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.003 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Endrin | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.0005 UJ | 0.003 U | 0.0005 UJ | 0.0005 U | 0.0005 U |
| Endrin aldehyde | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0031 NJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.003 U | 0.0005 U | 0.0005 U | 0.007 |
| Endrin ketone | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Gamma-BHC (Lindane) | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0033 NJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.003 U | 0.0005 U | 0.0005 U | 0.0005 U |
| gamma-Chlordane | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.003 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Heptachlor | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.003 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Heptachlor epoxide | ug/L | 0.0043 UJ | 0.0049 UJ | 0.0078 UJ | 0.0075 UJ | 0.02 UJ | 0.017 UJ | 0.035 UJ | 0.046 UJ | 0.042 UJ | 0.03 UJ | 0.0005 U | 0.0005 U | 0.0078 UJ | 0.015 UJ | 0.003 U | 0.0033 UJ | 0.049 J | 0.043 NJ |
| Methoxychlor | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.003 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Toxaphene | ug/L | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U |
| **General Chemistry** | | | | | | | | | | | | | | | | | | | |
| Suspended solids | mg/L | --- | --- | 66 | --- | 160 | --- | 160 | 140 | --- | --- | 120 | --- | 170 | --- | 180 | --- | 94 | --- |

Notes:

FD: Field dupllicate
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

TABLE 3
Surface Water Results
*United Heckathorn Superfund Site*

| Location ID | | L02 | L02 | L02 | L02 | L03 | L03 (FD) | L03 | L03 (FD) | L03 | L03 | L04 | L04 | L04 | L04 | L05 | L05 | L05 | L05 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date | | 8/7/2007 | 8/7/2007 | 8/7/2007 | 8/7/2007 | 8/7/2007 | 8/7/2007 | 8/7/2007 | 8/7/2007 | 8/7/2007 | 8/7/2007 | 8/7/2007 | 8/7/2007 | 8/7/2007 | 8/7/2007 | 8/7/2007 | 8/7/2007 | 8/7/2007 | 8/7/2007 |
| Sample Type | | Mid | Mid filtered | Shallow | Shallow filtered | Deep | Deep | Deep filtered | Deep filtered | Shallow | Shallow filtered | Deep | Deep filtered | Shallow | Shallow filtered | Deep | Deep filtered | Mid | Mid filtered |
| Lab | | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL |
| **Analyte** | **Units** | **Analytical Results** | | | | | | | | | | | | | | | | | |
| **Pesticides** | | | | | | | | | | | | | | | | | | | |
| 2,4-DDD | ug/L | 0.005 J | 0.0005 U | 0.0031 | 0.0005 U | 0.014 | 0.03 | 0.0005 U | 0.0005 U | 0.0071 | 0.0005 U | 0.011 | 0.0015 | 0.016 NJ | 0.0005 U | 0.013 | 0.003 | 0.01 NJ | 0.0005 U |
| 2,4-DDE | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 UJ | 0.0025 U | 0.0005 U | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.001 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| 2,4-DDT | ug/L | 0.0005 U | 0.0005 U | 0.005 NJ | 0.0005 U | 0.001 U | 0.0025 UJ | 0.0005 U | 0.0005 UJ | 0.00059 NJ | 0.0005 U | 0.001 UJ | 0.0005 U | 0.0026 | 0.0005 U | 0.0005 U | 0.005 NJ | 0.0005 U | 0.0005 U |
| 4,4-DDD | ug/L | 0.0098 J | 0.0005 U | 0.01 | 0.0017 NJ | 0.054 | 0.14 | 0.0005 U | 0.0011 | 0.024 | 0.0022 | 0.047 | 0.0049 | 0.043 J | 0.0005 U | 0.049 J | 0.0096 J | 0.011 J | 0.0005 U |
| 4,4-DDE | ug/L | 0.0022 NJ | 0.0005 U | 0.0035 NJ | 0.0005 U | 0.0029 NJ | 0.0057 | 0.0005 U | 0.0005 | 0.00055 J | 0.0005 U | 0.0049 NJ | 0.0005 U | 0.0034 NJ | 0.0005 U | 0.0056 NJ | 0.0019 NJ | 0.0005 U | 0.0005 U |
| 4,4-DDT | ug/L | 0.028 J | 0.0005 U | 0.015 | 0.0029 NJ | 0.0023 | 0.0062 J | 0.0005 U | 0.0013 J | 0.004 J | 0.0005 U | 0.0043 J | 0.0005 U | 0.0085 NJ | 0.0005 U | 0.01 NJ | 0.014 NJ | 0.0042 NJ | 0.0005 U |
| **Total DDT** | ug/L | **0.045** | **0.0005 U** | **0.0366** | **0.0046** | **0.0732** | **0.1819** | **0.0005 U** | **0.0029** | **0.03624** | **0.0022** | **0.0672** | **0.0064** | **0.0735** | **0.0005 U** | **0.0776** | **0.0335** | **0.0252** | **0.0005 U** |
| Dieldrin | ug/L | 0.0092 NJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0063 | 0.015 | 0.0005 U | 0.0022 | 0.0084 NJ | 0.0005 U | 0.011 | 0.0005 U | 0.02 NJ | 0.0005 U | 0.011 NJ | 0.0005 U | 0.0069 NJ | 0.0005 U |
| Aldrin | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 UJ | 0.0025 U | 0.0005 U | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.001 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| alpha-BHC | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 UJ | 0.0025 U | 0.0005 U | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.001 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| alpha-Chlordane | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 U | 0.0025 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| beta-BHC | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 UJ | 0.0025 U | 0.0005 U | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.001 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| delta-BHC | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 UJ | 0.0025 U | 0.0005 U | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.001 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Endosulfan I | ug/L | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 UJ | 0.0025 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 U | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 UJ | 0.0005 UJ | 0.0005 UJ | 0.0005 U |
| Endosulfan II | ug/L | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 U | 0.0025 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 U | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 UJ | 0.0005 UJ | 0.0005 UJ | 0.0005 U |
| Endosulfan sulfate | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 U | 0.0025 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0018 NJ | 0.0005 U |
| Endrin | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 U | 0.0025 U | 0.0005 U | 0.0005 U | 0.00057 | 0.0005 U | 0.001 U | 0.0005 U | 0.0026 NJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Endrin aldehyde | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0015 | 0.001 U | 0.0025 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Endrin ketone | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 U | --- | 0.0005 U | --- | --- | --- | --- | --- | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Gamma-BHC (Lindane) | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 UJ | 0.0025 U | 0.0005 U | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.001 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| gamma-Chlordane | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 U | 0.0026 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Heptachlor | ug/L | 0.0053 NJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0014 NJ | 0.0025 U | 0.0005 U | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.001 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0027 NJ | 0.0024 NJ | 0.0082 NJ | 0.0005 U |
| Heptachlor epoxide | ug/L | 0.049 J | 0.016 | 0.0005 U | 0.012 J | 0.001 UJ | 0.0025 U | 0.0064 J | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.001 UJ | 0.0005 U | 0.0005 U | 0.018 | 0.049 | 0.022 | 0.016 NJ | 0.019 J |
| Methoxychlor | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 U | 0.0025 UJ | 0.0005 U | 0.0005 UJ | 0.0005 UJ | 0.0005 U | 0.001 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Toxaphene | ug/L | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.1 U | 0.25 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.1 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U |
| **General Chemistry** | | | | | | | | | | | | | | | | | | | |
| Suspended solids | mg/L | 89 | --- | 99 | --- | 96 | --- | --- | --- | --- | --- | --- | --- | 86 | --- | 120 | --- | 93 | --- |

Notes:

FD: Field dupllicate
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

TABLE 3
Surface Water Results
*United Heckathorn Superfund Site*

| Location ID | | L05 | L05 | L06 | L06 | L06 | L06 | L06 | L06 |
|---|---|---|---|---|---|---|---|---|---|
| Sample Date | | 8/7/2007 | 8/7/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 | 8/1/2007 |
| Sample Type | | Shallow | Shallow filtered | Deep | Deep filtered | Mid | Mid filtered | Shallow | Shallow filtered |
| Lab | | GPL | GPL | GPL | GPL | GPL | GPL | GPL | GPL |
| **Analyte** | **Units** | **Analytical Results** | | | | | | | |
| **Pesticides** | | | | | | | | | |
| 2,4-DDD | ug/L | 0.0046 NJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| 2,4-DDE | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| 2,4-DDT | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| 4,4-DDD | ug/L | 0.014 J | 0.0005 U | 0.0043 NJ | 0.0005 U | 0.007 | 0.0005 UJ | 0.0005 U | 0.0018 NJ |
| 4,4-DDE | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 | 0.0005 U | 0.0005 U | 0.0016 |
| 4,4-DDT | ug/L | 0.0034 J | 0.0005 U | 0.0036 NJ | 0.0005 U | 0.016 | 0.0005 U | 0.0005 U | 0.0019 |
| **Total DDT** | ug/L | **0.022** | **0.0005 U** | **0.0079** | **0.0005 U** | **0.024** | **0.0005 U** | **0.0005 U** | **0.0053** |
| Dieldrin | ug/L | 0.0091 NJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Aldrin | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0011 NJ |
| alpha-BHC | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| alpha-Chlordane | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| beta-BHC | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| delta-BHC | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Endosulfan I | ug/L | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0033 NJ |
| Endosulfan II | ug/L | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0044 |
| Endosulfan sulfate | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.004 |
| Endrin | ug/L | 0.0005 U | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.002 J |
| Endrin aldehyde | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0059 NJ |
| Endrin ketone | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0019 NJ |
| Gamma-BHC (Lindane) | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| gamma-Chlordane | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| Heptachlor | ug/L | 0.0034 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0072 | 0.0078 | 0.0005 U |
| Heptachlor epoxide | ug/L | 0.012 | 0.048 NJ | 0.033 UJ | 0.048 UJ | 0.026 UJ | 0.01 UJ | 0.0083 UJ | 0.015 UJ |
| Methoxychlor | ug/L | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0033 NJ |
| Toxaphene | ug/L | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U |
| **General Chemistry** | | | | | | | | | |
| Suspended solids | mg/L | 110 | --- | 87 | --- | 88 | --- | 95 | --- |

Notes:

FD: Field dupllicate
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

**NOTE**

Appendix B, Table 4, Mussel Tissue Results

Data for resident and transplanted mussel tissue data collected in 2009 were incorrectly reported on laboratory reports as dry weight concentrations. These mussel tissue results and all results on the table are wet weight concentrations as confirmed by the EPA Contract Laboratory and the EPA Chemist.

A corrected version of Appendix B, Table 4 can be found in the errata dated April 18, 2012 that has been appended to the end of this document.

TABLE 4
Mussel Tissue Results
*United Heckathorn Superfund Site*

| Location ID | 303_1R | 303_1a | 303_1b | 303_1c | 303_1d | 303_2R | 303_2a | 303_2b | 303_2c | 303_2d | 303_3R | 303_3a | 303_3b | 303_3c | 303_3d | 303_4R | 303_4a | 303_4b |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Type | Resident | Transplant | Transplant | Resident | Resident | Resident | Transplant | Transplant | Resident | Resident | Resident | Transplant | Transplant | Resident | Resident | Resident | Transplant | Transplant |
| Percent Lipids | | | | | | | | | | | | | | | | | | |
| Sample Date | 6/19/2007 | 10/1/2009 | 10/1/2009 | 11/13/2009 | 11/13/2009 | 6/19/2007 | 10/1/2009 | 10/1/2009 | 11/13/2009 | 11/13/2009 | 6/19/2007 | 10/1/2009 | 10/1/2009 | 11/13/2009 | 11/13/2009 | 6/19/2007 | 10/1/2009 | 10/1/2009 |
| Lab | GPL | STLV | STLV | STLV | STLV | GPL | STLV | STLV | STLV | STLV | GPL | STLV | STLV | STLV | STLV | GPL | STLV | STLV |
| Basis | Wet | Dry | Dry | Dry | Dry | Wet | Dry | Dry | Dry | Dry | Wet | Dry | Dry | Dry | Dry | Wet | Dry | Dry |
| **Analyte** | **All Analytical Results in ug/kg** | | | | | | | | | | | | | | | | | |
| **Pesticides** | | | | | | | | | | | | | | | | | | |
| 2,4-DDD | 1.5 J | 4.5 J | 4.6 J | 7 J | 7.4 J | 48 | 73 J | 63 J | 160 J | 130 J | 230 | 340 J | 290 J | 380 J | 410 J | 17 | 31 J | 35 J |
| 2,4-DDE | 1.3 NJ | 3.1 J | 3.1 J | 3.6 J | 3.8 J | 5.9 NJ | 13 J | 9.8 J | 22 J | 19 J | 18 J | 25 J | 22 J | 33 J | 36 J | 1.6 J | 14 J | 15 J |
| 2,4-DDT | 1.5 NJ | 2 R | 2 R | 2.9 J | 2.9 J | 30 J | 40 J | 34 J | 100 J | 80 J | 160 J | 270 J | 230 J | 460 J | 540 J | 10 J | 8.5 J | 9.8 J |
| 4,4-DDD | 4.4 NJ | 12 J | 13 J | 18 J | 17 J | 97 | 180 J | 150 J | 380 J | 300 J | 470 | 700 J | 590 J | 780 J | 820 J | 36 | 110 J | 120 J |
| 4,4-DDE | 3.4 | 6.7 NJ | 7.1 NJ | 15 NJ | 16 NJ | 41 | 84 NJ | 79 NJ | 200 NJ | 160 NJ | 170 | 240 NJ | 200 NJ | 420 NJ | 440 NJ | 14 | 66 NJ | 76 NJ |
| 4,4-DDT | 3.4 NJ | 2.4 J | 2.6 J | 6.9 J | 8.3 J | 56 | 100 J | 88 J | 220 J | 170 J | 220 | 490 J | 410 J | 930 J | 1,100 J | 15 | 20 J | 23 J |
| **Total DDT** | **15.5** | **28.7** | **30.4** | **53.4** | **55.4** | **277.9** | **490** | **423.8** | **1,082** | **859** | **1,268** | **2,065** | **1,742** | **3,003** | **3,346** | **93.6** | **249.5** | **278.8** |
| Dieldrin | 1.5 NJ | 4.1 J | 3.1 J | 3.3 J | 3.3 J | 26 | 51 J | 39 J | 67 J | 48 J | 81 | 230 J | 190 J | 110 J | 90 J | 7.3 | 18 J | 20 J |
| Aldrin | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 7.1 NJ | --- | --- | --- | --- | 3.3 U | --- | --- |
| alpha-BHC | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 3.3 U | --- | --- |
| alpha-Chlordane | 1.7 U | --- | --- | --- | --- | 3.2 NJ | --- | --- | --- | --- | 9.9 NJ | --- | --- | --- | --- | 3.3 U | --- | --- |
| beta-BHC | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 3.3 U | --- | --- |
| Chlordane | 33 U | --- | --- | --- | --- | 170 U | --- | --- | --- | --- | 670 U | --- | --- | --- | --- | 67 U | --- | --- |
| delta-BHC | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 3.3 U | --- | --- |
| Endosulfan I | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 3.3 U | --- | --- |
| Endosulfan II | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 3.3 U | --- | --- |
| Endosulfan sulfate | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 3.3 U | --- | --- |
| Endrin | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 0.98 NJ | --- | --- |
| Endrin aldehyde | 1.3 NJ | --- | --- | --- | --- | 7.3 NJ | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 0.82 J | --- | --- |
| Endrin ketone | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 3.3 U | --- | --- |
| Gamma-BHC (Lindane) | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 3.3 U | --- | --- |
| gamma-Chlordane | 1.7 NJ | --- | --- | --- | --- | 7.1 NJ | --- | --- | --- | --- | 26 NJ | --- | --- | --- | --- | 2.8 NJ | --- | --- |
| Heptachlor | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 3.3 U | --- | --- |
| Heptachlor epoxide | 1.7 U | --- | --- | --- | --- | 4.3 NJ | --- | --- | --- | --- | 16 NJ | --- | --- | --- | --- | 1.5 NJ | --- | --- |
| Methoxychlor | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 3.3 U | --- | --- |
| Toxaphene | 33 U | --- | --- | --- | --- | 170 U | --- | --- | --- | --- | 670 U | --- | --- | --- | --- | 67 U | --- | --- |

Notes:

ug/kg: microgram per kilogram (ppb)
FD: Field dupllicate
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

TABLE 4
Mussel Tissue Results
*United Heckathorn Superfund Site*

| Location ID | 303_4T | 303_6a | 303_6b | 303_6c | 303_6d | 303_7a | 303_7b | 303_7c | 303_7d | 303_8a | 303_8b | 303_9a | 303_9b | 303_10a | 303_10b | L01R | L02R | L03R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Type | Resident | Transplant | Transplant | Resident | Resident | Transplant | Transplant | Resident | Resident | Transplant | Transplant | Transplant | Transplant | Transplant | Transplant | Resident | Resident | Resident |
| Percent Lipids | | | | | | | | | | | | | | | | | | |
| Sample Date | 10/1/2009 | 10/1/2009 | 10/1/2009 | 11/13/2009 | 11/13/2009 | 10/1/2009 | 10/1/2009 | 11/13/2009 | 11/13/2009 | 10/1/2009 | 10/1/2009 | 10/1/2009 | 10/1/2009 | 10/1/2009 | 10/1/2009 | 6/19/2007 | 6/19/2007 | 6/19/2007 |
| Lab | STLV | STLV | STLV | STLV | STLV | STLV | STLV | STLV | STLV | STLV | STLV | STLV | STLV | STLV | STLV | GPL | GPL | GPL |
| Basis | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Wet | Wet | Wet |
| **Analyte** | **All Analytical Results in ug/kg** | | | | | | | | | | | | | | | | | |
| **Pesticides** | | | | | | | | | | | | | | | | | | |
| 2,4-DDD | 25 J | 41 J | 37 J | 170 J | 190 J | 230 J | 170 J | 320 J | 330 J | 2.6 J | 3 J | 2 J | 3.4 J | 1.8 J | 1.7 J | 79 | 48 | 180 |
| 2,4-DDE | 11 J | 12 J | 10 J | 29 J | 33 J | 21 J | 15 J | 36 J | 34 J | 1.9 J | 2.5 J | 1.9 J | 2.9 J | 2.4 J | 2 J | 7.4 J | 3.3 J | 16 J |
| 2,4-DDT | 5.6 J | 13 J | 11 J | 300 J | 410 J | 61 J | 54 J | 190 J | 180 J | 1.9 R | 1.9 R | 1.9 R | 3.8 J | 2 R | 2 R | 74 J | 51 J | 58 NJ |
| 4,4-DDD | 77 J | 140 J | 120 J | 360 J | 390 J | 630 J | 440 J | 900 J | 930 J | 6.8 J | 8.3 J | 5.5 J | 10 J | 5 J | 4.7 J | 170 | 94 | 460 |
| 4,4-DDE | 43 NJ | 46 NJ | 45 NJ | 270 NJ | 340 NJ | 130 NJ | 110 NJ | 330 NJ | 300 NJ | 4.3 NJ | 5.3 NJ | 3.4 NJ | 5.5 NJ | 4 NJ | 4.1 NJ | 79 | 45 | 100 |
| 4,4-DDT | 14 J | 56 J | 34 J | 620 J | 790 J | 150 J | 140 J | 430 J | 420 J | 1.8 J | 1.7 J | 2.3 J | 25 J | 1.6 J | 1.2 J | 130 | 82 | 80 |
| **Total DDT** | **175.6** | **308** | **257** | **1,749** | **2,153** | **1,222** | **929** | **2,206** | **2,194** | **17.4** | **20.8** | **15.1** | **50.6** | **14.8** | **13.7** | **539.4** | **323.3** | **894** |
| Dieldrin | 17 J | 21 J | 17 J | 36 J | 38 J | 190 J | 120 J | 130 J | 110 J | 2.4 J | 2.6 J | 1.3 J | 1.8 J | 1.3 J | 1.4 J | 39 | 24 | 59 |
| Aldrin | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 1.9 NJ | 33 U |
| alpha-BHC | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 8.3 U | 33 U |
| alpha-Chlordane | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 2.4 NJ | 5 J |
| beta-BHC | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 8.3 U | 33 U |
| Chlordane | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 330 U | 170 U | 670 U |
| delta-BHC | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 8.3 U | 33 U |
| Endosulfan I | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 8.3 U | 33 U |
| Endosulfan II | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 8.3 U | 33 U |
| Endosulfan sulfate | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 8.3 U | 33 U |
| Endrin | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 3.7 J | 1.7 J | 9.2 J |
| Endrin aldehyde | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 4.2 NJ | 8.3 U | 33 U |
| Endrin ketone | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 8.3 U | 33 U |
| Gamma-BHC (Lindane) | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 8.3 U | 33 U |
| gamma-Chlordane | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 12 NJ | 6.6 NJ | 27 NJ |
| Heptachlor | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 8.3 U | 33 U |
| Heptachlor epoxide | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 3.3 NJ | 33 U |
| Methoxychlor | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 8.3 U | 33 U |
| Toxaphene | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 330 U | 170 U | 670 U |

Notes:

ug/kg: microgram per kilogram (ppb)
FD: Field dupllicate
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

TABLE 4
Mussel Tissue Results
*United Heckathorn Superfund Site*

| **Location ID** | **L04R** | **PCR** |
|---|---|---|
| **Sample Type** | **Resident** | **Resident** |
| **Percent Lipids** | | |
| **Sample Date** | **6/19/2007** | **6/19/2007** |
| **Lab** | **GPL** | **GPL** |
| **Basis** | **Wet** | **Wet** |
| **Analyte** | **All Analytical Results in ug/kg** | |
| **Pesticides** | | |
| 2,4-DDD | 120 | 6.7 |
| 2,4-DDE | 11 J | 1.8 NJ |
| 2,4-DDT | 55 J | 4.8 J |
| 4,4-DDD | 300 | 15 |
| 4,4-DDE | 81 | 8.8 |
| 4,4-DDT | 90 | 9 |
| **Total DDT** | **657** | **46.1** |
| Dieldrin | 46 | 4.5 |
| Aldrin | 33 U | 1.7 U |
| alpha-BHC | 33 U | 1.7 U |
| alpha-Chlordane | 4.7 J | 0.86 NJ |
| beta-BHC | 33 U | 1.7 U |
| Chlordane | 670 U | 33 U |
| delta-BHC | 33 U | 1.7 U |
| Endosulfan I | 33 U | 1.7 U |
| Endosulfan II | 33 U | 1.7 U |
| Endosulfan sulfate | 33 U | 1.7 U |
| Endrin | 7.4 NJ | 1.7 U |
| Endrin aldehyde | 33 U | 1.6 NJ |
| Endrin ketone | 33 U | 1.7 U |
| Gamma-BHC (Lindane) | 33 U | 1.7 U |
| gamma-Chlordane | 18 NJ | 2.3 NJ |
| Heptachlor | 33 U | 1.7 U |
| Heptachlor epoxide | 11 NJ | 0.98 NJ |
| Methoxychlor | 33 U | 1.7 U |
| Toxaphene | 670 U | 33 U |

Notes:

ug/kg: microgram per kilogram (ppb)
FD: Field dupllicate
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

TABLE 5
Fish Tissue Results
*United Heckathorn Superfund Site*

| Location ID | 303.1 | 303.1 | 303.1 | 303.1 | 303.1 | 303.1 | 303.1 | 303.1 (FD) | 303.1 | 303.1 (FD) | 303.1 | 303.1 (FD) | 303.1 | 303.1 | 303.1 | 303.1 | 303.1 | 303.1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date | 5/14/2008 | 5/14/2008 | 5/14/2008 | 5/14/2008 | 5/14/2008 | 5/14/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 |
| Species | Anchovy | Anchovy | Anchovy | Anchovy | Bay Shrimp | Bay Shrimp | Halibut | Halibut | Halibut | Halibut | Halibut | Halibut | Halibut | Halibut | Halibut | Sanddab | Sculpin | Sculpin |
| Sample Type | composite | composite | composite | composite | composite | composite | carcass | carcass | fillet | fillet | whole (C) | whole (C) | carcass | fillet | whole (C) | composite | composite | composite |
| Lab | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV |
| Percent Lipids | 1.8 | 1.6 | 1.4 | 1.3 | 1.7 | 1.6 | 1.9 | 2 | 0.4 | 0.3 | 1.02 | 1.02 | 3.2 | 0.6 | 1.84 | 2.8 | 1.4 | 1.6 |
| **Analyte** | **All Analytical Results in wet weight ug/kg** | | | | | | | | | | | | | | | | | |
| **Pesticides** | | | | | | | | | | | | | | | | | | |
| 2,4-DDD | 1.2 | 1.2 | 2.4 | 1.3 | 0.8 U | 0.8 U | 1.6 | 2.3 | 0.8 U | 0.8 U | 0.9 | 1.19 | 3.2 | 0.8 U | 1.74 | 1.2 J | 0.8 UJ | 0.81 UJ |
| 2,4-DDE | 2.4 | 2.7 | 2.2 | 2.3 NJ | 0.8 U | 0.8 U | 6.1 NJ | 6.4 | 1 NJ | 1.1 | 3.12 | 3.3 | 6.2 | 1.5 | 3.75 | 0.8 UJ | 0.8 UJ | 0.81 UJ |
| 2,4-DDT | 0.8 U | 0.8 U | 0.8 U | 1.1 NJ | 0.8 U | 0.8 U | 0.95 NJ | 1.2 | 0.8 U | 0.8 U | 0.63 | 0.73 | 1.5 NJ | 0.8 U | 0.93 | 0.8 UJ | 0.8 UJ | 0.81 UJ |
| 4,4-DDD | 11 | 16 | 14 | 11 | 1.5 | 1.5 | 15 | 20 | 1.9 | 3 | 7.34 | 10.06 | 30 | 5.5 | 17.21 | 5.9 J | 2.9 J | 4 J |
| 4,4-DDE | 14 | 21 | 12 | 13 | 6.1 | 7.2 | 73 | 68 | 7.8 | 8.9 | 34.87 | 33.44 | 68 J | 12 | 38.77 | 4.9 J | 4.9 J | 6 J |
| 4,4-DDT | 4 NJ | 7.1 NJ | 7.1 NJ | 4.4 NJ | 0.81 NJ | 0.8 NJ | 8.2 NJ | 8.7 | 1.1 NJ | 1.4 | 4.05 | 4.43 | 7.7 NJ | 2.1 NJ | 4.78 | 2 NJ | 1.1 NJ | 1.4 NJ |
| **Total DDT** | **32.6** | **48** | **37.7** | **33.1** | **8.41** | **9.5** | **104.85** | **106.6** | **11.8** | **14.4** | **50.43** | **52.68** | **116.6** | **21.1** | **66.76** | **14** | **8.9** | **11.4** |
| Dieldrin | 2.3 | 2.7 | 2.2 | 2.3 | 0.8 U | 0.8 U | 1.4 | 1.6 | 0.8 U | 0.8 U | 0.82 | 0.9 | 2.5 | 0.8 U | 1.4 | 2.1 J | 0.8 UJ | 1.1 J |
| Aldrin | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | --- | --- | 0.79 U | 0.8 U | --- | 0.8 UJ | 0.8 UJ | 0.81 UJ |
| alpha-BHC | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | --- | --- | 0.79 U | 0.8 U | --- | 0.8 UJ | 0.8 UJ | 0.81 UJ |
| alpha-Chlordane | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 2.4 NJ | 2.3 | 0.8 U | 0.8 U | --- | --- | 1.3 NJ | 0.8 U | --- | 0.8 UJ | 0.8 UJ | 0.81 UJ |
| beta-BHC | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | --- | --- | 0.79 U | 0.8 U | --- | 0.8 UJ | 0.8 UJ | 0.81 UJ |
| delta-BHC | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | --- | --- | 0.79 U | 0.8 U | --- | 0.8 UJ | 0.8 UJ | 0.81 UJ |
| Endosulfan I | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 1.1 NJ | 1 | 0.8 U | 0.8 U | --- | --- | 0.79 U | 0.8 U | --- | 0.8 UJ | 0.8 UJ | 0.81 UJ |
| Endosulfan II | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | --- | --- | 0.79 U | 0.8 U | --- | 0.8 UJ | 0.8 UJ | 0.81 UJ |
| Endosulfan sulfate | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 1.6 NJ | 1.7 | 0.8 U | 0.8 U | --- | --- | 0.96 NJ | 0.8 U | --- | 0.8 UJ | 0.8 UJ | 0.81 UJ |
| Endrin | 0.8 U | 0.8 U | 0.8 U | 0.86 | 0.8 U | 0.8 U | 1.3 | 1.2 | 0.8 U | 0.8 U | --- | --- | 1.1 | 0.8 U | --- | 1.5 NJ | 0.8 UJ | 0.81 UJ |
| Endrin aldehyde | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 2.1 NJ | 2.1 | 0.8 U | 0.8 U | --- | --- | 1.1 NJ | 0.8 U | --- | 0.8 UJ | 0.8 UJ | 0.81 UJ |
| Gamma-BHC (Lindane) | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | --- | --- | 0.79 U | 0.8 U | --- | 0.8 UJ | 0.8 UJ | 0.81 UJ |
| gamma-Chlordane | 1.5 | 1.5 | 1.3 | 1.3 NJ | 0.8 U | 0.8 U | 2.8 NJ | 2.9 | 0.8 U | 0.8 U | --- | --- | 3.5 | 0.85 NJ | --- | 0.8 UJ | 0.8 UJ | 0.81 J |
| Heptachlor | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | --- | --- | 0.79 U | 0.8 U | --- | 0.8 UJ | 0.8 UJ | 0.81 UJ |
| Heptachlor epoxide | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | --- | --- | 0.79 U | 0.8 U | --- | 0.8 UJ | 0.8 UJ | 0.81 UJ |
| Methoxychlor | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 1.5 UJ | 1.7 J | 0.8 U | 0.8 U | --- | --- | 0.79 U | 0.8 U | --- | 0.8 UJ | 0.8 UJ | 0.81 UJ |
| Toxaphene | 99 U | 99 U | 99 U | 100 U | 99 U | 99 U | 100 U | 100 U | 100 U | 100 U | --- | --- | 99 U | 99 U | --- | 99 UJ | 100 UJ | 100 UJ |

Notes:

ug/kg: microgram per kilogram (ppb)
FD: Field dupllicate
C: Calculated
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

TABLE 5
Fish Tissue Results
*United Heckathorn Superfund Site*

| **Location ID** | **303.1** | **303.1 (FD)** | **303.1** | **303.1** | **303.1** | **303.1** | **303.1** | **303.1** | **303.1** | **303.1** | **303.1 (FD)** | **303.1** | **303.1** | **303.1** | **303.1** | **303.1** | **303.3** | **303.3** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample Date** | **5/14/2008** | **5/14/2008** | **5/14/2008** | **5/14/2008** | **5/14/2008** | **5/14/2008** | **5/14/2008** | **5/14/2008** | **5/14/2008** | **5/15/2008** | **5/15/2008** | **5/15/2008** | **5/15/2008** | **5/15/2008** | **5/15/2008** | **5/15/2008** | **5/15/2008** | **5/15/2008** |
| **Species** | **Shiner Surfperch** | **Shiner Surfperch** | **Shiner Surfperch** | **Shiner Surfperch** | **Shiner Surfperch** | **Shiner Surfperch** | **Shiner Surfperch** | **Shiner Surfperch** | **Shiner Surfperch** | **Starry Flounder** | **Starry Flounder** | **Starry Flounder** | **Starry Flounder** | **Starry Flounder** | **Starry Flounder** | **Starry Flounder** | **Anchovy** | **Anchovy** |
| **Sample Type** | **whole** | **whole** | **whole** | **whole** | **whole** | **whole** | **whole** | **whole** | **composite** | **carcass** | **carcass** | **fillet** | **whole (C)** | **carcass** | **fillet** | **whole (C)** | **composite** | **composite** |
| **Lab** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** |
| **Percent Lipids** | **1.4** | **1.4** | **5.3** | **4.8** | **2.9** | **5** | **4.5** | **3.3** | **5** | **4** | **4.7** | **1.5** | **2.66** | **2.8** | **0.7** | **1.79** | **1.8** | **1.5** |
| **Analyte** | **All Analytical Results in wet weight ug/kg** | | | | | | | | | | | | | | | | | |
| **Pesticides** | | | | | | | | | | | | | | | | | | |
| 2,4-DDD | 3.6 | 3.9 | 3.8 | 10 | 2.8 | 3 | 4.8 | 4.4 | 2.4 | 1.9 | 2.1 | 0.8 UJ | 1.09 | 1.5 | 0.8 U | 0.97 | 63 | 46 |
| 2,4-DDE | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 3.4 NJ | 3.9 NJ | 4.3 NJ | 3 NJ | 0.8 U | 0.8 UJ | 0.8 UJ | 0.4 U | 2.4 | 0.8 U | 1.44 | 5.1 J | 3.7 J |
| 2,4-DDT | 1.5 | 1.7 | 1.5 | 6.9 | 1.4 | 0.99 NJ | 6.3 | 1.6 | 0.93 | 1.8 | 2 | 0.87 J | 1.3 | 1.1 NJ | 0.8 U | 0.76 | 35 | 29 |
| 4,4-DDD | 21 | 21 J | 19 | 33 | 14 J | 13 | 19 | 20 | 11 | 12 | 14 | 4.4 J | 7.91 | 10 | 2.1 | 6.22 | 420 | 270 |
| 4,4-DDE | 40 | 39 J | 33 | 34 J | 39 J | 38 | 58 J | 33 | 30 | 14 | 16 | 5.4 J | 9.38 | 24 | 4.5 | 14.66 | 90 | 71 |
| 4,4-DDT | 4.5 | 4.6 NJ | 6.2 NJ | 8.8 NJ | 4.5 NJ | 4.1 NJ | 19 NJ | 5.1 NJ | 3.1 NJ | 4.4 | 5 NJ | 1.7 NJ | 2.95 | 4 NJ | 0.85 NJ | 2.49 | 120 | 77 |
| **Total DDT** | **70.6** | **70.2** | **63.5** | **92.7** | **61.7** | **62.49** | **111** | **68.4** | **50.43** | **34.1** | **39.1** | **12.37** | **22.42** | **43** | **7.45** | **25.97** | **733.1** | **496.7** |
| Dieldrin | 3.2 | 3.3 J | 5.5 J | 7.9 J | 3.6 | 3.9 | 3.9 | 3.3 | 2.1 | 3.1 | 3.5 | 1.3 J | 2.13 | 2.4 | 0.8 U | 1.44 | 69 | 55 |
| Aldrin | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 UJ | 0.8 UJ | --- | 0.79 U | 0.8 U | --- | 1.6 U | 0.79 U |
| alpha-BHC | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 UJ | 0.8 UJ | --- | 0.79 U | 0.8 U | --- | 1.6 U | 0.79 U |
| alpha-Chlordane | 2.4 | 2.6 NJ | 1.8 NJ | 2.4 NJ | 1.2 NJ | 1.9 NJ | 1 NJ | 1.8 NJ | 1.1 NJ | 0.96 | 1.1 J | 0.8 UJ | --- | 1.3 NJ | 0.8 U | --- | 2.3 | 1.6 |
| beta-BHC | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 UJ | 0.8 UJ | --- | 0.79 U | 0.8 U | --- | 1.6 U | 0.79 U |
| delta-BHC | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 UJ | 0.8 UJ | --- | 0.79 U | 0.8 U | --- | 1.6 U | 0.79 U |
| Endosulfan I | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 UJ | 0.8 UJ | --- | 0.79 U | 0.8 U | --- | 1.6 U | 0.79 U |
| Endosulfan II | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 UJ | --- | 0.79 U | 0.8 U | --- | 1.6 U | 0.79 U |
| Endosulfan sulfate | 0.8 U | 0.8 U | 0.8 U | 0.88 NJ | 0.8 U | 0.81 NJ | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 UJ | --- | 0.79 U | 0.8 U | --- | 1.6 U | 0.79 U |
| Endrin | 0.8 U | 0.8 U | 5.9 | 1.4 | 1.4 | 1.5 | 1.8 NJ | 1.2 | 1.5 NJ | 0.85 | 0.8 | 0.8 UJ | --- | 0.79 U | 0.8 U | --- | 3.5 | 2.5 NJ |
| Endrin aldehyde | 0.8 U | 0.87 NJ | 0.8 U | 0.8 U | 0.8 UJ | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 UJ | 0.8 UJ | --- | 0.79 U | 0.8 U | --- | 1.6 U | 0.79 U |
| Gamma-BHC (Lindane) | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 UJ | 0.8 UJ | --- | 0.79 U | 0.8 U | --- | 1.6 U | 0.79 U |
| gamma-Chlordane | 2.3 | 2.6 NJ | 2.2 NJ | 3.7 | 1.7 NJ | 1.6 NJ | 2 NJ | 2 NJ | 1.3 NJ | 1.4 | 1.5 | 0.8 UJ | --- | 1.1 NJ | 0.8 U | --- | 2.1 NJ | 1.5 NJ |
| Heptachlor | 0.96 | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 UJ | 0.8 UJ | --- | 0.79 U | 0.8 U | --- | 1.6 U | 0.79 U |
| Heptachlor epoxide | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 UJ | 0.8 UJ | --- | 0.79 U | 0.8 U | --- | 1.6 U | 1.3 NJ |
| Methoxychlor | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 UJ | --- | 0.79 U | 0.8 U | --- | 1.6 U | 0.79 U |
| Toxaphene | 100 U | 100 U | 100 U | 100 U | 100 U | 100 U | 100 U | 100 U | 100 U | 100 U | 99 U | 100 UJ | --- | 99 U | 100 U | --- | 200 U | 99 U |

Notes:

ug/kg: microgram per kilogram (ppb)
FD: Field dupllicate
C: Calculated
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

TABLE 5
Fish Tissue Results
*United Heckathorn Superfund Site*

| Location ID | 303.3 | 303.3 | 303.3 | 303.3 | 303.3 | 303.3 | 303.3 | 303.3 | 303.3 | 303.3 (FD) | 303.3 | 303.3 | 303.3 | 303.3 | 303.3 | 303.3 | 303.3 | 303.3 (FD) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample Date** | **5/15/2008** | **5/15/2008** | **6/12/2008** | **6/12/2008** | **6/12/2008** | **6/12/2008** | **6/12/2008** | **6/12/2008** | **6/12/2008** | **6/12/2008** | **6/12/2008** | **6/12/2008** | **6/12/2008** | **6/12/2008** | **6/12/2008** | **6/12/2008** | **6/12/2008** | **6/12/2008** |
| **Species** | **Anchovy** | **Goby** | **Jacksmelt** | **Jacksmelt** | **Jacksmelt** | **Jacksmelt** | **Jacksmelt** | **Jacksmelt** | **Jacksmelt** | **Jacksmelt** | **Jacksmelt** | **Jacksmelt** | **Jacksmelt** | **Jacksmelt** | **Jacksmelt** | **Jacksmelt** | **Jacksmelt** | **Jacksmelt** |
| **Sample Type** | **composite** | **composite** | **carcass** | **fillet** | **whole (C)** | **carcass** | **fillet** | **whole (C)** | **carcass** | **carcass** | **fillet** | **whole (C)** | **carcass** | **fillet** | **whole (C)** | **carcass** | **fillet** | **fillet** |
| **Lab** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** |
| **Percent Lipids** | **1.7** | **1.5** | **1** | **0.5** | **0.76** | **4.8** | **0.2** | **2.82** | **4.2** | **3.5** | **0.8** | **2.74** | **3.4** | **0.9** | **2.25** | **1.7** | **4.3** | **0.5** |
| **Analyte** | **All Analytical Results in wet weight ug/kg** | | | | | | | | | | | | | | | | | |
| **Pesticides** | | | | | | | | | | | | | | | | | | |
| 2,4-DDD | 46 | 360 | 1.2 NJ | 0.84 NJ | 1.03 | 56 | 12 | 37.06 | 40 | 43 | 7.2 | 25.93 | 34 | 8.9 | 22.42 | 4.5 | 1.9 | 2.1 |
| 2,4-DDE | 4.8 J | 20 J | 1.3 J | 0.8 U | 0.88 | 9.8 J | 2.3 J | 6.57 | 13 | 11 J | 2.4 J | 8.45 | 11 J | 2.9 J | 7.26 | 4.3 J | 2 | 2.2 J |
| 2,4-DDT | 21 | 23 | 0.86 | 0.8 U | 0.64 | 23 | 5.2 | 15.34 | 29 | 31 | 5.4 | 18.88 | 29 | 8.1 | 19.36 | 3 | 1.2 | 1.5 |
| 4,4-DDD | 370 | 4,800 | 11 J | 7 | 9.11 | 670 | 140 | 441.83 | 570 | 660 | 120 | 376.98 | 950 | 220 | 613.13 | 84 | 35 | 39 |
| 4,4-DDE | 97 | 410 | 28 | 17 | 22.81 | 170 | 39 | 113.6 | 220 | 230 | 44 | 144.51 | 280 | 74 | 184.94 | 84 | 37 | 41 |
| 4,4-DDT | 150 | 250 | 6.4 | 3.5 NJ | 5.03 | 140 | 34 | 94.37 | 220 | 220 | 43 | 144.08 | 310 | 84 | 205.71 | 35 | 14 | 15 |
| **Total DDT** | **688.8** | **5,863** | **48.76** | **28.34** | **39.12** | **1,069** | **232.5** | **708.76** | **1,092** | **1,195** | **222** | **718.83** | **1,614** | **397.9** | **1,053** | **214.8** | **91.1** | **100.8** |
| Dieldrin | 66 | 320 | 14 | 10 | 12.11 | 390 | 90 | 260.85 | 330 | 340 | 70 | 218.48 | 340 | 96 | 227.4 | 30 | 13 | 14 |
| Aldrin | 1.6 U | 1.6 U | 0.8 U | 0.8 U | --- | 8 U | 0.8 U | --- | 8 U | 8 U | 0.8 U | --- | 8 U | 0.8 U | --- | 0.8 U | 0.8 U | 0.8 U |
| alpha-BHC | 1.6 U | 1.6 U | 0.8 U | 0.8 U | --- | 8 U | 0.8 U | --- | 8 U | 8 U | 0.8 U | --- | 8 U | 0.8 U | --- | 0.8 U | 0.8 U | 0.8 U |
| alpha-Chlordane | 2.1 | 10 | 0.8 U | 0.8 U | --- | 8 U | 1.1 | --- | 8 U | 8 U | 1 | --- | 8 U | 1.5 | --- | 0.98 NJ | 0.8 U | 0.8 U |
| beta-BHC | 1.6 U | 1.6 U | 0.8 U | 0.8 U | --- | 8 U | 0.8 U | --- | 8 U | 8 U | 0.8 U | --- | 8 U | 0.8 U | --- | 0.8 U | 0.8 U | 0.8 U |
| delta-BHC | 1.6 U | 1.6 U | 0.8 U | 0.8 U | --- | 8 U | 0.8 U | --- | 8 U | 8 U | 0.8 U | --- | 8 U | 0.8 U | --- | 0.8 U | 0.8 U | 0.8 U |
| Endosulfan I | 1.6 U | 1.6 U | 0.8 U | 0.8 U | --- | 8 U | 0.8 U | --- | 8 U | 8 U | 0.8 U | --- | 8 U | 0.8 U | --- | 0.8 U | 0.8 U | 0.8 U |
| Endosulfan II | 1.6 U | 1.6 U | 0.8 U | 0.8 U | --- | 8 U | 0.8 U | --- | 8 U | 8 U | 0.8 U | --- | 8 U | 0.8 U | --- | 0.8 U | 0.8 U | 0.8 U |
| Endosulfan sulfate | 1.6 U | 1.6 U | 0.8 J | 0.8 J | --- | 8 J | 0.8 J | --- | 8 U | 8 J | 0.8 J | --- | 8 J | 0.8 J | --- | 0.8 J | 0.8 U | 0.8 J |
| Endrin | 3.3 | 3.9 NJ | 0.8 U | 0.8 U | --- | 12 | 2.8 | --- | 8.6 | 8.9 | 1.8 | --- | 9.5 | 2.9 | --- | 0.8 U | 0.8 U | 0.8 U |
| Endrin aldehyde | 1.6 U | 1.6 U | 0.8 J | 0.8 J | --- | 8 J | 0.8 J | --- | 8 U | 8 J | 0.8 J | --- | 8 J | 0.8 J | --- | 0.8 J | 0.8 U | 0.8 J |
| Gamma-BHC (Lindane) | 1.6 U | 1.6 U | 0.8 U | 0.8 U | --- | 8 U | 0.8 U | --- | 8 U | 8 U | 0.8 U | --- | 8 U | 0.8 U | --- | 0.8 U | 0.8 U | 0.8 U |
| gamma-Chlordane | 2 NJ | 12 NJ | 0.8 U | 0.8 U | --- | 8 U | 0.8 U | --- | 8 U | 8 U | 0.8 U | --- | 8 U | 0.83 NJ | --- | 0.8 U | 0.8 U | 0.8 U |
| Heptachlor | 1.6 U | 1.6 U | 0.8 U | 0.8 U | --- | 8 U | 0.8 U | --- | 8 U | 8 U | 0.8 U | --- | 8 U | 0.8 U | --- | 0.8 U | 0.8 U | 0.8 U |
| Heptachlor epoxide | 1.6 U | 6.1 NJ | 0.8 U | 0.8 U | --- | 8 U | 0.8 U | --- | 8 U | 8 U | 0.8 U | --- | 8 U | 0.85 NJ | --- | 1.2 NJ | 0.8 U | 0.8 U |
| Methoxychlor | 1.6 U | 1.6 U | 0.8 J | 0.8 J | --- | 8 J | 0.8 J | --- | 8 U | 8 J | 0.8 J | --- | 8 J | 0.8 J | --- | 0.8 J | 0.8 U | 0.8 J |
| Toxaphene | 200 U | 200 U | 100 U | 100 U | --- | 1,000 U | 100 U | --- | 1,000 U | 1,000 U | 100 U | --- | 990 U | 100 U | --- | 100 U | 100 U | 100 U |

Notes:

ug/kg: microgram per kilogram (ppb)
FD: Field dupllicate
C: Calculated
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

TABLE 5
Fish Tissue Results
*United Heckathorn Superfund Site*

| Location ID | 303.3 | 303.3 | 303.3 | 303.3 | 303.3 (FD) | 303.3 | 303.3 | 303.3 | 303.3 | 303.3 | 303.3 (FD) | 303.3 | 303.3 | 303.3 | 303.4 | 303.4 | 303.4 | 303.4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date | 6/12/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 |
| Species | Jacksmelt | Sculpin | Sculpin | Sculpin | Sculpin | Sculpin | Shiner Surfperch | Shiner Surfperch | Shiner Surfperch | Shiner Surfperch | Shiner Surfperch | Shiner Surfperch | Starry Flounder | Starry Flounder | Bay Shrimp | Bay Shrimp | Bay Shrimp | Bay Shrimp |
| Sample Type | whole (C) | whole | composite | composite | composite | composite | whole | whole | whole | composite | composite | composite | whole | composite | composite | composite | composite | composite |
| Lab | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV |
| Percent Lipids | 2.78 | 1.4 | 1.9 | 1.5 | 1.3 | 1.4 | 4.8 | 4.3 | 4.1 | 3.1 | 3.3 | 4.7 | 1.6 | 1.3 | 1.6 | 1.5 | 1.4 | 1.5 |
| **Analyte** | All Analytical Results in wet weight ug/kg | | | | | | | | | | | | | | | | | |
| **Pesticides** | | | | | | | | | | | | | | | | | | |
| 2,4-DDD | 3.42 | 58 | 89 | 130 | 110 | 98 | 1,500 | 1,000 | 710 | 100 | 90 | 190 | 490 | 330 | 0.82 J | 1.5 NJ | 1.2 | 1.6 |
| 2,4-DDE | 3.34 | 5.5 J | 7.2 J | 12 | 13 J | 6.5 J | 68 NJ | 110 NJ | 43 J | 8.6 J | 11 | 15 J | 51 J | 23 J | 0.8 UJ | 0.8 U | 0.8 U | 0.8 U |
| 2,4-DDT | 2.25 | 25 | 39 | 66 | 54 | 28 | 88 | 390 | 98 | 140 | 120 | 190 | 100 | 180 | 0.8 UJ | 0.8 U | 0.8 U | 1.6 |
| 4,4-DDD | 63.58 | 460 | 680 | 920 | 880 | 540 | 7,500 | 6,100 | 5,800 | 150 | 130 | 560 | 4,300 | 1,400 | 4.9 J | 7.4 J | 4.9 J | 6.2 J |
| 4,4-DDE | 64.41 | 66 | 94 | 270 | 250 | 110 | 850 J | 2,200 | 750 | 93 | 80 | 760 | 1,400 | 400 | 19 J | 33 J | 35 J | 32 |
| 4,4-DDT | 26.25 | 130 | 170 | 250 | 250 | 110 | 210 | 1,200 | 280 | 110 | 95 | 310 | 380 | 410 | 2.4 J | 4.1 | 2.8 | 3.5 NJ |
| **Total DDT** | **163.25** | **744.5** | **1,079** | **1,648** | **1,557** | **892.5** | **10,216** | **11,000** | **7,681** | **601.6** | **526** | **2,025** | **6,721** | **2,743** | **27.12** | **46** | **43.9** | **44.9** |
| Dieldrin | 22.92 | 72 | 130 | 110 | 98 | 110 | 550 | 260 | 330 | 280 | 240 | 130 | 300 | 180 | 1.1 J | 1.5 | 1.4 | 1.7 |
| Aldrin | --- | 1.6 U | 4 U | 4 U | 4 U | 1.6 U | 16 U | 16 U | 16 U | 0.81 U | 0.8 U | 4 U | 16 U | 4 U | 0.8 UJ | 0.8 U | 0.8 U | 0.8 U |
| alpha-BHC | --- | 1.6 U | 4 U | 4 U | 4 U | 1.6 U | 16 U | 16 U | 16 U | 0.81 U | 0.8 U | 4 U | 16 U | 4 U | 0.8 UJ | 0.8 U | 0.8 U | 0.8 U |
| alpha-Chlordane | --- | 2.2 | 4 U | 4 U | 4 | 3.3 | 23 | 47 | 16 U | 2.8 | 2.8 | 4.4 NJ | 24 | 6.7 | 0.8 UJ | 0.8 U | 0.8 U | 0.8 U |
| beta-BHC | --- | 1.6 U | 4 U | 4 U | 4 U | 1.6 U | 16 U | 16 U | 16 U | 0.81 U | 0.8 U | 4 U | 16 U | 4 U | 0.8 UJ | 0.8 U | 0.8 U | 0.8 U |
| delta-BHC | --- | 1.6 U | 4 U | 4 U | 4 U | 1.6 U | 16 U | 16 U | 16 U | 0.81 U | 0.8 U | 4 U | 16 U | 4 U | 0.8 UJ | 0.8 U | 0.8 U | 0.8 U |
| Endosulfan I | --- | 1.6 U | 4 U | 4 U | 4 U | 1.6 U | 16 U | 16 U | 16 U | 0.81 U | 0.8 U | 4 U | 16 U | 4 U | 0.8 UJ | 0.8 U | 0.8 U | 0.8 U |
| Endosulfan II | --- | 1.6 U | 4 U | 4 U | 4 U | 1.6 U | 16 U | 16 U | 16 U | 0.93 NJ | 1.3 | 4 U | 16 U | 4 U | 0.8 UJ | 0.8 U | 0.8 U | 0.8 U |
| Endosulfan sulfate | --- | 1.6 U | 4 U | 4 U | 4 U | 1.6 U | 16 U | 16 U | 16 U | 0.81 U | 2.2 | 4 U | 16 U | 4 U | 0.8 UJ | 0.8 U | 0.8 U | 0.8 U |
| Endrin | --- | 2.1 NJ | 4.7 | 4 U | 4 U | 4.6 | 16 U | 16 U | 16 U | 6.6 NJ | 6.1 | 4 U | 16 U | 4 U | 0.8 UJ | 0.8 U | 0.8 U | 0.8 U |
| Endrin aldehyde | --- | 1.6 U | 4 U | 4 U | 4 U | 1.6 U | 16 U | 16 U | 16 U | 0.81 U | 0.8 U | 4 U | 16 U | 4 U | 0.8 UJ | 0.8 U | 0.8 U | 0.8 U |
| Gamma-BHC (Lindane) | --- | 1.6 U | 4 U | 4 U | 4 U | 1.6 U | 16 U | 16 U | 16 U | 0.81 U | 0.8 U | 4 U | 16 U | 4 U | 0.8 UJ | 0.8 U | 0.8 U | 0.8 U |
| gamma-Chlordane | --- | 1.9 NJ | 4 U | 4 U | 4.4 NJ | 3.4 NJ | 30 NJ | 47 NJ | 19 NJ | 2.4 NJ | 1.9 | 4 U | 19 NJ | 4.8 NJ | 0.8 UJ | 0.8 U | 0.8 U | 0.8 U |
| Heptachlor | --- | 1.6 U | 4 U | 4 U | 4 U | 1.6 U | 16 U | 16 U | 16 U | 0.81 U | 0.8 U | 4 U | 16 U | 4 U | 0.8 UJ | 0.8 U | 0.8 U | 0.8 U |
| Heptachlor epoxide | --- | 1.6 U | 4 U | 4 U | 4 U | 1.6 U | 16 U | 16 U | 16 U | 1.8 NJ | 2 | 4 U | 16 U | 4 U | 0.8 UJ | 0.8 U | 0.8 U | 0.8 U |
| Methoxychlor | --- | 1.6 U | 4 U | 4 U | 4 U | 1.6 U | 16 U | 16 U | 16 U | 0.81 U | 0.8 U | 4 U | 16 U | 4 U | 0.8 UJ | 0.8 U | 0.8 U | 0.8 U |
| Toxaphene | --- | 200 U | 500 U | 500 U | 500 U | 200 U | 2,000 U | 2,000 U | 2,000 U | 100 U | 100 U | 500 U | 2,000 U | 500 U | 100 UJ | 100 U | 100 U | 100 U |

Notes:

ug/kg: microgram per kilogram (ppb)
FD: Field dupllicate
C: Calculated
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

TABLE 5
Fish Tissue Results
*United Heckathorn Superfund Site*

| Location ID | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 (FD) | 303.4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date | 5/15/2008 | 5/15/2008 | 6/12/2008 | 6/12/2008 | 6/12/2008 | 6/12/2008 | 6/12/2008 | 6/12/2008 | 6/12/2008 | 6/12/2008 | 6/12/2008 | 6/12/2008 | 6/12/2008 | 6/12/2008 | 6/12/2008 | 6/12/2008 | 6/12/2008 | 6/12/2008 |
| Species | Bay Shrimp | Goby | Jacksmelt | Jacksmelt | Jacksmelt | Jacksmelt | Jacksmelt | Jacksmelt | Jacksmelt | Jacksmelt | Jacksmelt | Jacksmelt | Jacksmelt | Jacksmelt | Jacksmelt | Jacksmelt | Jacksmelt | Jacksmelt |
| Sample Type | composite | composite | carcass | fillet | whole (C) | carcass | fillet | whole (C) | carcass | fillet | whole (C) | carcass | fillet | whole (C) | carcass | fillet | fillet | whole (C) |
| Lab | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV |
| Percent Lipids | 1.5 | 1.4 | 3.4 | 1.1 | 2.33 | 3.9 | 1 | 2.67 | 6 | 1 | 3.88 | 1.3 | 0.6 | 0.97 | 1.8 | 0.3 | 0.6 | 1.18 |
| **Analyte** | **All Analytical Results in wet weight ug/kg** | | | | | | | | | | | | | | | | | |
| **Pesticides** | | | | | | | | | | | | | | | | | | |
| 2,4-DDD | 1.3 | 3.7 | 8.5 | 3 | 5.94 | 8.7 | 2.5 | 6.06 | 8.4 | 1.5 | 5.47 | 2.2 | 0.87 | 1.58 | 7.2 | 0.8 U | 0.8 U | 4.4 |
| 2,4-DDE | 0.8 U | 0.8 U | 7.8 J | 2.9 J | 5.52 | 3.3 J | 0.8 U | 2.07 | 9.2 J | 2 J | 6.15 | 4.7 J | 2.1 J | 3.48 | 2.7 | 1.4 | 1.4 | 2.16 |
| 2,4-DDT | 1.5 | 2.2 | 3 | 1.1 | 2.12 | 4.2 | 1.2 | 2.92 | 3.8 | 0.8 U | 2.36 | 1.1 NJ | 0.8 U | 0.77 | 6.9 | 0.8 U | 0.8 U | 4.22 |
| 4,4-DDD | 5.1 J | 39 J | 78 | 25 | 53.35 | 42 | 12 | 29.23 | 120 | 20 | 77.6 | 43 | 17 | 30.85 | 34 J | 12 J | 11 | 24.93 |
| 4,4-DDE | 35 | 32 | 52 | 18 | 36.18 | 37 | 9.9 | 25.46 | 79 | 14 | 51.44 | 89 | 38 | 65.16 | 30 | 11 | 10 | 22.17 |
| 4,4-DDT | 3.8 NJ | 12 NJ | 18 NJ | 6.1 NJ | 12.46 | 13 | 3.9 | 9.13 | 25 | 4.6 NJ | 16.35 | 20 NJ | 7.9 NJ | 14.34 | 16 | 2.6 NJ | 2.4 | 10.48 |
| **Total DDT** | **46.7** | **88.9** | **167.3** | **56.1** | **115.57** | **108.2** | **29.5** | **74.7** | **245.4** | **42.1** | **159.2** | **160** | **65.87** | **116** | **96.8** | **27** | **24.8** | **68.03** |
| Dieldrin | 1.5 NJ | 6.5 | 45 | 15 | 31.05 | 19 | 5.8 | 13.38 | 66 | 12 | 43.1 | 22 | 8.3 | 15.6 | 24 | 9.4 | 8.9 | 17.98 |
| Aldrin | 0.8 U | 0.8 U | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | 0.8 U | --- |
| alpha-BHC | 0.8 U | 0.8 U | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | 0.8 U | --- |
| alpha-Chlordane | 0.8 U | 0.8 U | 1.1 NJ | 0.8 U | --- | 0.91 NJ | 0.8 U | --- | 1.8 NJ | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | 0.8 U | --- |
| beta-BHC | 0.8 U | 0.8 U | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | 0.8 U | --- |
| delta-BHC | 0.8 U | 0.8 U | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | 0.8 U | --- |
| Endosulfan I | 0.8 U | 0.8 U | 0.8 U | 0.8 U | --- | 0.82 | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | 0.8 U | --- |
| Endosulfan II | 0.8 U | 0.8 U | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | 0.8 U | --- |
| Endosulfan sulfate | 0.8 U | 0.8 U | 0.8 J | 0.8 J | --- | 0.8 J | 0.8 J | --- | 0.8 J | 0.8 J | --- | 0.8 J | 0.8 J | --- | 0.8 U | 0.8 U | 0.8 U | --- |
| Endrin | 0.8 U | 1.1 | 1.1 NJ | 0.8 U | --- | 0.8 U | 0.8 U | --- | 1.6 NJ | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | 0.8 U | --- |
| Endrin aldehyde | 0.8 U | 0.8 U | 0.8 J | 0.8 J | --- | 0.8 J | 0.8 J | --- | 0.8 J | 0.8 J | --- | 0.8 J | 0.8 J | --- | 0.8 U | 0.8 U | 0.8 U | --- |
| Gamma-BHC (Lindane) | 0.8 U | 0.8 U | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | 0.8 U | --- |
| gamma-Chlordane | 0.8 U | 1.4 NJ | 0.94 NJ | 0.8 U | --- | 0.8 U | 0.8 U | --- | 1.4 NJ | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | 0.8 U | --- |
| Heptachlor | 0.8 U | 0.8 U | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | --- | 0.8 U | 0.8 U | 0.8 U | --- |
| Heptachlor epoxide | 0.8 U | 0.8 U | 2.9 NJ | 1 NJ | --- | 1.3 NJ | 0.8 U | --- | 4.2 NJ | 0.96 NJ | --- | 1.8 NJ | 0.8 U | --- | 0.83 NJ | 0.8 U | 0.8 U | --- |
| Methoxychlor | 0.8 U | 0.8 U | 0.8 J | 0.8 J | --- | 0.8 J | 0.8 J | --- | 0.8 J | 0.8 J | --- | 0.8 J | 0.8 J | --- | 0.8 U | 0.8 U | 0.8 U | --- |
| Toxaphene | 100 U | 100 U | 100 U | 100 U | --- | 100 U | 100 U | --- | 100 U | 100 U | --- | 100 U | 100 U | --- | 100 U | 99 U | 100 U | --- |

Notes:

ug/kg: microgram per kilogram (ppb)
FD: Field dupllicate
C: Calculated
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

TABLE 5
Fish Tissue Results
*United Heckathorn Superfund Site*

| Location ID | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 | 303.4 (FD) | 303.4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date | 6/12/2008 | 6/12/2008 | 6/12/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 | 5/15/2008 |
| Species | Jacksmelt | Jacksmelt | Jacksmelt | Sanddab | Sanddab | Sanddab | Sculpin | Shiner Surfperch | Shiner Surfperch | Shiner Surfperch | Starry Flounder | Starry Flounder | Starry Flounder | Starry Flounder | Starry Flounder | Starry Flounder | Starry Flounder | Starry Flounder |
| Sample Type | carcass | fillet | whole (C) | composite | composite | composite | composite | whole | whole | whole | whole | whole | whole | whole | whole | whole | whole | composite |
| Lab | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV | TAMV |
| Percent Lipids | 4.1 | 1.3 | 2.83 | 2.5 | 1.8 | 2.4 | 1.4 | 4.3 | 2.5 | 4.9 | 1.7 | 2 | 1.7 | 2 | 1.9 | 1.8 | 1.8 | 1.6 |
| **Analyte** | **All Analytical Results in wet weight ug/kg** | | | | | | | | | | | | | | | | | |
| **Pesticides** | | | | | | | | | | | | | | | | | | |
| 2,4-DDD | 1.8 | 0.79 U | 1.16 | 4.8 J | 3.7 J | 7 J | 1.7 J | 11 J | 3 UJ | 12 | 8 | 16 | 9.9 | 4.6 J | 6.7 J | 5.7 | 5.7 | 6 |
| 2,4-DDE | 1.6 | 0.79 U | 1.05 | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 U | 8.1 J | 7.3 J | 0.8 UJ | 0.81 UJ | 0.8 U | 0.8 U | 0.8 U |
| 2,4-DDT | 0.79 U | 0.79 U | 0.4 U | 2.4 J | 2.5 J | 4.5 J | 2.3 | 10 J | 0.8 UJ | 6.4 | 6.1 | 15 | 8.1 | 2.8 J | 4.3 J | 5.2 | 5.1 | 4.1 J |
| 4,4-DDD | 9 J | 3.3 J | 6.41 | 26 J | 26 J | 48 | 31 J | 49 | 11 J | 88 | 46 | 80 J | 59 J | 29 J | 47 J | 38 | 49 J | 31 J |
| 4,4-DDE | 35 | 10 | 23.66 | 26 J | 26 J | 50 | 49 | 57 | 13 J | 140 | 52 J | 58 J | 56 J | 29 J | 52 J | 39 | 53 J | 39 |
| 4,4-DDT | 3.1 NJ | 1.1 NJ | 2.19 | 6.7 J | 7.7 J | 15 J | 16 J | 16 J | 2.1 NJ | 26 NJ | 24 NJ | 33 J | 22 J | 9.1 NJ | 13 NJ | 18 | 17 | 14 J |
| **Total DDT** | **50.5** | **14.4** | **34.12** | **65.9** | **65.9** | **124.5** | **100** | **143** | **26.1** | **272.4** | **136.1** | **210.1** | **162.3** | **74.5** | **123** | **105.9** | **129.8** | **94.1** |
| Dieldrin | 7 | 2.4 | 4.91 | 4.9 J | 4.7 J | 8.9 | 5.9 | 13 J | 5 J | 16 | 9 J | 18 | 12 | 5.4 J | 9.7 | 6.2 | 6.2 | 8.5 |
| Aldrin | 0.79 U | 0.79 U | --- | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 U | 0.79 U | 0.8 U | 0.8 UJ | 0.81 UJ | 0.8 U | 0.8 U | 0.8 U |
| alpha-BHC | 0.79 U | 0.79 U | --- | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 U | 0.79 U | 0.8 U | 0.8 UJ | 0.81 UJ | 0.8 U | 0.8 U | 0.8 U |
| alpha-Chlordane | 0.79 U | 0.79 U | --- | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 1 NJ | 0.8 UJ | 2.1 NJ | 1.3 NJ | 1.5 | 1.3 | 0.8 UJ | 0.81 UJ | 0.8 UJ | 0.87 NJ | 0.8 UJ |
| beta-BHC | 0.79 U | 0.79 U | --- | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 U | 0.79 U | 0.8 U | 0.8 UJ | 0.81 UJ | 0.8 U | 0.8 U | 0.8 U |
| delta-BHC | 0.79 U | 0.79 U | --- | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 U | 0.79 U | 0.8 U | 0.8 UJ | 0.81 UJ | 0.8 U | 0.8 U | 0.8 U |
| Endosulfan I | 0.79 U | 0.79 U | --- | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 U | 0.79 U | 0.8 U | 0.8 UJ | 0.81 UJ | 0.8 U | 0.8 U | 0.8 U |
| Endosulfan II | 0.79 U | 0.79 U | --- | 0.8 UJ | 0.8 UJ | 0.8 U | 0.8 U | 0.8 UJ | 0.8 UJ | 0.8 U | 0.8 U | 0.79 U | 0.8 U | 0.8 UJ | 0.81 U | 0.8 U | 0.8 U | 0.8 U |
| Endosulfan sulfate | 0.79 U | 0.79 U | --- | 0.8 UJ | 0.8 UJ | 0.8 U | 0.8 U | 0.8 UJ | 0.8 UJ | 0.8 U | 0.8 U | 0.79 U | 0.8 U | 0.8 UJ | 0.81 U | 0.8 U | 0.8 U | 0.8 U |
| Endrin | 0.79 U | 0.79 U | --- | 0.82 NJ | 0.8 UJ | 1.1 NJ | 0.8 U | 2.4 NJ | 1.1 J | 2.8 | 1.7 NJ | 1.7 | 1.2 | 0.8 UJ | 0.81 U | 0.8 U | 0.8 U | 0.8 U |
| Endrin aldehyde | 0.79 U | 0.79 U | --- | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 U | 0.79 U | 0.8 U | 0.8 UJ | 0.81 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ |
| Gamma-BHC (Lindane) | 0.79 U | 0.79 U | --- | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 U | 0.79 U | 0.8 U | 0.8 UJ | 0.81 UJ | 0.8 U | 0.8 U | 0.8 U |
| gamma-Chlordane | 0.79 U | 0.79 U | --- | 1.1 NJ | 1.2 NJ | 1.7 NJ | 1.7 NJ | 0.99 NJ | 0.8 UJ | 1.8 NJ | 4.5 NJ | 2.6 NJ | 2.6 NJ | 1.4 NJ | 1.8 NJ | 1.9 | 1.9 NJ | 2.4 NJ |
| Heptachlor | 0.79 U | 0.79 U | --- | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 U | 0.79 U | 0.8 U | 0.8 UJ | 0.81 UJ | 0.8 U | 0.8 U | 0.8 U |
| Heptachlor epoxide | 0.79 U | 0.79 U | --- | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 UJ | 0.8 U | 2.7 NJ | 3 NJ | 0.8 UJ | 0.81 UJ | 0.8 U | 0.8 U | 0.8 U |
| Methoxychlor | 0.79 U | 0.79 U | --- | 0.8 UJ | 0.8 UJ | 0.8 U | 0.8 U | 0.8 UJ | 0.8 UJ | 0.8 U | 0.8 U | 0.79 U | 0.8 U | 0.8 UJ | 0.81 U | 0.8 U | 0.8 U | 0.8 U |
| Toxaphene | 99 U | 99 U | --- | 100 UJ | 100 UJ | 100 U | 100 U | 100 UJ | 100 UJ | 100 U | 99 U | 99 U | 99 U | 100 UJ | 100 U | 100 U | 100 U | 100 U |

Notes:

ug/kg: microgram per kilogram (ppb)
FD: Field dupllicate
C: Calculated
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

TABLE 5
Fish Tissue Results
*United Heckathorn Superfund Site*

| Location ID | 303.6 | 303.6 | 303.6 | 303.6 | 303.6 | 303.6 | 303.6 (FD) | 303.6 | 303.6 | 303.6 | 303.6 (FD) | 303.6 | 303.6 | 303.7 | 303.7 | 303.7 | 303.7 (FD) | 303.7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample Date** | **5/15/2008** | **5/15/2008** | **5/15/2008** | **5/15/2008** | **5/15/2008** | **5/15/2008** | **5/15/2008** | **5/15/2008** | **5/15/2008** | **5/15/2008** | **5/15/2008** | **5/15/2008** | **5/15/2008** | **5/15/2008** | **5/15/2008** | **5/15/2008** | **5/15/2008** | **5/15/2008** |
| **Species** | **Sculpin** | **Sculpin** | **Sculpin** | **Sculpin** | **Sculpin** | **Sculpin** | **Sculpin** | **Sculpin** | **Walleyed Perch** | **Walleyed Perch** | **Walleyed Perch** | **Walleyed Perch** | **Walleyed Perch** | **Anchovy** | **Bay Shrimp** | **Bay Shrimp** | **Bay shrimp** | **Flounder/ goby** |
| **Sample Type** | **composite** | **composite** | **composite** | **composite** | **composite** | **composite** | **composite** | **whole** | **composite** | **composite** | **composite** | **composite** | **composite** | **composite** | **composite** | **composite** | **composite** | **composite** |
| **Lab** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** | **TAMV** |
| **Percent Lipids** | **1.2** | **1.1** | **1.1** | **1.5** | **1.1** | **0.9** | **1.2** | **1.6** | **3.7** | **3.9** | **4.2** | **4.5** | **3.4** | **6.5** | **1.4** | **1.5** | **1.4** | **2.1** |
| **Analyte** | **All Analytical Results in wet weight ug/kg** | | | | | | | | | | | | | | | | | |
| **Pesticides** | | | | | | | | | | | | | | | | | | |
| 2,4-DDD | 8.1 | 13 | 4.8 | 14 | 6.2 | 7.5 | 9.5 | 30 | 17 | 12 | 12 | 5.8 | 11 | 3.6 | 0.87 | 1.1 | 1.3 | 2.8 |
| 2,4-DDE | 210 J | 15 J | 6.4 J | 30 J | 19 J | 7.7 | 8.7 | 52 NJ | 12 | 7.5 | 8.4 | 4.6 | 8 | 4.5 J | 0.8 U | 0.8 U | 0.8 U | 0.8 U |
| 2,4-DDT | 21 | 9.4 | 8.9 | 22 | 14 | 14 | 17 | 19 | 14 | 3.5 | 4.1 | 1.7 | 4.9 | 1.2 NJ | 0.8 U | 0.8 U | 0.8 U | 2.3 |
| 4,4-DDD | 120 | 200 | 82 | 260 | 97 | 93 | 110 | 540 | 95 | 52 | 58 | 28 | 63 | 12 | 3.6 | 4.8 | 4.1 J | 21 J |
| 4,4-DDE | 200 NJ | 200 | 120 | 350 | 150 | 130 | 150 | 530 | 110 | 67 | 78 | 41 | 75 | 21 | 19 | 28 | 30 NJ | 19 J |
| 4,4-DDT | 120 NJ | 60 | 65 | 140 | 80 | 90 | 110 | 120 NJ | 52 J | 16 | 20 NJ | 7.6 NJ | 23 NJ | 2.7 NJ | 1.7 J | 2.1 | 2.1 J | 8.4 J |
| **Total DDT** | **679.1** | **497.4** | **287.1** | **816** | **366.2** | **345.1** | **405.2** | **1,291** | **300** | **158** | **180.5** | **88.7** | **184.9** | **45** | **25.17** | **36** | **37.5** | **53.5** |
| Dieldrin | 9.8 NJ | 15 | 6.5 | 17 | 7.6 | 7.7 | 9.3 | 32 | 19 | 15 | 16 | 9.1 | 14 | 5.7 | 0.81 | 0.85 | 0.91 | 3.4 NJ |
| Aldrin | 0.79 U | 0.8 U | 0.79 U | 0.79 U | 0.8 U | 0.8 U | 0.79 U | 1.6 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U |
| alpha-BHC | 0.79 U | 0.8 U | 0.79 U | 0.79 U | 0.8 U | 0.8 U | 0.79 U | 1.6 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U |
| alpha-Chlordane | 2.6 NJ | 2.3 | 1.7 | 2.6 | 1.8 | 2.4 | 2.8 NJ | 4.5 NJ | 3.2 NJ | 2.4 | 2.5 NJ | 2.3 NJ | 2.6 NJ | 1.5 NJ | 0.8 U | 0.8 U | 0.8 U | 0.8 U |
| beta-BHC | 0.79 U | 0.8 U | 0.79 U | 0.79 U | 0.8 U | 0.8 U | 0.79 U | 1.6 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U |
| delta-BHC | 0.79 U | 0.8 U | 0.79 U | 0.79 U | 0.8 U | 0.8 U | 0.79 U | 1.6 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U |
| Endosulfan I | 1.2 NJ | 0.8 U | 0.79 U | 0.79 U | 0.8 U | 0.8 U | 0.79 U | 1.6 U | 0.8 U | 1.1 | 1.5 | 0.89 NJ | 1.2 NJ | 1.1 | 0.8 U | 0.8 U | 0.8 U | 0.8 U |
| Endosulfan II | 0.79 U | 0.8 U | 0.79 U | 0.8 NJ | 0.8 U | 0.8 U | 0.79 U | 2.3 NJ | 0.96 NJ | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U |
| Endosulfan sulfate | 3.2 NJ | 0.8 U | 0.79 U | 0.79 U | 0.8 U | 0.8 U | 0.79 U | 1.6 U | 0.8 U | 0.81 | 0.97 NJ | 0.8 U | 0.8 NJ | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U |
| Endrin | 3.4 NJ | 0.8 U | 0.79 U | 0.79 U | 0.8 U | 0.8 U | 0.79 U | 1.6 U | 0.97 NJ | 0.8 U | 0.81 NJ | 0.8 U | 0.8 U | 20 NJ | 0.8 U | 0.8 U | 0.8 U | 2.2 NJ |
| Endrin aldehyde | 2 NJ | 0.8 U | 0.79 U | 0.79 U | 0.8 U | 0.8 U | 0.79 U | 1.6 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U |
| Gamma-BHC (Lindane) | 0.79 U | 0.8 U | 0.79 U | 0.79 U | 0.8 U | 0.8 U | 0.79 U | 1.6 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U |
| gamma-Chlordane | 8.9 NJ | 1.9 NJ | 1.2 NJ | 5.2 NJ | 1.4 NJ | 3.2 | 3.8 NJ | 21 NJ | 5.2 J | 3.7 | 3.9 | 2 NJ | 4.4 J | 1.9 | 0.8 U | 0.8 U | 0.8 U | 1.1 NJ |
| Heptachlor | 0.79 U | 0.8 U | 0.79 U | 0.79 U | 0.8 U | 0.8 U | 0.79 U | 1.6 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U |
| Heptachlor epoxide | 2.2 NJ | 0.8 U | 0.79 U | 0.84 NJ | 0.8 U | 0.8 U | 0.79 U | 1.6 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 1.2 NJ | 0.8 U | 0.8 U | 0.8 U | 0.8 U |
| Methoxychlor | 1.5 NJ | 0.8 U | 0.79 U | 0.79 U | 0.8 U | 0.8 U | 0.79 U | 1.6 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U |
| Toxaphene | 99 U | 100 U | 99 U | 99 U | 100 U | 100 U | 99 U | 200 U | 100 U | 100 U | 100 U | 100 U | 100 U | 100 U | 100 U | 100 U | 100 U | 100 U |

Notes:

ug/kg: microgram per kilogram (ppb)
FD: Field dupllicate
C: Calculated
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

TABLE 5
Fish Tissue Results
*United Heckathorn Superfund Site*

| **Location ID** | **303.7** | **303.7** | **303.7** |
|---|---|---|---|
| **Sample Date** | **5/15/2008** | **5/15/2008** | **5/15/2008** |
| **Species** | **Sculpin** | **Anchovy** | **Anchovy** |
| **Sample Type** | **composite** | **composite** | **composite** |
| **Lab** | **TAMV** | **TAMV** | **TAMV** |
| **Percent Lipids** | **1.9** | **2.6** | **6.5** |
| **Analyte** | **All Analytical Results in wet weight ug/kg** | | |
| **Pesticides** | | | |
| 2,4-DDD | 4.4 | 2.4 NJ | 2.2 |
| 2,4-DDE | 0.8 U | 4.1 J | 0.8 U |
| 2,4-DDT | 1.8 | 0.8 U | 0.8 U |
| 4,4-DDD | 32 | 9.6 | 7.9 |
| 4,4-DDE | 37 J | 17 | 21 |
| 4,4-DDT | 8.8 NJ | 2.9 NJ | 2.3 NJ |
| **Total DDT** | **84** | **36** | **33.4** |
| Dieldrin | 6.6 J | 3.1 | 3.2 |
| Aldrin | 0.8 U | 0.8 U | 0.8 U |
| alpha-BHC | 0.8 U | 0.8 U | 0.8 U |
| alpha-Chlordane | 1.1 NJ | 1.3 NJ | 1.8 NJ |
| beta-BHC | 0.8 U | 0.8 U | 0.8 U |
| delta-BHC | 0.8 U | 0.8 UJ | 0.8 U |
| Endosulfan I | 0.8 U | 0.8 U | 1.1 NJ |
| Endosulfan II | 0.8 U | 0.8 U | 0.8 U |
| Endosulfan sulfate | 0.8 U | 0.8 UJ | 0.8 U |
| Endrin | 1.6 | 0.8 U | 25 |
| Endrin aldehyde | 0.8 U | 0.8 UJ | 0.8 U |
| Gamma-BHC (Lindane) | 0.8 U | 0.8 U | 0.8 U |
| gamma-Chlordane | 2 NJ | 0.8 U | 1.8 |
| Heptachlor | 0.94 | 0.8 U | 0.8 U |
| Heptachlor epoxide | 0.8 U | 0.8 U | 0.8 U |
| Methoxychlor | 0.8 U | 0.8 U | 0.8 U |
| Toxaphene | 100 U | 100 U | 100 U |

Notes:

ug/kg: microgram per kilogram (ppb)
FD: Field dupllicate
C: Calculated
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

# Appendix C
# Risk Assessment and Toxicology Analysis

# United Heckathorn Superfund Site Five-Year Review Human Health Risk Assessment and Toxicology Analysis

PREPARED FOR: United States Environmental Protection Agency, Region IX

PREPARED BY: Gayle Lytle/CH2M HILL

DATE: June 27, 2011

This technical memorandum (TM) presents an analysis of human health risk assessment (HHRA) and toxicity factors in support of the Five-Year Review of the United Heckathorn Superfund Site on Richmond Harbor, an inlet of San Francisco Bay, in Contra Costa County, California. The Record of Decision (ROD) selecting the remedy for the United Heckathorn site was issued by the U.S. Environmental Protection Agency (USEPA) in October 1994.

As described in the guidance for USEPA's Comprehensive Five-Year Reviews (USEPA 2001), a key purpose of the five-year review process for a site is to determine if the remedy is, or upon completion will be, protective of human health and the environment. Protectiveness is generally defined in the National Contingency Plan (NCP) by the risk range and the Hazard Index (HI). The following three questions are part of the technical assessment of the protectiveness of the remedy, as outlined in the USEPA five-year review guidance document:

- Question A – Is the remedy functioning as intended by the decision documents?
- Question B - Are the exposure assumptions, toxicity data, and remedial action objectives (RAOs) used at the time of remedy selection still valid?
- Question C – Has any other information come to light that could call into question the protectiveness of the remedy?

To determine whether the protectiveness of the remedy at the United Heckathorn site has been maintained, the sections below evaluate changes in site conditions, changes in exposure pathways, changes in toxicity values, changes in risk assessment methodologies, and changes in cleanup levels since selection of the site remedy. Protection of the environment (ecological risk of the marine sediments) at the site is evaluated in a separate technical memorandum.

The HHRA for the Site was prepared by ICF Technology, Inc. in May 1994 (ICF 1994) and was updated in a TM titled *Reassessment of Total DDT and Dieldrin Remediation Levels to Address the Fish Consumption Pathway* in February 2010 (CH2M HILL 2010). Both of these documents were reviewed for this evaluation.

# Changes in Site Conditions

The former United Heckathorn facility includes approximately 5 acres of upland area currently owned by Levin Richmond Terminal Corporation (LRTC). A dry bulk cargo shipping terminal with a dock for ocean-going vessels occupies this site. The former United Heckathorn facility is bounded to the west by the Lauritzen Channel. The Lauritzen Channel connects to the Santa Fe Channel on its southern end. The Santa Fe Channel connects at its east end with the Richmond Inner Harbor Channel. The Parr Canal lies east of the Lauritzen Channel and is not actively used as a waterway. The TM which updated the original HHRA (CH2M HILL 2010) evaluated these four waterways.

No major changes in the site conditions that might affect the exposure pathways were identified as part of the five-year review. The Levin Terminal is surrounded by other industrial facilities. The property is fenced and access is limited. The cap over the upland area is in good condition and is operating and functioning as designed.

The results of the 2008 fish sampling event (CH2M HILL 2008) and 2010 reassessment of risk (CH2M HILL 2010) indicated that fish tissue concentrations of DDT and dieldrin in the Lauritzen Channel are still present at levels that could pose unacceptable risk to people consuming fish. In general, fish caught in the Parr Canal, Santa Fe Channel, and Richmond Inner Harbor pose risks and hazards to fish consumers that are within the risk management range and below the noncancer threshold. A focused feasibility study is being prepared to address the sources of sediment contamination identified since the ROD was issued.

On May 23, 2011, the California Environmental Protection Agency's (Cal/EPA's) Office of Environmental Health Hazard Assessment (OEHHA) issued an updated fish advisory for San Francisco Bay which also specifies a "do not eat" fish advisory for the Lauritzen Channel (Cal/EPA 2011). This updated advisory replaces the specific advisory for the Richmond Harbor Channel issued in 1993 which advised that no one eat specific fish species (croakers, surfperches, bullheads, gobies, or shellfish).

# Changes in Exposure Pathways

No additional contaminants or new routes of human exposure were identified that would affect the protectiveness of the remedy. The 1994 HHRA reported that among the potential human exposure pathways for site contaminants, only the consumption of fish posed risks above USEPA's acceptable risk range. This potential for risk continues as harvesting of fish and/or shellfish from the Lauritzen Channel, Santa Fe Channel, and/or Richmond Inner Harbor Channel by fishermen and potential ingestion by their families still occurs. Community interviews confirmed that fishing occurs regularly in the Richmond Harbor, particularly at a site in the Richmond Inner Harbor Channel near the Parr Canal that has unrestricted access. It was reported that some anglers are from the most vulnerable communities at risk. Fishing in the Lauritzen Channel is restricted because it is surrounded by fenced industrial facilities, and fishing boats are discouraged by warning signs in English, Spanish, Vietnamese, and Laotian, posted under a 1986 order of the California Department of Health Services.

# Changes in Toxicity Values

The main constituents of concern (COCs) at the United Heckathorn site are DDT and dieldrin. The human health toxicity values used for these compounds have not changed since the 1994 HHRA was performed. Changes to other toxicity values are documented in Table 1 at the end of this TM; however, these changes do not affect the protectiveness of the remedy.

For compounds other than DDT and dieldrin, most of the changes to the toxicity values since the 1994 HHRA documented in the 2006 Five-Year Review are still valid. In addition, for carcinogenic effects, slope factors for ethylbenzene, 1,2,4-trichlorobenzene, and butylbenylphthalate were not considered in the original HHRA. In November 2007, OEHHA adopted a unit risk factor for ethylbenzene based on the incidence of kidney cancer in male rats. Inhalation unit risk factors were not considered in the original HHRA for hexachlorocyclohexane, gamma isomer (gamma-BHC), benzo(a)anthracene, benzo(b)fluoranthene, chrysene, dichloro- diphenyl-dichloroethane (DDD), dichloro-diphenyl-dichloroethylene (DDE), dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, pentachlorophenol, and nickel, so cancer effects may have been underestimated. In addition, new slope factors for pentachlorophenol and tetrachloroethene indicate an increased cancer risk compared to that previously considered. However, revisions to the slope factors for gamma-BHC (oral only), 1,4-dichlorobenzene (oral only), benzo(a)pyrene (inhalation only), trichloroethene (oral only), and arsenic (oral only) indicate a lower excess cancer risk associated with potential oral or inhalation exposures to these compounds than previously considered.

Oral reference doses for 1,4-dichlorobenzene, ethylbenzene, pentachlorophenol, toluene, and xylenes indicate increased hazard quotients since the 1994 HHRA, so noncancer effects for these chemicals may have previously been underestimated. However, revisions to oral reference doses for endosulfan, naphthalene, copper, and zinc indicate reduced hazard quotients from exposure to these chemicals than previously considered. In addition, DDD, DDE, polychlorinated biphenyls (PCBs), trichloroethene (TCE), and lead had oral references doses that have been withdrawn since the 1994 HHRA. As these compounds are no longer evaluated as noncarcinogens, the 1994 hazard indices may have been overestimated.

Inhalation references doses for 1,4-dichlorobenzene, toluene, xylenes, and chromium indicate a decrease in hazard index since the 1994 HHRA. In contrast, 1,2,4-trichlorobenzene, mercury, and vinyl chloride indicate an increase in hazard index. New reference concentrations for isophorone, naphthalene, tetrachloroethylene, arsenic, cadmium, and nickel also indicate an increase in hazard index compared to that previously considered.

It should be noted that the 2009 USEPA external review draft document entitled *Toxicological Review of Trichloroethylene (CAS No. 79-01-6) In Support of Summary Information on the Integrated Risk Information System (IRIS)* (EPA/635/R-09/011A) proposes TCE cancer slope factors for inhalation and oral exposures that are greater (more conservative) than those of Cal/EPA. Future changes in the USEPA toxicity criteria for TCE (and potential updates to the maximum contaminant level [MCL]) should be considered during subsequent reviews to ensure the protectiveness of the remediation is maintained.

# Changes in Cleanup Levels

The remedial goals for surface water, as reported in the 1994 ROD, were based on the USEPA Ambient Water Quality Criteria for DDT and dieldrin (consumption of organisms, only). These criteria were updated in 2009. The National Recommended Water Quality Criteria (NRWQC; USEPA 2009c) for DDT and dieldrin have decreased from 0.59 nanograms per liter (ng/L) for DDT to 0.22 ng/L and from 0.14 ng/L for dieldrin to 0.054 ng/L.

The HHRA Update TM (CH2M HILL 2010) recommended sediment risk-based concentrations (RBCs) derived using empirical data describing the relationships between sediment and acceptable fish tissue concentrations. The sediment RBC for dieldrin is 13 micrograms per kilogram (μg/kg) based on a cancer endpoint of $1x10^{-4}$, and the sediment RBC for DDT is 450 μg/kg based on a noncancer endpoint (HQ=1). The Update concluded that because these site-specific goals are based on site-specific data, the sediment RBCs would be more appropriate for use in future remediation decisions compared with the previous remedial goals established in the 1994 ROD.

# Changes in Risk Assessment Methodology

USEPA has published several new risk assessment guidance documents since the ROD was prepared, some of which have been discussed above. The following is a list of these new guidance documents:

- *Risk Assessment Guidance for Superfund–Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final* (USEPA 2004)
- *Guidelines for Carcinogen Risk Assessment* (USEPA 2005a)
- *Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens* (USEPA 2005b)
- *Risk Assessment Guidance for Superfund: Volume I Human Health Evaluation Manual - Part F, Supplemental Guidance for Inhalation Risk Assessment* (USEPA 2009b)

On March 29, 2005, USEPA issued the revised *Guidelines for Carcinogen Risk Assessment* (USEPA 2005a), along with an associated document entitled *Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens* (USEPA 2005b). These documents provide guidance for assessing carcinogens considered to have a mutagenic mode of action (MOA). If a chemical has been determined to cause cancer by a mutagenic MOA, USEPA has noted that it is possible that exposures to that chemical in early life may result in higher lifetime cancer risks than a comparable duration adult exposure (USEPA 2009b). Carcinogenic PAHs are chemicals that have been considered to have a mutagenic MOA, whereas the ROD did not consider this designation. Since the mutagenic MOA approach only affects early-life stages, this issue only affects the residential and recreational exposure scenarios. Since the off-site residential and recreational risk assessments did not consider this approach, those risk estimates could be underestimated compared to using the current approach.

# Conclusions

Post-remediation marine monitoring indicates that remediation goals for DDT and dieldrin for water and sediments have not been maintained. Concentrations of DDT and dieldrin in some fish species have increased from 1994 to 2008 in the Lauritzen Channel. The updated risk assessment indicated that these contaminants may continue to pose unacceptable risk to fishermen and their families. A focused feasibility study is being prepared to address the sources of sediment contamination identified since the ROD was issued.

Community interviews conducted by USEPA since the previous Five-Year Review confirmed that the marine area is used by recreational fishermen, despite multilingual signs posted by the Department of Health Services that warn of the risks of consuming fish or shellfish. It is likely that some consumption of contaminated fish still occurs because access to the site by trespassing boats cannot be completely eliminated. Also, fish within the site may migrate to outlying areas that are legally accessible to fishermen. Such conditions may pose a risk to human health.

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TABLE 1
Comparison Between 1994 Toxicity Values and Current Regional Screening Level (RSL) Values

| Chemical | Ingestion Exposure | | | | | | Inhalation Exposure | | | | | | Rationale for Chemicals with No Toxicity Values |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | RfDo (mg/kg-day) | | | SFo (mg/kg-day)$^{-1}$ | | | RfC (mg/m$^3$) | | | URF (µg/m$^3$) | | | |
| | Table 2-4 from 1994 HHRA | November 2010 RSL Table | Change in Toxicity | Table 2-4 from 1994 HHRA | November 2010 RSL Table | Change in Toxicity | Table 2-4 from 1994 HHRA | November 2010 RSL Table | Change in Toxicity | Table 2-4 from 1994 HHRA | November 2010 RSL Table | Change in Toxicity | |
| **ORGANIC COMPOUNDS** | | | | | | | | | | | | | |
| Acenaphthene | 6.00E-02 | 6.00E-02 | no change | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| Acenaphthylene | 6.00E-02 | 6.00E-02 | no change | -- | -- | -- | -- | -- | -- | -- | -- | -- | Similar structure - grouped with acenaphthene |
| Aldrin | 3.00E-05 | 3.00E-05 | no change | 1.70E+01 | 1.70E+01 | no change | -- | -- | -- | 4.90E-03 | 4.90E-03 | no change | |
| Anthracene | 3.00E-01 | 3.00E-01 | no change | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| alpha-BHC | -- | 8.00E-03 | more toxic | 6.30E+00 | 6.30E+00 | no change | -- | -- | -- | 1.80E-03 | 1.80E-03 | no change | |
| beta-BHC | -- | -- | -- | 1.80E+00 | 1.80E+00 | no change | -- | -- | -- | 5.30E-04 | 5.30E-04 | no change | |
| delta-BHC | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| gamma-BHC | 3.00E-04 | 3.00E-04 | no change | 1.30E+00 | 1.10E+00 | less toxic | -- | -- | -- | -- | 3.10E-04 | more toxic | |
| Benzo(a)anthracene | -- | -- | -- | 7.30E-01 | 7.30E-01 | no change | -- | -- | -- | -- | 1.10E-04 | more toxic | |
| Benzo(b)fluoranthene | -- | -- | -- | 7.30E-01 | 7.30E-01 | no change | -- | -- | -- | -- | 1.10E-04 | more toxic | |
| Benzo(k)fluoranthene | -- | -- | -- | 7.30E-01 | 7.30E-02 | less toxic | -- | -- | -- | -- | 1.10E-04 | more toxic | |
| Benzo(g,h,i)perylene | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | Similar structure - grouped with pyrene |
| Benzo(a)pyrene | -- | -- | -- | 7.30E+00 | 7.30E+00 | no change | -- | -- | -- | 1.70E-03 | 1.10E-03 | less toxic | |
| Chrysene | -- | -- | -- | 7.30E-03 | 7.30E-03 | no change | -- | -- | -- | -- | 1.10E-05 | more toxic | |
| DDD | 5.00E-04 | -- | less toxic | 2.40E-01 | 2.40E-01 | no change | -- | -- | -- | -- | 6.90E-05 | more toxic | |
| DDE | 5.00E-04 | -- | less toxic | 3.40E-01 | 3.40E-01 | no change | -- | -- | -- | -- | 9.70E-05 | more toxic | |
| DDT | 5.00E-04 | 5.00E-04 | no change | 3.40E-01 | 3.40E-01 | no change | -- | -- | -- | 9.70E-05 | 9.70E-05 | no change | |
| Dibenz(a,h)anthracene | -- | -- | -- | 7.30E+00 | 7.30E+00 | no change | -- | -- | -- | -- | 1.20E-03 | more toxic | |
| 1,4-Dichlorobenzene | 1.00E-01 | 7.00E-02 | more toxic | 2.40E-02 | 5.40E-03 | less toxic | 7.00E-01 | 8.00E-01 | less toxic | -- | 1.10E-05 | more toxic | |
| trans-1,2-Dichloroethene | 2.00E-02 | 2.00E-02 | no change | -- | -- | -- | -- | 6.00E-02 | more toxic | -- | -- | -- | |
| Dichlorprop | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | Similar structure, grouped with 2,4-DB |
| Dieldrin | 5.00E-05 | 5.00E-05 | no change | 1.60E+01 | 1.60E+01 | no change | -- | -- | -- | 4.60E-03 | 4.60E-03 | no change | |
| 2,4-Dimethylphenol | 2.00E-02 | 2.00E-02 | no change | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| Endosulfan | 5.00E-05 | 6.00E-03 | less toxic | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| Endrin | 3.00E-04 | 3.00E-04 | no change | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| Ethylbenzene | 1.00E-01 | 3.00E-02 | more toxic | -- | 1.10E-02 | more toxic | 1.00E+00 | 1.00E+00 | no change | -- | 2.50E-06 | more toxic | |

TABLE 1
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| Fluoranthene | 4.00E-02 | 4.00E-02 | no change | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| Fluorene | 4.00E-02 | 4.00E-02 | no change | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| Heptachlor | 5.00E-04 | 5.00E-04 | no change | 4.50E+00 | 4.50E+00 | no change | -- | -- | -- | 1.30E-03 | 1.30E-03 | no change | |
| Heptachlor epoxide | 1.30E-05 | 1.30E-05 | no change | 9.10E+00 | 9.10E+00 | no change | -- | -- | -- | 2.60E-03 | 2.60E-03 | no change | |
| Indeno(1,2,3-cd)pyrene | -- | -- | -- | 7.30E-01 | 7.30E-01 | no change | -- | -- | -- | -- | 1.10E-04 | more toxic | |
| Isophorone | 2.00E-01 | 2.00E-01 | no change | 4.10E-03 | 9.50E-04 | less toxic | -- | 2.00E+00 | more toxic | -- | -- | -- | |
| 2-Methylnaphthalene | 4.00E-03 | 4.00E-03 | no change | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| Motor Oil | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| Naphthalene | 4.00E-03 | 2.00E-02 | less toxic | -- | -- | -- | -- | 3.00E-03 | more toxic | -- | 3.40E-05 | more toxic | |
| 2-Nitrophenol | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| PCB | 1.00E-04 | -- | less toxic | 7.70E+00 | 2.00E+00 | less toxic | -- | -- | -- | -- | 5.70E-04 | more toxic | |
| Pentachlorophenol | 3.00E-02 | 5.00E-03 | more toxic | 1.20E-01 | 4.00E-01 | more toxic | -- | -- | -- | -- | 5.10E-06 | more toxic | |
| Phenanthrene | 3.00E-01 | 3.00E-01 | no change | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| Butylbenzylphthalate | 2.00E-01 | 2.00E-01 | no change | -- | 1.90E-03 | more toxic | -- | -- | -- | -- | -- | -- | |
| Di-n-butylphthalate | 1.00E-01 | 1.00E-01 | no change | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| bis(2-ethylhexyl)phthalate | 2.00E-02 | 2.00E-02 | no change | 1.40E-02 | 1.40E-02 | no change | -- | -- | -- | -- | 6.20E-02 | more toxic | |
| Pyrene | 3.00E-02 | 3.00E-02 | no change | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| Tetrachloroethene | 1.00E-02 | 1.00E-02 | no change | 5.10E-02 | 5.40E-01 | more toxic | -- | 2.70E-01 | more toxic | 5.20E-07 | 5.90E-06 | more toxic | |
| Toluene | 2.00E-01 | 8.00E-02 | more toxic | -- | -- | -- | 4.00E-01 | 5.00E+00 | less toxic | -- | -- | -- | |
| Toxaphene | -- | -- | -- | 1.10E+00 | 1.10E+00 | no change | -- | -- | -- | 3.20E-04 | 3.20E-04 | no change | |
| 1,2,4-Trichlorobenzene | 1.00E-02 | 1.00E-02 | no change | -- | 2.90E-02 | more toxic | 9.00E-03 | 2.00E-03 | more toxic | -- | -- | -- | |
| Trichloroethene | 7.35E-03 | -- | less toxic | 1.10E-02 | 5.90E-03 | less toxic | -- | -- | -- | 1.70E-06 | 2.00E-06 | more toxic | |
| Vinyl chloride | -- | 3.00E-03 | more toxic | 1.90E+00 | 7.20E-01 | less toxic | -- | 1.00E-01 | more toxic | 8.40E-05 | 4.40E-06 | less toxic | |
| Xylenes | 2.00E+00 | 2.00E-01 | more toxic | -- | -- | -- | 1.00E-01 | 1.00E+00 | less toxic | -- | -- | -- | |

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| **INORGANIC COMPOUNDS** | | | | | | | | | | | | | |
| Antimony | 4.00E-04 | 4.00E-04 | no change | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| Arsenic | 3.00E-04 | 3.00E-04 | no change | 1.75E+00 | 1.50E+00 | less toxic | -- | 1.50E-05 | more toxic | 4.00E-03 | 4.30E-03 | more toxic | |
| Cadmium | 5.00E-04 | 5.00E-04 | no change | -- | -- | -- | -- | 1.00E-05 | more toxic | 1.80E-03 | 1.80E+03 | no change | |
| Chromium | 5.00E-03 | 3.00E-03 | more toxic | -- | 5.00E-01 | more toxic | 2.00E-06 | 1.00E-04 | less toxic | 1.20E-02 | 8.20E-02 | more toxic | Because values for chromium are no longer listed in RSL table, toxicity values for hexavalent chromium used |
| Copper | 3.70E-02 | 4.00E-02 | less toxic | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| Lead | 2.80E-04 | -- | change unknown | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| Mercury | 3.00E-04 | 3.00E-04 | no change | -- | -- | -- | 3.00E-04 | 3.00E-05 | more toxic | -- | -- | -- | |
| Nickel | 2.00E-02 | 2.00E-02 | no change | -- | -- | -- | -- | 9.00E-05 | more toxic | -- | 2.60E-04 | more toxic | |
| Silver | 5.00E-03 | 5.00E-03 | no change | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| Zinc | 2.00E-01 | 3.00E-01 | less toxic | -- | -- | -- | -- | -- | -- | -- | -- | -- | |

**Notes:**

µg/m$^3$ = micrograms per cubic meter
HHRA = Human Health Risk Assessment
mg/kg-day = milligrams per kilogram per day
mg/m$^3$ = milligrams per cubic meter
RfC = reference concentration
RfDo = oral reference dose
RSL = Regional Screening Level
SFo = oral slope factor
URF = unit risk factor

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# United Heckathorn Superfund Site Five-Year Review Ecological Risk Assessment and Toxicology Analysis

PREPARED FOR: United States Environmental Protection Agency, Region IX

PREPARED BY: Cameron Irvine/CH2M HILL

DATE: June 27, 2011

This technical memorandum presents an ecological risk assessment and ecotoxicology analysis in support of the Five-Year Review of the United Heckathorn Superfund Site (the site) in Richmond Harbor, an inlet of San Francisco Bay, in Contra Costa County, California. The Record of Decision (ROD) selecting the remedy for the United Heckathorn site was issued by the United States Environmental Protection Agency (USEPA) in October 1994 (USEPA 1994a).

The following three questions are part of the technical assessment of the protectiveness of the remedy, as outlined in the USEPA five-year review guidance document (USEPA 2001):

- Question A – Is the remedy functioning as intended by the decision documents?
- Question B - Are the exposure assumptions, toxicity data, and remedial action objectives (RAOs) used at the time of remedy selection still valid?
- Question C – Has any other information come to light that could call into question the protectiveness of the remedy?

In an effort to determine whether the remedy at the United Heckathorn site remains protective for ecological receptors, this memorandum discusses changes in site conditions, changes in exposure pathways, and changes in toxicity values since selection of the site remedy. Protectiveness of the risk to human health is evaluated in a separate document.

The ecological risk assessment (ERA) for the site was prepared in 1994 (USEPA 1994b). A reassessment of the remediation levels protective of ecological receptors at the United Heckathorn Superfund Site was conducted in 2010 (CH2M HILL 2010). These documents were reviewed as part of this evaluation.

## Changes in Site Conditions

The former United Heckathorn facility includes approximately 5 acres of upland area currently owned by Levin Richmond Terminal Corporation. A dry bulk cargo shipping terminal with a dock for ocean-going vessels occupies this site. The former United Heckathorn facility is bounded to the west by the Lauritzen Channel. The Lauritzen Channel connects to the Santa Fe Channel on its southern end. The Santa Fe Channel connects at its east end with the Richmond Inner Harbor Channel. The Parr Canal lies east of the Lauritzen Channel and is not actively used as a waterway. CH2M HILL (2010) evaluated these four waterways.

In 1999, a sediment re-contamination investigation was implemented (Battelle 2001a). The results of that investigation triggered Phase I and Phase II Source Investigations (Battelle 2002a, 2003, 2004; PNNL 2004). Those investigations focused on dichlorodiphenyltrichloroethane (DDT) and dieldrin concentrations along the eastern embankment of Lauritzen Channel adjacent to the former United Heckathorn facility as potential sources of recontamination to sediment within the channel.

Post-remediation (1999-present) monitoring of the Lauritzen Channel suggested that remedial goals for both water and sediment defined in the 1994 ROD have not been maintained and the DDT is bioavailable and accumulated by resident biota (Battelle 2000a, 2000b, 2001b, 2002a, 2002b, 2004). The biomonitoring studies focused on collection and analyses of mussel tissue and surface water samples at four monitoring stations in the Lauritzen, Santa Fe, and Richmond Inner Harbor Channels. In the Year 5 Post-Remediation Biomonitoring event, surface water and mussel tissue samples were also collected from locations within the Parr Canal. A study evaluating the dredging success by comparing body burdens of pre-dredged biota with post-dredged biota found significant levels of DDT remained in fish up to 16 months post-remedial dredging (Weston et al. 2002). That study also suggested that even migratory fish accumulate DDT relatively quickly and that only a few months of residency could increase the body burden of DDT.

A Focused Feasibility Study (FFS) is being prepared to develop an updated remedy that protects human health and the environment. Additional sampling of sediment, surface water, resident mussels, and fish were collected to characterize the current state of the site and address data gaps (CH2M HILL 2008a, 2008b).

Mussel tissue, surface water, and sediment sampling was conducted in three field events between June and August 2007. Samples from multiple locations representing the Lauritzen Channel, Parr Canal, Santa Fe Channel, and Richmond Inner Harbor Channel were analyzed for dieldrin and total DDT. In 2008, fish and shrimp sampling was conducted in the Lauritzen Channel, Richmond Inner Harbor Channel, Santa Fe Channel, and Parr Canal. Total DDT and dieldrin concentrations were analyzed in individual and composite fish and shrimp samples. Based on a comparison of mean concentrations of total DDT and dieldrin, concentrations in fish collected within the Lauritzen Channel were found to contain significantly more total DDT and dieldrin relative to fish collected within the Santa Fe Channel, Parr Canal, Richmond Inner Harbor Channel, and San Francisco Bay.

## Changes in Exposure Pathways

No additional contaminants or new exposure pathways were identified as part of the Five-Year Review. However, a refined version of the site conceptual model describing exposure pathways in greater detail than the 1994 ERA (USEPA 1994b) is included in the FFS Sampling and Analysis Plan (CH2M HILL 2007). Potential new contaminant sources were also identified during the Phase I and Phase II Source Investigations (Battelle 2002a, 2003, 2004; PNNL, 2004). These investigations identified a broken concrete outfall below the riprap on the eastern shore about 180 feet north of the Levin Pier which is a continuing source of sediment contamination. The Phase II Source Investigation also confirmed and delineated the sediment hotspot beneath the north end of Levin Pier.

## Changes in Toxicity Values

Updated toxicity values for specific constituents of concern in sediments at the United Heckathorn Superfund Site have been evaluated since the previous ERA was completed in 1994. These new data may affect the protectiveness of the remedy.

Literature-derived tissue-based effect levels for dieldrin and total DDT in fish and shrimp are available in Jarvinen and Ankley (1999), the U.S. Army Corps of Engineers' Environmental Effects Residue Database (ERED; http://el.erdc.usace.army.mil/ered/), Beckvar et al. (2005), and Beckvar and Lotufo (2010). Whole-body tissue-based threshold effect levels for dieldrin for fish and invertebrates are 0.2 and 0.08 milligrams per kilogram (mg/kg) wet weight, respectively; values for total DDT are 0.6 and 0.15 mg/kg wet weight for fish and invertebrates, respectively. Threshold sediment effect levels for total DDT and dieldrin in site sediments were calculated using wet-weight/bulk sediment and lipid-weight/total organic carbon empirical bioaccumulation models, and with a mechanistic model (CH2M HILL 2010). These models identified sediment threshold effect concentrations for a variety of invertebrate, fish, bird and mammal receptors ranging from 150 to 110,000 micrograms per kilogram (µg/kg) dry weight total DDT, and from 34 to 2,600 µg/kg dry weight dieldrin.

## Changes in Cleanup Levels

The remedial goals for surface water, as reported in the 1994 ROD, were based on the USEPA Ambient Water Quality Criteria for DDT and dieldrin based on the protection of human health. These criteria were updated in 2009. The National Recommended Water Quality Criteria (NRWQC; USEPA 2009) for DDT and dieldrin have decreased from 0.59 nanograms per liter (ng/L) for DDT to 0.22 ng/L and from 0.14 ng/L for dieldrin to 0.054 ng/L. These NRWQC for the protection of human health are below the NRWQC chronic marine criteria for the protection of aquatic life for DDT and dieldrin of 1.0 and 1.9 ng/L, respectively (USEPA 2009).

The remedial goal for DDT in sediment reported in the 1994 ROD, based on the 1994 ERA, was 590 µg/kg dry weight. Risk-based sediment concentrations for as many as 18 fish and wildlife receptors found that concentrations lower than the 1994 remedial goal may be needed to be protective of invertebrates, fish, birds, and mammals (CH2M HILL 2010). Total DDT concentrations as low as 150 µg/kg, and sediment concentrations of dieldrin as low as 34 µg/kg would be protective of all modeled ecological receptors.

## Conclusions

- The remedy is not functioning as intended by the decision documents. Post-remediation (1999-present) monitoring of the Lauritzen Channel suggested that remedial goals as defined in the 1994 ROD have not been maintained. Consequently, an FFS is being prepared to address the sources of sediment contamination identified since the ROD was issued.
- Exposure assumptions, toxicity data, and RAOs used at the time of remedy selection are no longer valid. Additional investigations as part of a FFS have collected additional data to define current conditions at the Site.

- New information calls into question the protectiveness of the remedy. Updated toxicity data and a reassessment of the remediation levels identified potential RAOs that are more protective of ecological receptors at the site than those in the ROD.

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# Appendix D
# ARARs Review

# United Heckathorn Superfund Site Five-Year Review Applicable or Relevant and Appropriate Requirements (ARARs) Evaluation

| | |
|---|---|
| PREPARED FOR: | United States Environmental Protection Agency, Region IX |
| PREPARED BY: | CH2M HILL |
| DATE: | June 27, 2011 |
| PROJECT NUMBER: | 419426.SR.01 |

This technical memorandum presents an evaluation of the Applicable or Relevant and Appropriate Requirements (ARARs) at the United Heckathorn Superfund Site (site).

## Purpose of ARARs Review

The purpose of an ARARs review is to determine whether laws, regulations, or guidance promulgated since approval of site decision documents alter the remedy's protectiveness of human health and the environment.

Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), ARARs are specified in the Record of Decision (ROD). Changes to ARARs, where necessary, can be memorialized in ROD Amendments or Explanations of Significant Differences (ESDs).

The preamble to the National Contingency Plan (NCP) states that remedy selection decisions are not to be reopened unless new or modified requirements call into question the protectiveness of the selected remedy (55 CFR 8757, March 8, 1990). This is interpreted to mean generally that ARARs are frozen at the time of remedy approval, unless updated by additional decision documents.

## ARARs Background

Section 121(d) of CERCLA requires that remedial actions implemented at CERCLA sites are carried out in compliance with any federal or more stringent state environmental standards, requirements, criteria, or limitations that are determined to be ARARs.

CERCLA response actions are exempted by law from the requirement to obtain federal, state or local permits related to any activities conducted completely on-site. However, this does not remove the requirement to meet the substantive provisions of permitting regulations that are ARARs.

## United Heckathorn Site Background

The United Heckathorn site is a CERCLA Superfund Site, and was placed on the National Priorities List in 1990. The site is located on Richmond Harbor, in Contra Costa County, California. The site includes five acres of land and approximately 15 acres of marine area (including Lauritzen Channel and Parr Canal) of Richmond Harbor (see main document, Figure 1).

The following remedies were selected in the 1994 ROD for the United Heckathorn site (U.S. Environmental Protection Agency [USEPA] 1994):

- Dredge all soft (young) bay mud from Lauritzen Channel and Parr Canal, with off-site disposal of dredged material.
- Place clean material in Lauritzen Channel and Parr Canal after dredging.
- Construct a cap around the former formulation area to prevent soil erosion.
- Attach a deed restriction limiting use of the property to non-residential uses.
- Implement upland operations and maintenance (O&M) and marine monitoring to verify the effectiveness of the remedy.

The selected remedial actions at Lauritzen Channel and Parr Canal were completed in 1997. Construction of the cap at the upland area was completed in 1999. Monitoring continues in the upland area, and in the marine sediments and surface waters of Lauritzen Channel and Parr Canal.

## United Heckathorn Site ARARs Review

The following tables list the ARARs (USEPA 1994) that relate to the protectiveness of the remedy, summarize the requirement for each ARAR, cite the regulatory basis for each ARAR, state the evaluated status of each ARAR, and comment on regulatory changes for each ARAR where applicable.

Table 1 contains chemical–specific ARARs, and Table 2 contains location-specific ARARs. The tables provide the applicable requirements and citation for each established ARAR; and describe whether any updates have occurred for each ARAR since the previous Five-Year Review. Current versions of the California Code of Regulations (CCR), the Code of Federal Regulations (CFR), and other publications were consulted (via the internet or in hardcopy) to review pertinent updates of laws, regulations, or guidance.

TABLE 1
Chemical-Specific ARARs

| Contaminant | Media | Requirement | Citation | Origin | ARARs Determination | Comments |
|---|---|---|---|---|---|---|
| DDT and Dieldrin | Surface Waters | Human Health water quality criteria (WQC); Remediation Goal as established by U.S. Environmental Protection Agency (USEPA) ambient water quality criteria (AWQC), derived to determine the Human Health WQC to prevent contaminant bioaccumulation for the protection of human health from consumption of fish | Clean Water Act (CWA). 42 USC Section 9621(d)(2)(A)(ii) and 40 CFR Section 300.430(e)(2)(i)(G). CWA, Section 304(a) requires USEPA criteria for water quality | 1994 Record of Decision (ROD) | Applicable | The following Human Health WQC were identified in the ROD and in the 2006 Five-Year Review:<br>• DDT = 0.59 nanograms per liter (ng/L)<br>• Dieldrin = 0.14 ng/L<br>In 2002 these criteria were revised to the following:<br>• DDT = 0.22 ng/L<br>• Dieldrin = 0.054 ng/L<br>(USEPA 2009) |
| DDT and Dieldrin | Surface Waters | Marine Chronic WQC; Established by USEPA AWQC, derived to determine the Marine Chronic WQC to be protective of marine organisms and environment | CWA. 42 USC Section 9621(d)(2)(A)(ii)and 40 CFR Section 300.430(e)(2)(i)(G). CWA, Section 304(a) requires USEPA criteria for water quality | 1994 ROD | Applicable | The following Marine Chronic WQC were identified in the ROD and in the 2006 Five-Year Review:<br>• DDT = 1 ng/L<br>• Dieldrin = 1.9 ng/L<br>These criteria remain unchanged. |
| DDT and Dieldrin | Surface Waters | Control the release of hazardous substances to surface waters | Porter-Cologne, and U.S. Fish and Game Code, Section 5650 | 1994 ROD | Applicable | Based on the results of the ecological assessment, mean sediment levels were calculated to prevent violations of the remediation goal ARARs for surface waters, and to meet the National Academy of Sciences (NAS) action level for DDT in fish to ensure protection of fish-eating birds. |

TABLE 1
Chemical-Specific ARARs

| Contaminant | Media | Requirement | Citation | Origin | ARARs Determination | Comments |
|---|---|---|---|---|---|---|
| DDT and Dieldrin | Fish and Shellfish | The NAS saltwater action levels are "To Be Considered" criteria (TBCs), which provide an additional level of protection to fish-eating birds beyond the level that is the basis of the surface water ARARs for aquatic life. The NAS action level was retained as a TBC to help determine the protectiveness of remediation, since the U.S. Fish and Wildlife Service raised concerns that the USEPA criteria for DDT might not be stringent enough for the protection of fish-eating birds. | 55 FR 8745 | 1994 ROD | TBC | The NAS action level for DDT in fish of 0.05 milligrams per kilogram (mg/kg) was identified in the ROD and in the 2006 Five-Year Review. This level remains unchanged.<br>No chemical-specific soil or sediment remedial goals were identified as ARARs in the ROD or Explanation of Significant Differences. Based on the results of the ecological assessment, mean sediment levels were calculated to prevent violations of the remediation goal ARARs for surface waters, and to meet the NAS action level for DDT in fish to ensure protection of fish-eating birds. |
| DDT and Dieldrin | Fish and Shellfish | The U.S. Food and Drug Administration (FDA) action levels for the marketability of fish and shellfish are TBCs for protecting human health; these levels are less stringent than the levels that would be achieved by meeting the surface water ARARs. | 21 CFR 109 and 509 | 1994 ROD | TBC | The following FDA action levels were identified in the ROD and in the 2006 Five-Year Review:<br>• DDT = 5.0 parts per million (ppm)<br>• Dieldrin = 0.3 ppm<br>These levels remain unchanged. |

**Notes:**

AWQC = ambient water quality criteria
ARAR = Applicable or Relevant and Appropriate Requirement
CFR = Code of Federal Regulations
CWA = Clean Water Act
DDT = dichlorodiphenyltrichloroethane
FDA = U. S. Food and Drug Administration
FR = Federal Register
H&S Code = California Health and Safety Code
mg/kg = milligrams per kilogram
NAS = National Academy of Sciences
ng/L = nanograms per liter
Porter-Cologne = California Porter Cologne Water Quality Control Act
ppm = parts per million
ROD = Record of Decision
TBC = To Be Considered
TSCA = Toxic Substances Control Act
USC = U.S. Code
USEPA = U. S. Environmental Protection Agency
WQC = Water Quality Criteria

TABLE 2
Location-Specific ARARs

| Location | Requirement | Citation | Origin | ARARs Determination | Comments |
|---|---|---|---|---|---|
| Areas that potentially affect threatened or endangered species, or critical habitat | Conserve fish, wildlife and plants that are threatened with extinction; identify any threatened or endangered species, or critical habitat, that would be affected by remedial action. | ESA, 16 USC, Section 1531 et seq. | 1994 Record of Decision (ROD) | Applicable | The ROD and the 2006 Five-Year Review identified the following as federally listed endangered species: Least tern and California brown pelican.<br>The California brown pelican was delisted due to recovery in 2009 (74 FR 59444); the least tern remains listed.<br>The ROD and the 2006 Five-Year Review identified the American peregrine falcon as a state listed endangered species.<br>The American peregrine falcon was delisted due to recovery in 2009 (California Department of Fish and Game 2011) |
| Areas that potentially affect state threatened or endangered species, or critical habitat | Conserve fish, wildlife and plants that are threatened with extinction; identify any threatened or endangered species, or critical habitat, that would be affected by remedial action. | Cal-ESA, California Fish and Game Code, Section 2050 | 1994 ROD | Applicable | The ROD and the 2006 Five-Year Review identified the California black rail as a state threatened species; its status remains unchanged.<br>The ROD and the 2006 Five-Year Review identified the following potentially affected California rare plant species: Mason's lilaeopsis and soft bird's-beak. Their status remains unchanged. |

**Notes:**

ARAR = Applicable or Relevant and Appropriate Requirement
Cal-ESA = California Endangered Species Act
CDFG = California Department of Fish and Game
ESA = Federal Endangered Species Act of 1973
FR = Federal Register
H&S Code = California Health and Safety Code
ROD = Record of Decision
USC = United States Code

## United Heckathorn Site ARARs Summary

The United Heckathorn site ARARs (as established in the ROD [USEPA 1994] and ESD [USEPA 1996], and reviewed in the previous Five-Year Review [USEPA 2006]) were evaluated and detailed in Tables 1 and 2. The basis for ARARs consists of the laws and regulations applicable to the site location, remedy actions, and contaminants of concern (COCs). The COCs at the Heckathorn site include DDT and dieldrin.

As presented in the United Heckathorn Site Background section, the remedial actions specified in the 1994 ROD were implemented and monitoring of the upland cover and the surface water and sediment continues. Based on data collected from the Lauritzen Channel, the dredging of the Channel has not resulted in achievement of remedial action objectives in the Channel.

As noted above, CERCLA response actions are exempted by law from the requirement to obtain federal, state or local permits related to any activities conducted completely on-site. However, this does not remove the requirement to meet the substantive provisions of permitting regulations that are ARARs.

The changes to ARARs that were identified in this ARARs evaluation for the current United Heckathorn Superfund Site Five-Year Review, as summarized in Tables 1 and 2, are described below.

The following recommended human health water quality criteria (WQCs) were identified in the ROD:

- DDT = 0.59 nanograms per liter (ng/L)
- Dieldrin = 0.14 ng/L.

On May 19, 2000, USEPA published the final California Toxics Rule (CTR), promulgating the above water quality criteria for California.

In 2002, the recommended human health water quality criteria were revised to the following:

- DDT = 0.22 ng/L
- Dieldrin = 0.054 ng/L (USEPA 2009).

These WQCs have not been promulgated. Therefore, while the WQCs identified in the ROD are not as protective as the current USEPA-recommended WQC, they are consistent with the promulgated WQC established by the CTR.

The ROD and the 2006 Five-Year Review identified the California least tern and California brown pelican as federally listed endangered species. The California brown pelican was delisted due to recovery in 2009 (74 FR 59444); the least tern remains listed.

The ROD and the 2006 Five-Year Review identified the American peregrine falcon as a state listed endangered species; it was delisted due to recovery in 2009 (California Department of Fish and Game 2011).

"To Be Considered" (TBC) criteria, as defined in 40 CFR 300.400(g)(3), are non-promulgated advisories or guidance issued by federal or state government that are not legally binding but may provide useful information or recommended procedures for remedial action. The following were identified in the 1994 ROD, and are noted as TBC criteria for the United Heckathorn site. These criteria remain unchanged.

- No chemical-specific soil or sediment remedial goals were identified as ARARs in the ROD or ESD. Based on the results of the ecological assessment, mean sediment levels were calculated to prevent violations of the remediation goal ARARs for surface waters, and to meet the National Academy of Sciences (NAS) action level for DDT in fish to ensure protection of fish-eating birds. There are no chemical-specific ARARs for the concentrations of COCs in fish and shellfish. The NAS saltwater action levels are TBCs, which provide an additional level of protection to fish-eating birds beyond the level that is the basis of the surface water ARARs for aquatic life. The NAS action level was retained as a TBC to help determine the protectiveness of remediation, since the U.S. Fish and Wildlife Service raised concerns that the USEPA criteria for DDT might not be stringent enough for the protection of fish-eating birds. The NAS action level for DDT in fish is 0.05 milligrams per kilogram.
- The U. S. Food and Drug Administration (FDA) action levels for the marketability of fish and shellfish are TBCs for protecting human health; these levels are less stringent than the levels that would be achieved by meeting the surface water ARARs. FDA action levels for the COCs at the Heckathorn site are as follows: DDT = 5.0 parts per million (ppm); dieldrin = 0.3 ppm.

In May 2011 the California Office of Environmental Health Hazard Assessment (OEHHA) issued revised fish consumption guidelines for San Francisco Bay, which include the recommendation that "because of high concentrations of dieldrin or DDTs or both, OEHHA recommends that no one eat fish from the Lauritzen Channel in Richmond Inner Harbor." This guideline is more restrictive than previous recommendations for this area.

## References

California Department of Fish and Game. 2011. State and Federally Listed Endangered & Threatened Animals of California. January. Online: http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/TEAnimals.pdf.

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# Appendix E
# Site Inspections: Site Inspection Checklist and Marine Signage Inspection Memo

# E1: Site Inspection Checklist

# Five-Year Review Site Inspection Checklist
# United Heckathorn Superfund Site

| I. SITE INFORMATION | |
|---|---|
| **Site name:**<br>United Heckathorn | **Date of inspection:**<br>April 21, 2011 |
| **Location and Region:**<br>Richmond, Contra Costa County, California | **EPA ID:**<br>CAD981436363 |
| **Agency, office, or company leading the five-year review:**<br>EPA Region IX | **Weather/temperature:**<br>Sunny / Approximately 70 °F |

**Remedy Includes:** (Check all that apply)

- ☒ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☒ Surface water collection and treatment
- ☒ Other (explain): Dredging Operation along Lauritzen Channel and Parr Canal
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☒ Inspection team roster attached ☒ Site map attached [in report]

## II. INTERVIEWS ☐Applicable ☒N/A

1. **O&M site manager** _____
   Name Title Date

   Interviewed: _____ Phone No: _____
   Problems, suggestions: _____

   NOTE: All referenced attachments can be found in Five-Year Review Report.

2. **O&M staff** _____
   Name Title Date

   Interviewed: _____ Phone No: _____
   Problems, suggestions: _____

   NOTE: All referenced attachments can be found in Five-Year Review Report.

3. **Local regulatory authorities and responsible agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone No.
Problems, suggestions: _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone No.
Problems, suggestions: _____

4. **Other interviews** (optional)

## III. ONSITE DOCUMENTS AND RECORDS VERIFIED ☒Applicable ☐N/A

1. **O&M Documents**

| | | | |
|---|---|---|---|
| O&M manual | ☒Readily available | ☒Up to date | ☐N/A |
| As-built drawings | ☒Readily available | ☒Up to date | ☐N/A |
| Maintenance logs | ☒Readily available | ☒Up to date | ☐N/A |

Remarks: _____

2. **Site-Specific Health and Safety Plan** ☒Readily available ☒Up to date ☐N/A
Contingency plan/emergency response plan ☒Readily available ☒Up to date ☐N/A

Remarks: _____

3. **O&M and OSHA Training Records** ☒Readily available ☒Up to date ☐N/A

Remarks: Personnel working onsite for daily normal operation are not required to be OSHA 40-hr HAZWOPER-trained. Personnel with potential to work with contaminated material are required to be OSHA 40-hr HAZWOPER-trained with a yearly 8-hr refresher course. O&M sampling and cleaning activities are required to be conducted by OSHA 40-hour HAZWOPER trained personnel/contractors. Based on personal communication with site personnel, all work with the potential to contact contaminated material is performed by 40-hr HAZWOPER trained workers.

| | | | | |
|---|---|---|---|---|
| 4. | **Permits and Service Agreements** | | | |
| | Air discharge permit | ☐Readily available | ☐Up to date | ☒N/A |
| | Effluent discharge | ☐Readily available | ☐Up to date | ☒N/A |
| | Waste disposal, City of Richmond POTW | ☒Readily available | ☒Up to date | ☐N/A |
| | Other permits: Stormwater Permit | ☒Readily available | ☒Up to date | ☐N/A |
| | Remarks: Stormwater Permit refers to General Stormwater Permit for Discharges of Stormwater Associated with Industrial Activities (General Permit No. 97-03-DWQ) administered by the State of California Water Resources Control Board. | | | |
| 5. | **Gas Generation Records** | ☐Readily available | ☐Up to date | ☒N/A |
| | Remarks: | | | |
| 6. | **Settlement Monument Records** | ☐Readily available | ☐Up to date | ☒N/A |
| | Remarks: | | | |
| 7. | **Groundwater Monitoring Records** | ☐Readily available | ☐Up to date | ☒N/A |
| | Remarks: | | | |
| 8. | **Lechate Extraction Records** | ☐Readily available | ☐Up to date | ☒N/A |
| | Remarks: | | | |
| 9. | **Discharge Compliance Records** | | | |
| | Air | ☐Readily available | ☐Up to date | ☒N/A |
| | Water (Effluent) | ☒Readily available | ☒Up to date | ☐N/A |
| | Remarks: Annual Reports for Storm Water Discharges Associated with Industrial Activities are readily available and up to date. | | | |
| 10. | **Daily Access/Security Logs** | ☒Readily available | ☒Up to date | ☐N/A |
| | Remarks: All visitors entering the facility are required to sign in/out from the security office at the main entrance on Wright Avenue. | | | |

## IV. O&M COSTS

☒ Applicable ☐ N/A

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☒ PRP in-house ☒ Contractor for PRP

Remarks: O&M inspection and monitoring of the upland cap have been conducted by PRP-in house personnel during normal operation on a daily basis. Cap inspection and storm water sampling have been conducted by Contractors on a regular basis.

2. **O&M Cost Records**

☒ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place ☐ NA

Original O&M cost estimate: $5,750 Annual Cost (from Feasibility Study)

Total annual cost by year for review period if available

| | | | | |
|---|---|---|---|---|
| From | 07/01/2005 | To | 07/01/2006 | $ $40,650 |
| | Date | | Date | Total cost |
| From | 07/01/2006 | To | 07/01/2007 | $ 42,223 |
| | Date | | Date | Total cost |
| From | 07/01/2007 | To | 07/01/2008 | $ 50,586 |
| | Date | | Date | Total cost |
| From | 07/01/2008 | To | 07/01/2009 | $ 68,974 |
| | Date | | Date | Total cost |
| From | 07/01/2009 | To | 07/01/2010 | $ 76,602 |
| | Date | | Date | Total cost |

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: The actual annual O&M costs are higher than the original O&M cost estimate; however, it does not appear to be an early indicator of remedy problem for the following reasons: [1] the original O&M cost estimate provided in Item IV.2 only includes stormwater sampling, analysis, and reporting of the O&M activities for the 5-acre upland cap and this estimate, prepared in the late 1990's is not adjusted for inflation or wages; [2] LRTC cannot provide a cost breakdown specifically for the 5-acre former United Heckathorn facility separated from the rest of the 42-acre terminal. The cost (as listed in Item IV.2) is estimated by LTRC as the portion (50%) of their total facility pollution prevention costs attributable to O&M for the 5-acre upland cap. [3] It is observed during the site inspection that an ongoing effort has been made to provide the best management practices onsite regarding stormwater pollution and spill prevention, material management, and maintenance of a clean operation onsite. No issue on the upland cap is observed during the site inspection.

## V. ACCESS AND INSTITUTIONAL CONTROLS ☒Applicable ☐N/A

### A. Fencing ☒Applicable ☐N/A

1. **Fencing** ☐Location shown on site map ☒Gates secured ☐N/A

Remarks: Fences are in-place at the perimeter of the site. Gates are secured. Security guards are on-site 24 hours a day. Based on personal communication with onsite personnel, there is no issue with illegal access to the site.

### B. Other Access Restrictions ☒Applicable ☐N/A

1. **Signs and other security measures** ☐Location shown on site map ☐N/A

Remarks: Marine Security (MARSEC) is in place at the site. All visitors are required to sign in/out from the security office at the main entrance on Wright Ave. Advisory/warning signs are observed at or near the site indicating pesticides and other chemicals are present. The site also has a video surveillance system that monitors marine activity.

### C. Institutional Controls (ICs) ☒Applicable ☐N/A

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐Yes ☒No ☐N/A
Site conditions imply ICs not being fully enforced ☐Yes ☒No ☐N/A

Type of monitoring (e.g., self-reporting, drive by) _____
Frequency _____
Responsible party/agency _____

Contact _____ _____ _____ _____
Name Title Date Phone No.

Reporting is up-to-date ☐Yes ☐No ☒N/A
Reports are verified by the lead agency ☐Yes ☐No ☒N/A

Specific requirements in deed or decision documents have been met ☒Yes ☐No ☐N/A
Violations have been reported ☐Yes ☒No ☐N/A
Other problems or suggestions: ☐Report attached ☒N/A

2. **Adequacy** ☒ICs are adequate ☐ICs are inadequate ☐N/A

Remarks: As required by the ROD, a deed notice is attached limiting land use of the property to non-residential classification. In addition, long-term operation and maintenance of the cap is required. These ICs are considered adequate to limit the land use of the site from converting to other use without further study and possibly further remediation, and to ensure long-term effectiveness of the remedy.

**D. General** ☒Applicable ☐N/A

1. **Vandalism/trespassing** ☐Location shown on site map ☒No vandalism evident

Remarks: _____

2. **Land use changes onsite** ☐Location shown on site map ☒N/A

Remarks: Onsite land use remains as industrial use (port priority or related industrial use) with no observed change.

3. **Land use changes offsite** ☐Location shown on site map ☒N/A

Remarks: Offsite land use within the City of Richmond has no significant change. Land use adjacent to the site remains as industrial use, which includes activities operated by Pacific Atlantic Terminal LLC, SIMS metals, Eagle Rock Aggregates, and Cemex USA.

## VI. GENERAL SITE CONDITIONS

**A. Roads** ☒Applicable ☐N/A

1. **Roads damaged** ☐Location shown on site map ☐Roads adequate ☒N/A

Remarks: There is no well-defined pedestrian walkway or vehicle driveway onsite; extra caution or onsite traffic control may be required during period of heavy traffic. The upland cap is used for daily normal operation of the terminal. Surface cracks are observed. Surface cracks in the general vicinity of the secondary storage area are large enough that repair may be necessary. Recommend further inspection of surface cracks in the cap by a qualified professional engineer. Surface cracks in the cap in the area north of the secondary storage area are surface hairline cracks, too small to be repaired. See attached Site photographs.

**B. Other Site Conditions**

Remarks: Railroad tracks, crane rail, truck/train scale and fuel station are observed at the site for import/export of material. Heavy construction equipment (such as tractors, front loaders, cranes, conveyors) are onsite in the staging area and performing various activities associated with daily operations.

During the site inspection, no erosion is observed on the upland cap; On-site stormwater collection system appears to be in good condition; General housekeeping is well-conducted; A proactive approach is perceived for material management and stormwater pollution prevention.

## VII. LANDFILL COVERS ☒Applicable ☐N/A

### A. Landfill Surface ☒Applicable ☐N/A

1. **Settlement** (Low spots) ☐Location shown on site map ☒Settlement not evident
Areal extent _____ Depth _____
Remarks _____

2. **Cracks** ☐Location shown on site map ☐Cracking not evident
Length _____ Widths _____ Depths _____

Remarks: Surface cracks are observed on the cap. Although it is not a concern at the time of the inspection, attention should be paid to monitor any propagation of the cracks. It is recommended that a qualified professional engineer inspect the cracks to determine if repairs are required and feasible. See attached Site photographs.

3. **Erosion** ☐Location shown on site map ☒Erosion not evident
Areal extent _____ Depth _____
Remarks _____

4. **Holes** ☐Location shown on site map ☒Holes not evident
Areal extent _____ Depth _____
Remarks _____

5. **Vegetative Cover** ☐Grass ☐Cover properly established ☐No signs of stress
☐Trees/Shrubs (indicate size and locations on a diagram) ☒N/A
Remarks _____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐N/A
Remarks The gravel cover, which is over a geotextile membrane, may have settled in some areas near stormwater interceptor #6.

7. **Bulges** ☐Location shown on site map ☒Bulges not evident
Areal extent _____ Height _____
Remarks _____

8. **Wet Area / Water Damage** ☒Wet areas/water damage not evident
Wet areas ☐Location shown on site map ☐Areal extent _____
Ponding ☐Location shown on site map ☐Areal extent _____
Seeps ☐Location shown on site map ☐Areal extent _____
Soft subgrade ☐Location shown on site map ☐Areal extent _____
Remarks _____

9. **Slope Instability** ☐Slides ☐Location shown on site map ☒No evidence of slope instability
Areal extent _____ Depth _____
Remarks _____

**B. Benches** ☐Applicable ☒N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐Location shown on site map ☐N/A or okay
Remarks _____

2. **Bench Breached** ☐Location shown on site map ☐N/A or okay
Remarks _____

3. **Bench Overtopped** ☐Location shown on site map ☐N/A or okay
Remarks _____

**C. Letdown Channels** ☐Applicable ☒N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐Location shown on site map ☐No evidence of settlement
Areal extent _____ Depth _____
Remarks _____

2. **Material Degradation** ☐Location shown on site map ☐No evidence of degradation
Material type _____ Areal extent _____
Remarks _____

3. **Erosion** ☐Location shown on site map ☐No evidence of erosion
Areal extent _____ Depth _____
Remarks _____

4. **Undercutting** ☐Location shown on site map ☐No evidence of undercutting
Areal extent _____ Depth _____
Remarks _____

5. **Obstructions** Type _____ ☐Location shown on site map ☐No obstruction
Areal extent _____ Size _____
Remarks _____

6. **Excessive Vegetative Growth** Type _____
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent _____
Remarks _____

**D. Cover Penetrations** ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks _____

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks _____

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks _____

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A
Remarks _____

**E. Gas Collection and Treatment** ☐ Applicable ☒ N/A

1. **Gas Treatment Facilities**
☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
☐ Good condition ☐ Needs Maintenance
Remarks _____

2. **Gas Collection Wells, Manifolds and Piping**
☐ Good condition ☐ Needs Maintenance
Remarks _____

3. **Gas Treatment Facilities** (e.g., gas monitoring of adjacent homes or buildings)
☐ Good condition ☐ Needs Maintenance ☐ N/A
Remarks _____

**F. Cover Drainage Layer** ☐Applicable ☒N/A

1. **Outlet Pipes Inspected** ☐Functioning ☐N/A
Remarks _____

2. **Outlet Rock Inspected** ☐Functioning ☐N/A
Remarks _____

**G. Detention/Sedimentation Ponds** ☐Applicable ☒N/A

1. **Siltation** Areal extent _____ Depth _____ ☐N/A
☐Siltation not evident
Remarks _____

2. **Erosion** Areal extent _____ Depth _____
☐Erosion not evident
Remarks _____

3. **Outlet Works** ☐Functioning ☐N/A
Remarks _____

4. **Dam** ☐Functioning ☐N/A
Remarks _____

**H. Retaining Walls** ☐Applicable ☒N/A

1. **Deformations** ☐Location shown on site map ☐Deformation not evident
Horizontal displacement _____ Vertical displacement _____
Rotational displacement _____
Remarks _____

2. **Degradation** ☐Location shown on site map ☐Deformation not evident
Remarks _____

**I. Perimeter Ditches/Off-Site Discharge** ☒Applicable ☐N/A

1. **Siltation** ☐Location shown on site map ☒Siltation not evident
Areal extent _____ Depth _____
Remarks: _____

2. **Vegetative Growth** ☐Location shown on site map ☒N/A
☐Vegetation does not impede flow
Areal extent _____ Type _____
Remarks: _____

3. **Erosion** ☐Location shown on site map ☒Erosion not evident
Areal extent _____ Depth _____
Remarks: _____

4. **Discharge Structure** ☐Functioning ☒N/A

Remarks: Direct stormwater discharge from the former United Heckathorn facility to Lauritzen Channel is not allowed (Stormwater Outfalls SW-3 to SW-7). These stormwater interceptors are designed to have sufficient capacity to hold all stormwater runoff generated during rainy season for discharge to City of Richmond POTW. Refer to figure in the Five-Year Review Report for locations of the stormwater outfalls. Since the previous Five-Year Review a 1-way tidal valve on the outfall pipe of SW-7 to prevent backwater from the Lauritzen Channel into the interceptors during high tides was found to be in poor condition and replaced with a shut off valve. Based on personal communication with onsite personnel, other 1-way tidal valves appear to be functioning properly but they may elect to replace them as a proactive measure.

**VIII. VERTICAL BARRIER WALLS** ☐Not Applicable ☒N/A

1. **Settlement** ☐Location shown on site map ☐Settlement not evident
Areal extent _____ Depth _____
Remarks: _____

2. **Performance Monitoring** Type of monitoring _____
☐Performance not monitored
Frequency _____ Evidence of breaching
Head differential _____
Remarks: _____

**IX. GROUNDWATER/SURFACE WATER REMEDIES** ☒Applicable ☐N/A

**A. Groundwater Extraction Wells, Pumps, and Pipelines** ☐Applicable ☒N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
☐Good condition ☐All required wells located ☐Needs O&M ☐N/A
Remarks _____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐Good condition ☐Needs Maintenance
Remarks _____

3. **Spare Parts and Equipment**
☐Readily available ☐Good condition ☐Requires upgrade ☐Needs to be provided
Remarks _____

**B. Surface Water Collection Structures, Pumps, and Pipelines** ☒Applicable ☐N/A

1. **Collection Structures, Pumps, and Electrical**
☒Good condition ☐Needs Maintenance

Remarks: Stormwater from the former United Heckathorn facility is directed into interceptors (SW-3 to SW-7), where it is sampled, tested and discharged to the city POTW. Interceptors are cleaned at least once a year and are observed to be in good condition.

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐Good condition ☐Needs Maintenance ☒N/A
Remarks: _____

3. **Spare Parts and Equipment**
☒Readily available ☒Good condition ☐Requires upgrade ☐Needs to be provided

Remarks: Maintenance and welding shops are located next to the Admin Building for general operation of the shipping terminal. Maintenance equipment is available for use if necessary.

**C. Treatment System** ☐Applicable ☒N/A

1. **Treatment Train** (Check components that apply)
☐Metals removal ☐Oil/water separation ☐Bioremediation
☐Air stripping ☐Carbon adsorbers
☐Filters _____
☐Additive (e.g., chelation agent, flocculent)_____
☐Others _____
☐Good condition ☐Needs Maintenance
☐Sampling ports properly marked and functional
☐Sampling/maintenance log displayed and up to date
☐Equipment properly identified
☐Quantity of groundwater treated annually _____
☐Quantity of surface water treated annually _____
Remarks _____

2. **Electrical Enclosures and Panels** (properly rated and functional)
☐N/A ☐Good condition ☐Needs Maintenance
Remarks _____

3. **Tanks, Vaults, Storage Vessels**
☐N/A ☐Good condition ☐Proper secondary containment ☐Needs Maintenance
Remarks _____

4. **Discharge Structure and Appurtenances**
☐N/A ☐Good condition ☐Needs Maintenance
Remarks _____

5. **Treatment Building(s) – support building**
☐ N/A ☐ Good condition (esp. roof and doorways)
☐ Needs repair ☐ Chemicals and equipment properly stored
Remarks _____

6. **Monitoring Wells** (pump and treatment remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells locations ☐ Needs Maintenance ☐ N/A
Remarks _____

**D. Monitored Natural Attenuation** ☐ Applicable ☒ N/A

1. **Monitoring Wells** (natural attenuation remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells locations ☐ Needs Maintenance ☐ N/A
Remarks _____

## X. OTHER REMEDIES ☒ Applicable ☐ N/A

If there are remedies applied at the site which are not covered above, describe the physical nature and condition of any facility associated with the remedy.

In addition to upland capping at the former United Heckathorn facility, the implemented remedy also includes [1] dredging of all Younger Bay Mud from the Lauritzen Channel and Parr Canal; [2] off-site disposal of dredged material by rail; [3] placement of clean sediment after dredging; and [4] marine monitoring of surface water and biota for at least five years or until it is demonstrated that the remediation goals have been achieved.

The dredging activities commenced in August 1996 and were completed in April 1997. The post-remediation biomonitoring of pesticides and other contaminants in marine waters near the site has been conducted under an ongoing effort. Results from the monitoring program are summarized in the Five-Year Review Report.

Based on personal communication with Tamara Frank, part of the inspection team, she had observed signs displayed along the waterways during a recent sampling event indicating that no fishing is allowed, and pesticides and that other contaminants are present in the channel. Fishing activities along the shore or from boats is not observed during the inspection. The Director of Facilities and Equipment at the site, Jim Holland, indicated that he has never observed fishing from shore or boats near the site.

## XI. OVERALL OBSERVATIONS ☒Applicable ☐N/A

### A. Implementation of the Remedy ☒Applicable ☐N/A

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

According to the ROD, the objective of the remedy is to address remaining hazardous substances at the Site and in the marine environment by implementing engineering and institutional controls.

At the upland area, the objective was to be met by construction of an upland cap at the former Heckathorn facility to prevent erosion of contaminated soil from migrating offsite. In addition, a deed restriction is attached to the site limiting use of the property to non-residential uses. O&M activities of the upland cap are being conducted on a regular basis to ensure long-term effectiveness of the remedy. Based on observation from the site inspection, the integrity of the upland cap is well-maintained and the cap is in good condition with no erosion. The land use of the property remains unchanged under industrial classification. O&M reports are prepared annually to summarize findings from inspections, which are summarized in the Five-Year Review Report.

For the marine environment, the objective was to be met by [1] dredging of all soft bay mud from the Lauritzen Channel and Parr Canal, with offsite disposal of dredged material, [2] placement of clean material after dredging, and [3] marine monitoring to verify the effectiveness of the remedy. The remedial construction was completed in 1997. Marine biomonitoring has been conducted and is summarized in the Five-Year Review Report. No issue or observation related to the effectiveness or functioning of the remedy can be determined from the site inspection.

### B. Adequacy of O&M ☒Applicable ☐N/A

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

Onsite personnel are responsible for daily inspection of the upland cap during normal operation while LRTC's contractor is responsible for cap inspection, stormwater sampling, and good housekeeping observation in a timely manner. The O&M procedures are combined with regular housekeeping to facilitate normal operation at the terminal.

During the site inspection, stormwater interceptors (SW-3 to SW-7) were observed to be maintained in good condition. Absorbent tubes were placed around all drain inlets. Ultra-storm guards were installed at the drop inlet to avoid inflow of silt and hydrocarbon. An equipment staging area was designated onsite to facilitate cleanup when potential leakage of equipment occurs.

Based on personal communication with onsite personnel, the stormwater interceptors are generally cleaned several times each year. Water accumulated in the interceptors is sampled and discharged on an-as-needed basis.

More information regarding stormwater discharge to the City of Richmond POTW is discussed in the Five-Year Review Report. Biomonitoring of the marine sediments is also discussed in the Five-Year Review Report.

| | | |
|---|---|---|
| **C.** | **Early Indicators of Potential Remedy Failure** | ☒Applicable ☐N/A |
| | Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.<br><br>Based on observation from the site inspection, cracking of the concrete cap could affect the protectiveness of the remedy in the future; however, further evaluation is necessary. | |
| **D.** | **Opportunities for Optimization** | ☒Applicable ☐N/A |
| | Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.<br><br>O&M activities have been continually conducted and optimized at the former United Heckathorn facility. LRTC is taking a proactive approach for housekeeping and stormwater pollution prevention. Monitoring and inspection should be continued for evaluation of any potential propagation of the existing surface cracks on the upland cap.<br><br>Possible opportunities for optimization in monitoring of the marine sediment are to be discussed in the Five-Year Review Report. | |

**ATTACHMENT 1**

# Five-Year Review Inspection Roster

Third Five-Year Review Inspection Roster
April 21, 2011 Inspection
*United Heckathorn Superfund Site*

| Name | Organization |
|---|---|
| Penny Reddy | USEPA |
| Allan Fone | DTSC |
| Jim Holland | Levin Richmond Terminal Corp. |
| Ellen Mawhinney | Environmental Technical Services |
| Tamara Frank | E2 Consulting Engineers |
| Diane Sarmiento | CH2M HILL |
| Abe Northup | CH2M HILL |

ATTACHMENT 2

# Site Photographs

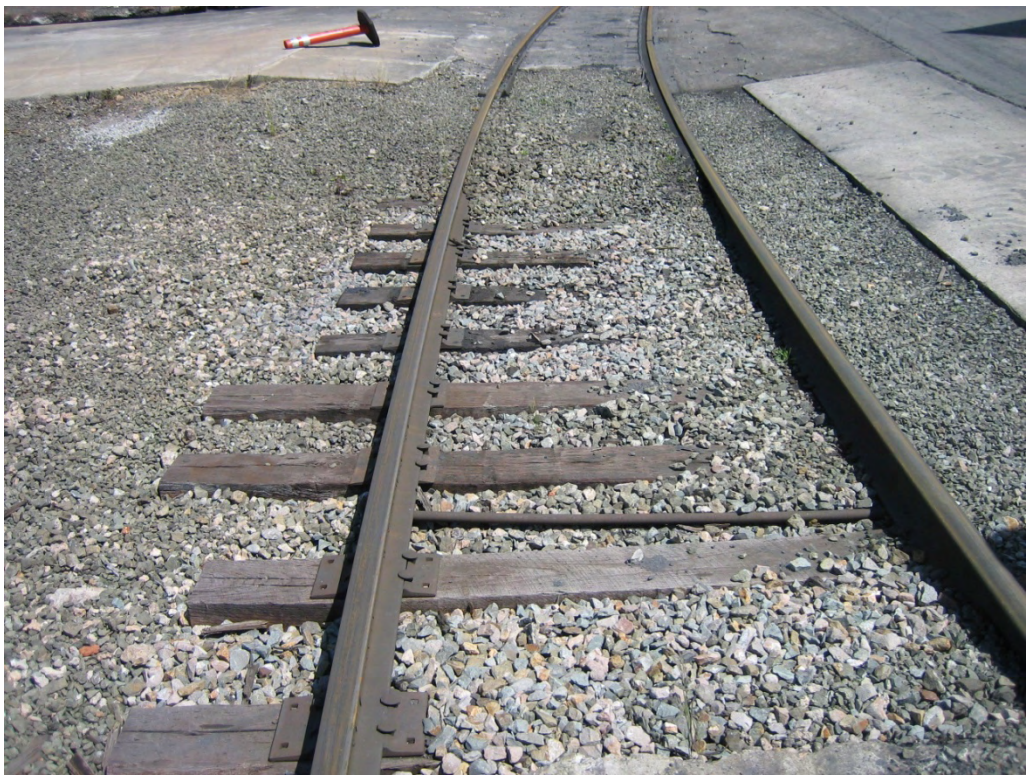
Description: Drain inlet equipped with absorbent tube and drain guard.
Photographer: Abe Northup/CH2M HILL Date: April 21, 2011

Description: Looking north, Secondary Storage Area 2. Note cracks in concrete cap.
Photographer: Abe Northup/CH2M HILL Date: April 21, 2011

Description: Cracks in the concrete cap on the north side of the cap, near Stormwater Interceptor #6.
Photographer: Abe Northup/CH2M HILL Date: April 21, 2011

Description: Cracks in the concrete cap in the secondary storage area.
Photographer: Abe Northup/CH2M HILL Date: April 21, 2011

Description: Cracks in the concrete cap in the secondary storage area.
Photographer: Abe Northup/CH2M HILL Date: April 21, 2011



Description: Looking north at gravel over geotextile membrane around railroad tracks in between Stormwater Interceptors #5 and #6.
Photographer: Abe Northup/CH2M HILL Date: April 21, 2011

Description: Looking east at the edge of concrete cap near Stormwater Interceptor #6.
Photographer: Abe Northup/CH2M HILL Date: April 21, 2011

Description: Looking north at the edge of the concrete cap near Stormwater Interceptor #6.
Photographer: Abe Northup/CH2M HILL Date: April 21, 2011

Description: Looking north on the north end of the concrete cap.
Photographer: Abe Northup/CH2M HILL Date: April 21, 2011

Description: Looking north at an aboveground storage tank for fueling equipment.
Photographer: Abe Northup/CH2M HILL Date: April 21, 2011

Description: Looking west at a timber in the Lauritzen Channel near City of Richmond outfall. Note the mussels on the side of the timber.
Photographer: Abe Northup/CH2M HILL Date: April 21, 2011

Description: Looking north at wood piles in Lauritzen Channel. Mussels on piles near the water line.
Photographer: Abe Northup/CH2M HILL Date: April 21, 2011

Description: Looking south at piles in the Lauritzen Channel, mussels on the piles near the water line.
Photographer: Abe Northup/CH2M HILL Date: April 21, 2011

Description: Outfall at the north end of Parr Canal.
Photographer: Abe Northup/CH2M HILL Date: April 21, 2011

Description: Looking south down the Parr Canal.
Photographer: Abe Northup/CH2M HILL Date: April 21, 2011

# E2: Marine Signage Inspection Memo

# United Heckathorn Superfund Site Five-Year Review Summary of Boat Tour Inspection of the Lauritzen Channel and Nearby Waterways and Observation of Posted Signage

PREPARED FOR: United States Environmental Protection Agency Region IX

PREPARED BY: Julia Spahn, P.E./ CH2M HILL

REVIEWED BY: Tamara Frank/E2 CH2M HILL
Diane Sarmiento/CH2M HILL

DATE: July 20th, 2011

PROJECT NUMBER: 419626.FR.02

## Introduction

This technical memo summarizes observed warning signs posted within navigable portions of the Lauritzen Channel and nearby portions of the Santa Fe Channel. Signs were observed during a site field visit to the Lauritzen Channel area via boat on January 26, 2011 by CH2M HILL and U.S. Environmental Protection Agency (USEPA) staff in order to perform field maintenance of turbidity meters previously deployed within the Lauritzen Channel. Warning signs posted along the Lauritzen Channel and in the Santa Fe Channel near its intersection with Parr Canal were noted and photographed. The condition of signage and the accuracy of posted contact phone numbers were checked and the results are noted in the following summary.

## Background

The United Heckathorn Superfund Site (the Site) is located in Richmond, California on the east side of San Francisco Bay in Contra Costa County. The Site is situated in an industrial area with active petroleum and shipping terminals. The Site is comprised of two areas: an upland area, which is the former United Heckathorn Site, and the marine area, which includes the Lauritzen Channel and the Parr Canal. Two commercial enterprises currently operate in the marine area of the Lauritzen Channel:

1. Manson Construction Company maintains a fleet of tugboats, barges, and dredges along the western portion of the Channel, and shallow draft barges in the northern reach.
2. Levin Richmond Terminal Corporation (LRTC) conducts shipping operations along the eastern (Berth A and B) pier portion of the Channel. The Lauritzen Channel is an active waterway, with continuous operations occurring around the clock.

The Lauritzen Channel is approximately 1,800 feet long (north-south) and varies in width between 120 feet near its northern end, to 350 feet near its southern end at the connection to the Santa Fe Channel. The Parr Canal lies to the east of the Lauritzen Channel and is not



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actively used as a waterway. It is approximately 750 feet long (north-south), a maximum of 100 feet wide, and generally less than 10 feet deep relative to mean low low water. The Parr Canal was not accessible during the site tour and views of the Canal were limited to locations along the Santa Fe Channel. The Santa Fe Channel connects at its southeastern end with the Richmond Inner Harbor.

Posted signs visible from accessed waterways were observed during a three-hour boat tour of the site on January 26th, 2011.

## Lauritzen Channel Warning and Fishing Restriction Signs

Fishing prohibition signs (with Department of Health Services [DHS] contact information) were observed along the pier structure at three locations within the Lauritzen Channel: At the northern end of Berth B, at the approximate midpoint of the Lauritzen Channel, and near the southern end of the Lauritzen at its intersection with the Santa Fe Channel. Signs posted the following warning in both English and Spanish: "Hazardous Substance Area: Unauthorized Persons Keep Out. Channel Sediments and Shellfish contaminated with DDT. California Department of Health Services (415) 540-2043." DHS signs were noted to show significant signs of wear, although most of the language was still readable from a distance of approximately 20 feet. Two of the three signs had contact numbers corrected to (415) 540-3739. Both contact numbers were dialed and were no longer in service. Photographs of the signs are attached at the end of this technical memo.

In addition to fishing advisory signs, several small Warning signs were posted noting "KEEP OUT. No trespassing or fishing on or under this dock" (English only). These signs were posted along the Berth A and Berth B dock areas of the LRTC terminal.

U.S. Coast Guard (USCG) Restricted Area Signs were also identified along Berths A and B. These signs noted, "Unauthorized Tie-ups by Tugs, Marine Vessels, Marine Craft Constitutes a Breach of Security (USCG DHS 05.2650-(7) (b))."

Equipment and rail lines along the LRTC berths are powered by a high voltage system that transects and underlies most of the elevated active pier structure. Numerous small placard signs state "WARNING. High Voltage. Keep Out."

In August 2010, Levin Richmond Terminal Corporation installed a high definition fish-eyed webcam and telemetry equipment onsite with a panoramic view of the Lauritzen Channel. LRTC provided the USEPA with remote access to the video feed from the site camera for a period of 8 months (August 2010 to March 2011). A review of the video by CH2M HILL staff indicates that no fishing activities occurred within the channel during the 8 month period.

## Santa Fe Channel and Parr Canal Fishing Restriction Signs

The Parr Canal is a non-navigable waterway and boat access was not feasible during the site tour. One large fishing advisory sign was noted along the eastern bank of the Santa Fe Channel, immediately west of its intersection with the Parr Canal. This fishing advisory sign noted the following warning in Vietnamese, English, and Spanish:

> Do not eat croakers (king fish), surfperch (pogies),
> bullheads, gobies and shellfish gathered within this area due to toxic chemicals.
> This specific advisory does not apply to other fish species



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Office of Environmental Health Hazard Assessment
California Environmental Protection Agency
(916) 327-7319 or (510) 540-3063

Contact information for this sign was checked. The (510) 540-3063 contact number was found to be no longer in service. The (916) 327-7319 contact number is still active and reached the appropriate agency representative within the OEHHA branch of Cal/EPA. Further inspection of this sign noted that the sign post originally had two signs: one facing land and one visible to boaters. The land-facing sign was missing at the time of inspection.

## Summary

There are numerous signs warning against fishing and prohibiting access posted within Lauritzen Channel. Although some signs are outdated and do not provide current contact information, signs along the piers clearly state warnings against trespassing on the piers and surrounding waterway areas within the channel, or consuming fish or shellfish caught in Channel waters.

A single warning sign was observed in the Santa Fe Channel near its intersection with the Parr Canal. One of the two contact telephone numbers on the sign was correct; however, the type is small and difficult to read. The land-facing portion of the sign is missing.



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# Attachment A
# Annotated Photos

**Photo 1.** Photo of the northernmost DHS fishing advisory sign, mounted near the northern end of the Berth B pier structure.



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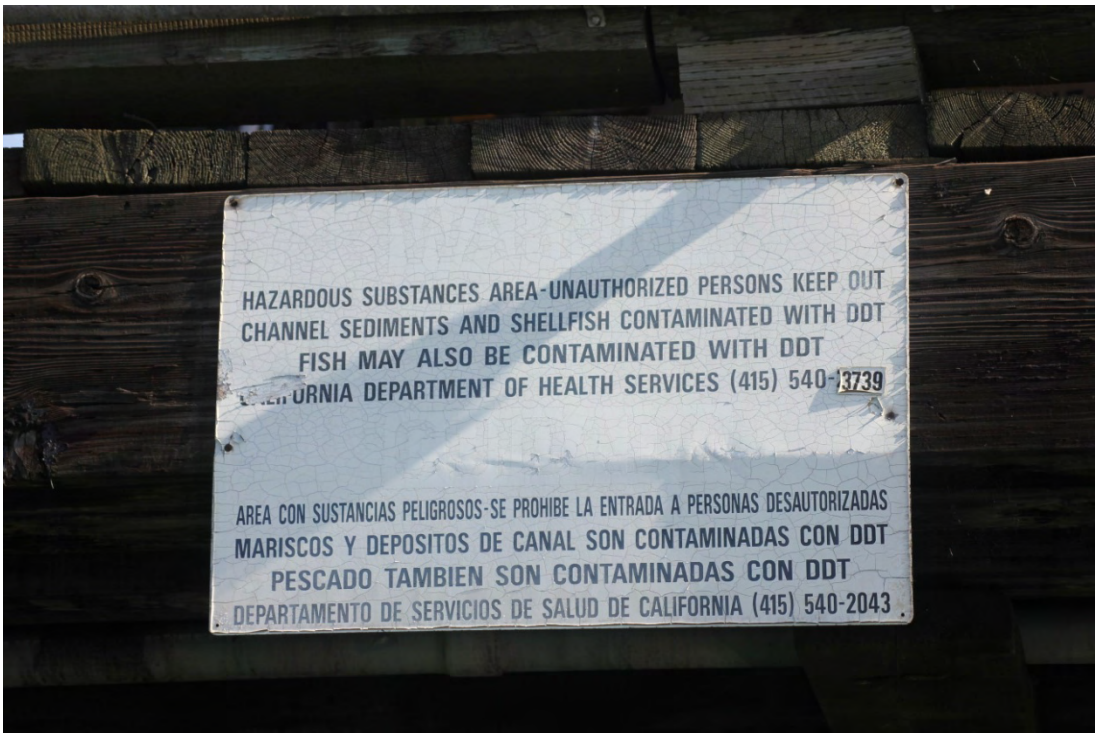


**Photo 2.** Detail of a DHS fishing advisory sign, showing detail of the posted warning in both English and Spanish.

**Photo 3.** Example of "Restricted Area" signs posted along the LRTC Berths A and B and noting U.S. Coast Guard regulations restricting access by marine vessels in the posted area.



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**Photo 4.** Example of "Keep Out" signs prohibiting trespassing or fishing on or around the LTRC berths and dock.

**Photo 5.** View of the Santa Fe Channel showing LRTC Berth "A" at right side of photo.



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**Photo 6.** View of the Parr Canal, looking north (taken from the Santa Fe Channel at its instersection with the Parr Canal).

**Photo 7.** Photo of the Cal/EPA fishing advisory sign listing warnings in Vietnamese, English, and Spanish on fishing restrictions.



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**Photo 8.** Detail of Cal/EPA fishing advisory sign posted in the Santa Fe Channel near its connection with the Parr Canal.



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**Photo 9.** Detail of the Cal/EPA fishing advisory sign at an angle, showing the land facing side of this sign is missing.



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# Appendix F
# Institutional Controls Assessment Review

# United Heckathorn Superfund Site Five-Year Review Institutional Controls Evaluation

| | |
|---|---|
| PREPARED FOR: | United States Environmental Protection Agency (USEPA), Region IX |
| PREPARED BY: | CH2M HILL |
| DATE: | July 22, 2011 |
| PROJECT NUMBER: | 419426 |

Institutional controls are non-engineering methods by which access to contaminated environmental media is restricted. This technical memorandum summarizes the results of an evaluation of institutional controls for the United Heckathorn Superfund Site (United Heckathorn).

A Record of Decision (ROD) for United Heckathorn (USEPA 1994) was signed on October 26, 1994. The remedy outlined in the ROD included a deed restriction or notice limiting the use of the Levin-Richmond Terminal, the current property owner/operator, to its industrial classification. Two Five-Year Reviews have been performed since the ROD was issued in 1994. The first Five-Year Review, completed in September 2001, and the second Five-Year Review, completed in September 2006, reported that institutional controls limiting use of the property to non-residential uses were put in place (CH2M HILL 2006). In addition, the Five-Year Review noted that the deed notices required long-term operation and maintenance (O&M) of the cap that was to be placed on the northern half of the Levin Terminal (USEPA 2001). However, review of the actual Covenant to Restrict Use of Property that was recorded on August 2, 1996 indicates that it does not include any language about O&M of the cap. Although this language does not appear in the covenant, the Five-Year Review findings show that O&M are being adequately conducted, pursuant to the requirements and obligations placed on the settling parties by the Consent Decree with the Levin entities.

The United Heckathorn site is comprised of two discrete parcels identified by the Contra Costa County Assessor's Office as parcel numbers 560-380-008 (402 Wright Avenue including a portion of Lauritzen Channel) and 560-380-002 (312 Cutting Blvd.). The Covenant to Restrict Use of Property recorded August 2, 1996 includes legal description for both of these parcel numbers, as well as a third parcel, 560-280-011 (700 Wright Avenue) that includes a portion of the Parr Canal, where it was deemed appropriate to restrict land use to commercial/industrial due to contamination by hazardous substances. A copy of the covenant was obtained through a request performed by a title search company from the Contra Costa County Recorder's Office and is provided in Attachment 1. The title search documentation for the parcels associated with the United Heckathorn site, 560-380-008 and 560-380-002, are provided as Attachment 2 and Attachment 3, respectively.

The covenant was signed by the president of Levin Enterprises Incorporated. The covenant contains the following general provisions:

- Protective provisions to run with the land.
- Requirement that all future owners of the property agree that the property is subject to the restrictions.
- Incorporation of covenant into all deeds and leases.
- Notice that the Consent Decree was entered.
- Statement of the restrictions associated with the site, including prohibiting use of the site as a hospital, school, day care, or for residential purposes.
- Language that must be included on all future deeds, leases, assignments, or other transfers for the property that communicates the restrictions associated with the property to future property owners or tenants.
- Provisions for site access and enforcement by USEPA.

## Deficiencies and Recommendations

There are no known deficiencies related to the institutional controls set forth in the ROD for United Heckathorn. The institutional controls remain protective of human health and the environment. Should USEPA ever receive notice under the Consent Decree that the Levin entities are planning to sell the parcels, USEPA should evaluate whether the Covenant to Restrict Use of Property would be sufficient following the transfer of the three parcels to a new owner.

## References

CH2M HILL. 2006. *Second Five-Year Review Report for United Heckathorn Superfund Site*. Prepared for United States Environmental Protection Agency. September 22.

United States Environmental Protection Agency (USEPA). 1994. *EPA Superfund Record of Decision: United Heckathorn Site, Richmond, CA, 10/26/1994*. EPA/ROD/R09-95/121. October.

_____. 2001. *First Five-Year Review Report for United Heckathorn Superfund Site*. September 28, 2001.

# Attachment 1
# July 24, 1996 Covenant to Restrict Use Agreement

Recording Requested By:
Keith Howard, Cooper White & Cooper
1333 North California Blvd., Suite 450
Walnut Creek, CA 94596

96 145362

15

RECORDED AT REQUEST OF
Attorney
AUG 2 1996
AUG 2 1996
AT 3 O'CLOCK P M.
CONTRA COSTA COUNTY RECORDS
STEPHEN L. WEIR
COUNTY RECORDER
FEE: 49.00 pd

When Recorded, Mail To:
Keith Howard, Cooper White & Cooper
1333 North California Blvd., Suite 450
Walnut Creek, CA 94596

COVENANT

TO RESTRICT USE OF PROPERTY

Levin Enterprises, Inc. - Richmond Site

This Covenant and Agreement ("Covenant") is made on the 24th day of July 1996, by Levin Enterprises, Inc. ("Covenantor"), who is the owner of record of certain Property situated in the City of Richmond, County of Contra Costa, State of California, described in Exhibit "B" attached hereto and incorporated herein by this reference ("the Property"), with reference to the following facts:

A. The Property contains hazardous substances;

B. Portions of the Property have been designated by the United States Environmental Protection Agency as a Superfund site on the National Priorities' List. Potentially responsible parties at the site have been identified by the Environmental Protection Agency, and such parties have entered into a series of four Consent Decrees with the United States providing for the

remediation of the Site in accordance with the United States Environmental Protection Agency's Record of Decision executed on October 26, 1994 (ROD). Covenantor has entered into such a Consent Decree with the United States in an action entitled United States of America, Plaintiff vs. Montrose Chemical Corporation of California, et al., Defendants, No. C 96-2103 MEJ Consolidated with C 84 6273 CW (Consent Decree) in the United States District Court, Northern District of California,. (Hereinafter referred to as Covenantor Consent Decree).

B.1. Contamination of the Property. Portions of the soil on the Property and adjoining underwater sediments have become contaminated with hazardous substances, including Dichlorodiphenylchloroethane (DDT), Dichlorodiphenyl-dechloroethylene (DDE), and Dieldrin. Remedial activities that have occurred at the Property and that will occur pursuant to the above-referenced Consent Decrees are designed to eliminate any significant risk to human health and/or the environment from the above-referenced contaminants.

B.2. Surrounding Land use and Population Potentially Affected. Land use in the immediate vicinity of the Property is industrial. The nearest residential area is approximately one quarter of a mile to the Northeast of the Property.

C. Covenantor desires and intends that in order to protect the present or future public health and safety, the Property shall be used in such a manner as to avoid potential harm to persons or Property which may result from hazardous substances which have been deposited on portions of the Property.

**ARTICLE I**

**GENERAL PROVISIONS**

1.01 Provisions to Run With the Land. This Covenant sets forth protective provisions, covenants, restrictions and conditions (collectively referred to as "Restrictions") upon and subject to which the Property and every portion thereof shall be improved, held, used, occupied, leased, sold, hypothecated, encumbered and/or conveyed. Each and all of the Restrictions shall run with the land, and pass with each and every portion of the Property, and shall apply to, inure to the benefit of and bind the respective successors in interest thereof. Each and all of the Restrictions are imposed upon the entire Property unless expressly stated as applicable to a specific portion of the Property. Each and all of the restrictions are for the benefit of and enforceable by the United States Environmental Protection Agency.

1.02 Concurrence of Owners Presumed. All purchasers, lessees, or possessors of any portion of the Property shall be deemed by their purchase, leasing, or possession of such Property, to

be in accord with the foregoing and to agree for and among themselves, their heirs, successors, and assignees, and the agents, employees, and lessees of such owners, heirs, successors, and assignees, that the Restrictions as herein established must be adhered to for the benefit of future Owners and Occupants and that their interest in the Property Shall be subject to the Restrictions contained herein.

1.03 Notice of Entry of Consent Decree On July 19, 1996 the Covenantor Consent Decree was entered in the United States District Court, Northern District of California. A copy of the Covenantor Consent Decree is available for inspection at the Property subject to this Covenant.

1.04 Incorporation into Deeds and Leases. Covenantor desires and covenants that the Restrictions set out herein and in the Covenantor Consent Decree shall be incorporated by reference in each and all deeds and leases of any portion of the Property.

**ARTICLE II**

**DEVELOPMENT, USE AND CONVEYANCE OF THE PROPERTY**

2.01 Restrictions on Development and Use. Covenantor promises to restrict the use of that portion of the Property as described in Exhibit B as follows:

a. Development of the Property shall be restricted to commercial or industrial use.

b. No residence for human habitation shall be permitted on the Property.

c. No hospitals shall be permitted on the Property.

d. No schools for persons under 18 years of age shall be permitted on the Property.

e. No day care centers for children shall be permitted on the Property.

2.02 Conveyance of Property. The Covenantor shall provide a thirty (30) day advance notice to the United States Environmental Agency of any lease of the entire Property or other conveyance of the Property or an interest in the Property to a third person.

2.03 Notice in Agreements. Covenantor shall execute a written instrument which shall accompany all purchase, lease, sublease, or rental agreements relating to the Property. The instrument shall contain the following statement:

"The land described herein contains hazardous substances and therefore is subject to a Covenant to Restrict Use of Property which has been recorded. This statement is not a declaration that a hazard exists."

**ARTICLE III**

**ACCESS**

3.01 Notice of Obligation to Provide Access. Beginning on June 1, 1996, the Covenantor agrees to provide access at all reasonable times to the Site and, to the extent access to the Property is controlled by Covenantor, any other Property to which access is required for the implementation of the response actions called for in the ROD. Such access shall be provided to the United States and its representatives, (including EPA and its contractors); the Supervising Contractor and its employees, agents and subcontractors, and

technical representatives of any potentially responsible party performing response actions at the Site pursuant to an EPA order or agreement. Access shall be for the purposes of conducting any activity related to the Consent Decree including, but not limited to:

a. Monitoring the Work;

b. Verifying any data or information submitted to the United States;

c. Conducting investigations relating to contamination at or near the Site;

d. Obtaining samples;

e. Assessing the need for, planning, or implementing additional response actions at or near the Site;

f. Inspecting and copying records, operating logs, contracts, or other documents maintained or generated by Settling Defendants or their agents; and

g. Assessing Covenantor's compliance with this Consent Decree, or assessing other potentially responsible parties' compliance with an EPA order or agreement.

## IV.

## MISCELLANEOUS

4.01 Partial Invalidity. If any potion of the Restriction or terms set forth herein is determined to be involved for any reason, the remaining portion shall remain in full force and effect as if such portion had not been included herein.

4.02 Recordation. This instrument shall be executed by the Covenantor and shall be recorded by the Covenantor in the County

96 145362

of Contra Costa within ten (10) days of the date of entry of the Covenantor Consent Decree.

IN WITNESS WHEREOF, the parties execute this Covenant as of the date set forth above.

OWNER: Levin Enterprises Inc.

By: W S Berak

Title: President

Date: July 24, 1996

STATE OF CALIFORNIA )
) ss.
COUNTY OF Santa Clara )

On this the 24th day of July, 1996, before me, the undersigned Notary Public, personally appeared William S. Berak, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person whose name is subscribed to the within instrument and acknowledged that he/she executed the same in his/her authorized capacity, and that by his/her signature on the instrument the person or the entity upon behalf of which the person acted, executed the instrument.

WITNESS my hand and official seal.

Eleanore M. Lewis
Notary's Signature

137313.1

ELEANORE M. LEWIS
COMM. # 984321
Notary Public – California
SANTA CLARA COUNTY
My Comm. Expires FEB 2, 1997

96 145362

THE LAND REFERRED TO HEREIN IS SITUATED IN THE STATE OF CALIFORNIA, COUNTY OF CONTRA COSTA, CITY OF RICHMOND, DESCRIBED AS FOLLOWS:

PARCEL 1:

PORTION OF TIDE LAND LOTS 26 AND 27, SECTION 13, PORTION OF TIDE LAND LOTS 6, 7, 10 AND 11, SECTION 24, TOWNSHIP 1 NORTH, RANGE 5 WEST, MOUNT DIABLO BASE AND MERIDIAN, AND A PORTION OF SWAMP AND OVERFLOW LANDS IN SAID TOWNSHIP AND RANGE, DESCRIBED AS FOLLOWS:

BEGINNING ON THE SOUTH LINE OF THE 3.39 ACRE STRIP OF LAND DESCRIBED IN THE DEED TO THE CITY OF RICHMOND, RECORDED AUGUST 11, 1948, BOOK 1272, OFFICIAL RECORDS, PAGE 161, AT THE NORTHWEST CORNER OF THE 8.938 ACRE PARCEL OF LAND DESCRIBED IN THE DEED TO TIME OIL COMPANY, RECORDED JUNE 23, 1950, BOOK 1580, OFFICIAL RECORDS, PAGE 53; THENCE FROM SAID POINT OF BEGINNING ALONG THE WEST LINES OF SAID 8.938 ACRE PARCEL SOUTH 7° 22' 42" EAST, 755.15 FEET AND SOUTH 39° 35' 54" WEST, 183.99 FEET TO THE SOUTHWEST CORNER THEREOF; THENCE CONTINUING SOUTH 39° 35' 54" WEST, 148.21 FEET TO THE SOUTH LINE OF THE PARCEL OF LAND FIRSTLY DESCRIBED IN THE DEED TO PARR-RICHMOND INDUSTRIAL CORPORATION, RECORDED JUNE 1, 1949, BOOK 1394, OFFICIAL RECORDS, PAGE 370; THENCE ALONG THE EXTERIOR BOUNDARY LINES OF SAID PARCEL (1394 OR 370), AS FOLLOWS:

NORTH 50° 45' 20" WEST, 837.27 FEET; NORTH 0° 08; EAST, 287.09 FEET; NORTH 41° 46' EAST, 94.75 FEET; NORTH 4° 45' EAST, 646.21 FEET; SOUTH 89° 50' 50" EAST, 75.64 FEET; NORTH 12° 47' 24" EAST, 231.34 FEET; NORTH 89° 55' EAST, 39.57 FEET; NORTH 0° 05' WEST, 309.99 FEET; NORTH 16° 00' 31" EAST, 60.11 FEET; NORTH 6° 09' 11" EAST, 121.33 FEET; NORTH 89° 55' EAST, 8.55 FEET AND NORTH 0° 08' EAST, 30.82 FEET; THENCE LEAVING SAID EXTERIOR BOUNDARY LINE SOUTH 89° 35' EAST, 144.10 FEET; THENCE SOUTH 6° 53' EAST, 49.45 FEET; THENCE SOUTH 5° 04' WEST, 833.81 FEET; THENCE SOUTH 84° 56' EAST, 173.95 FEET TO THE WEST LINE OF SAID 3.39 ACRE PARCEL; THENCE ALONG THE WEST AND SOUTH LINES OF SAID 3.39 ACRE PARCEL, SOUTH 0° 31' WEST, 373.95 FEET AND SOUTH 89° 31' EAST, 195.48 FEET TO THE POINT OF BEGINNING.

PARCEL 2:

PORTION OF BLOCK 50 AND A PORTION OF FOURTH STREET AS SHOWN ON THE REVISED MAP OF SANTA FE, FILED AUGUST 24, 1915, IN BOOK 12 OF MAPS, PAGE 280; PORTION OF LOT 42 AS SHOWN ON THE MAP OF SAN PABLO RANCHO, FILED MARCH 1, 1894; PORTION OF TIDE LOT 27, SECTION 13 AND A PORTION OF TIDE LOT 6, SECTION 24, TOWNSHIP 1 NORTH, RANGE 5 WEST, MOUNT DIABLO BASE AND MERIDIAN, AS SHOWN ON MAP NO. 1 SALT MARSH AND TIDE

LANDS; FILED JUNE 11, 1917, IN RACK MAP NO. 9, IN THE OFFICE OF THE COUNTY RECORDER OF CONTRA COSTA COUNTY, DESCRIBED AS FOLLOWS:

BEGINNING ON THE MOST WESTERN LINE OF THAT CERTAIN STRIP OF LAND CONTAINING 3.39 ACRE, MORE OR LESS, DESCRIBED IN THE DEED FROM PARR-RICHMOND INDUSTRIAL CORPORATION TO CITY OF RICHMOND, RECORDED AUGUST 11, 1948, IN BOOK 1272 OF OFFICIAL RECORDS, PAGE 161, AT THE EASTERN TERMINUS OF THE LINE GIVEN AS "NORTH 84° 56' WEST, 173.95 FEET" THE BEARING OF SAID LINE BEING TAKEN AS NORTH 83° 58' 39" WEST FOR THE PURPOSE OF THIS DESCRIPTION, IN THE DEED FROM PARR-RICHMOND INDUSTRIAL CORPORATION TO PARR-RICHMOND TERMINAL COMPANY, RECORDED DECEMBER 30, 1955, IN BOOK 2681 OF OFFICIAL RECORDS, PAGE 353; THENCE FROM SAID POINT OF BEGINNING ALONG THE EXTERIOR LINES OF SAID PARCEL (2681 OR 353) AS FOLLOWS:

NORTH 83° 58' 39" WEST, 173.95 FEET; NORTH 6° 01' 21" EAST, 833.81 FEET; NORTH 5° 55' 39" WEST, 49.45 FEET AND NORTH 88° 37' 39" WEST, 18.85 FEET; THENCE NORTH 4° 14' 09" WEST, 44.61 FEET; THENCE NORTHERLY ALONG THE ARC OF A TANGENT CURVE TO THE RIGHT HAVING A RADIUS OF 360 FEET AN ARC DISTANCE OF 51.31 FEET; THENCE NORTH 3° 55' 51" EAST, 88.52 FEET TO THE SOUTH LINE OF CUTTING BOULEVARD; THENCE SOUTH 88° 39' 09" EAST ALONG SAID SOUTH LINE 24.79 FEET TO THE SOUTH LINE OF THE PARCEL OF LAND DESCRIBED AS PARCEL ONE IN THE DEED FROM PARR-RICHMOND INDUSTRIAL CORPORATION TO SOUTHERN PACIFIC RAILROAD COMPANY, RECORDED AUGUST 7, 1953, IN BOOK 2172 OF OFFICIAL RECORDS, PAGE 514; THENCE ALONG SAID SOUTH LINE AS FOLLOWS:

SOUTH 83° 58' 13" EAST, 68.37 FEET; EASTERLY ALONG THE ARC OF A TANGENT CURVE TO THE RIGHT HAVING A RADIUS OF 291.90 FEET OF 35.37 FEET AND SOUTH 73° 32' 21" EAST, 7.49 FEET TO THE EXTENSION NORTH 1° 28' 21" EAST AT THE MOST WESTERN LINE OF SAID CITY OF RICHMOND PARCEL (1272 OR 161); THENCE SOUTH 1° 28" 21' WEST ALONG SAID EXTENSION AND ALONG SAID WESTERN LINE 1057.71 FEET TO THE POINT OF BEGINNING.

PARCEL 4:

A PORTION OF AMENDMENT TO MAP OF ELLIS LANDING, FILED OCTOBER 28, 1913, IN BOOK 11 OF MAPS, PAGE 247; AND A PORTION OF TIDE LOTS 5 AND 12, SECTION 24, TOWNSHIP 1 NORTH, RANGE 5 WEST, MOUNT DIABLO BASE AND MERIDIAN, AS SHOWN ON MAP NO. 1, SALT MARSH AND TIDE LANDS, FILED JUNE 11, 1917, SAID MAPS BEING FILED IN THE OFFICE OF THE COUNTY RECORDER OF CONTRA COSTA COUNTY AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE WESTERN LINE OF EIGHTH STREET AS SAID STREET IS SHOWN ON SAID AMENDMENT TO MAP OF ELLIS LANDING, SAID POINT

BEING ALSO THE SOUTHEAST CORNER OF THE 3.39 ACRE STRIP DESCRIBED IN DEED FROM PARR RICHMOND INDUSTRIAL CORPORATION TO THE CITY OF RICHMOND FOR STREET PURPOSES, (SAID PORTION OF SAID STRIP BEING COMMONLY CALLED WRIGHT AVENUE), RECORDED AUGUST 11, 1948, IN BOOK 1272 OF OFFICIAL RECORDS, PAGE 161; THENCE SOUTH 1° 26' 21" WEST ALONG THE WESTERN LINE OF SAID EIGHTH STREET AND ITS SOUTHERLY PROJECTION 1229.02 FEET TO THE SOUTHERLY LINE OF DOCK AVENUE AS SAID DOCK AVENUE IS SHOWN ON SAID AMENDMENT TO MAP OF ELLIS LANDING; THENCE SOUTH 62° 53' 39" EAST ALONG SAID SOUTHERLY LINE OF DOCK AVENUE, 15.76 FEET TO THE NORTHERN CORNER OF THE TRACT OF LAND DESCRIBED AS PARCEL ONE IN THE DEED FROM ELLIS LANDING AND DOCK CO., A CORPORATION, TO THE CITY OF RICHMOND, DATED FEBRUARY 10, 1926, RECORDED APRIL 22, 1926, IN BOOK 29 OF OFFICIAL RECORDS, PAGE 283; THENCE SOUTH 4° 19' 34" EAST ALONG THE WEST LINE OF SAID LAST MENTIONED PARCEL AND ALONG THE WEST LINE OF PARCEL TWO DESCRIBED IN SAID DEED (29 OR 283), 120.30 FEET TO THE NORTHERLY U.S. PIERHEAD AND BULKHEAD LINE OF SAID RICHMOND INNER HARBOR; THENCE NORTH 71° 04' 25" WEST ALONG SAID NORTHERLY LINE 467.06 FEET TO THE SOUTHERLY EXTENSION OF THE EASTERLY LINE OF THE PARCEL OF LAND DESCRIBED IN DEED FROM PARR RICHMOND INDUSTRIAL CORPORATION TO TIME OIL CO., DATED JUNE 9, 1950 AND RECORDED JUNE 23, 1950, IN BOOK 1580 OF OFFICIAL RECORDS, PAGE 553; THENCE NORTH 2° 38' 09" WEST ALONG SAID SOUTHERLY EXTENSION AND SAID EASTERLY LINE, 1218.26 FEET TO THE SOUTHERLY LINE OF THE SAID 3.39 ACRE STRIP (1272 OR 161); THENCE SOUTH 88° 33' 39" EAST ALONG SAID SOUTHERLY LINE, 505.76 FEET TO THE POINT OF BEGINNING.

EXCEPTING THEREFROM:

THE PARCEL OF LAND DESCRIBED IN THE DEED TO TIME OIL CO., RECORDED NOVEMBER 23, 1966, BOOK 5250, OFFICIAL RECORDS, PAGE 411.

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BEGINNING AT THE NORTHWESTERN CORNER OF THE LAND DESIGNATED AS PARCEL 2 IN THE QUIT CLAIM DEED TO PARR-RICHMOND INDUSTRIAL CORPORATION, RECORDED JUNE 1, 1949 IN BOOK 1394 OF OFFICIAL RECORDS OF CONTRA COSTA COUNTY, PAGE 370; RUNNING THENCE ALONG THE NORTHERN LINE OF SAID LAND, BEING THE SOUTHERN LINE OF CUTTING BOULEVARD, EASTERLY, 88.61 FEET TO THE EASTERN LINE OF THE LAND SECONDLY DESCRIBED IN THE DEED TO PARR-RICHMOND TERMINAL CORPORATION, RECORDED DECEMBER 30, 1953, IN BOOK 2681 OF OFFICIAL RECORDS OF CONTRA COSTA COUNTY, PAGE 353; THENCE ALONG THE LAST NAMED LINE SOUTH 1° 56' WEST, SAID BEARINGS USED FOR THE PURPOSE OF THIS DESCRIPTION, 139.51 FEET AND SOUTH 6° 53' WEST 38.59 FEET TO THE NORTHERN LINE OF THE LAND FIRSTLY DESCRIBED IN SAID LAST MENTIONED DEED; THENCE ALONG THE LAST NAMED LINE NORTH 89° 34' WEST 144.10 FEET TO THE WESTERN LINE OF SAID LAND FIRST MENTIONED 1394 OR 370; AND THENCE ALONG THE LAST NAMED LINE NORTH 83 FEET AND NORTH 39° 53' EAST 84.13 FEET TO THE POINT OF BEGINNING.

EXCEPTING THEREFROM:

THAT PORTION THEREOF LYING WITHIN THE LINES OF THE PARCEL OF LAND DESCRIBED AS PARCEL ONE IN THE DEED TO PARR-RICHMOND TERMINAL COMPANY, RECORDED OCTOBER 4, 1951, BOOK 3966, OFFICIAL RECORDS, PAGE 474.

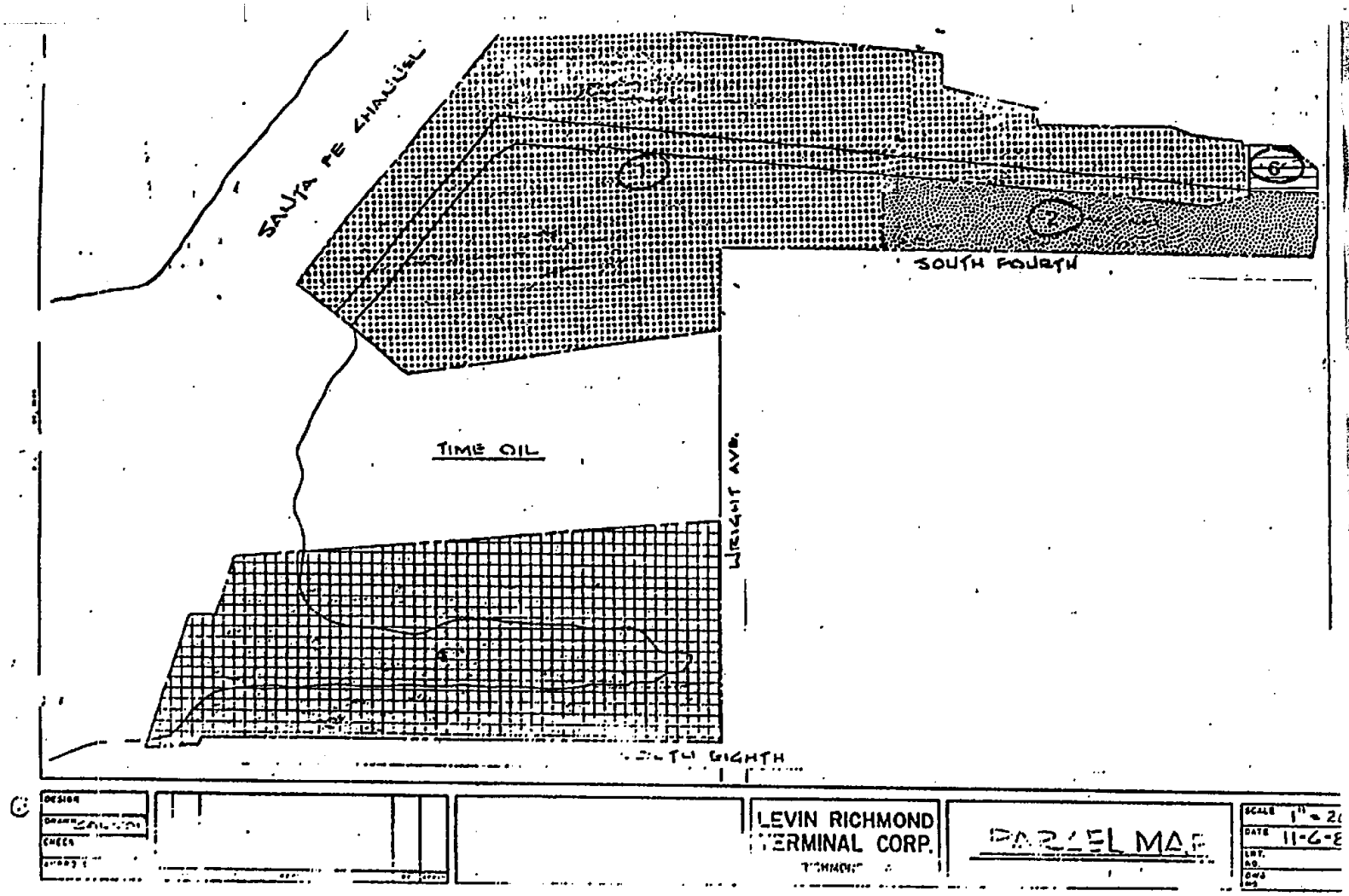


EXHIBIT B1

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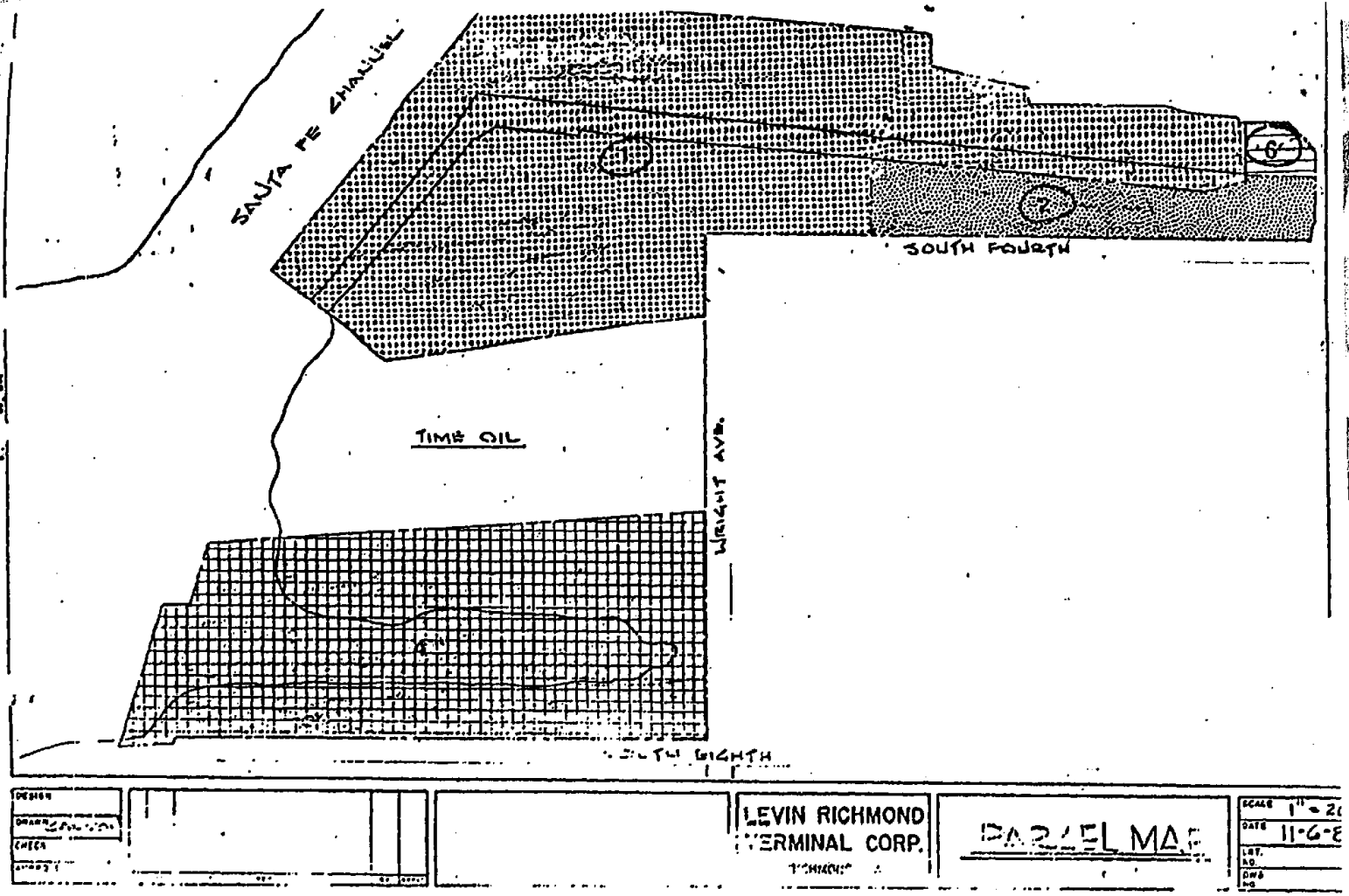
BEGINNING AT THE NORTHWESTERN CORNER OF THE LAND DESIGNATED AS PARCEL 2 IN THE QUIT CLAIM DEED TO PARR-RICHMOND INDUSTRIAL CORPORATION, RECORDED JUNE 1, 1949 IN BOOK 1394 OF OFFICIAL RECORDS OF CONTRA COSTA COUNTY, PAGE 370; RUNNING THENCE ALONG THE NORTHERN LINE OF SAID LAND, BEING THE SOUTHERN LINE OF CUTTING BOULEVARD, EASTERLY, 88.61 FEET TO THE EASTERN LINE OF THE LAND SECONDLY DESCRIBED IN THE DEED TO PARR-RICHMOND TERMINAL CORPORATION, RECORDED DECEMBER 30, 1953, IN BOOK 2681 OF OFFICIAL RECORDS OF CONTRA COSTA COUNTY, PAGE 353; THENCE ALONG THE LAST NAMED LINE SOUTH 1° 56' WEST, SAID BEARINGS USED FOR THE PURPOSE OF THIS DESCRIPTION, 139.51 FEET AND SOUTH 6° 53' WEST 38.59 FEET TO THE NORTHERN LINE OF THE LAND FIRSTLY DESCRIBED IN SAID LAST MENTIONED DEED; THENCE ALONG THE LAST NAMED LINE NORTH 89° 34' WEST 144.10 FEET TO THE WESTERN LINE OF SAID LAND FIRST MENTIONED 1394 OR 370; AND THENCE ALONG THE LAST NAMED LINE NORTH 83 FEET AND NORTH 39° 53' EAST 84.13 FEET TO THE POINT OF BEGINNING.

EXCEPTING THEREFROM:

THAT PORTION THEREOF LYING WITHIN THE LINES OF THE PARCEL OF LAND DESCRIBED AS PARCEL ONE IN THE DEED TO PARR-RICHMOND TERMINAL COMPANY, RECORDED OCTOBER 4, 1951, BOOK 3966, OFFICIAL RECORDS, PAGE 474.




96 145362

EXHIBIT B1

END OF DOCUMENT

# Attachment 2
# APN 560-380-008, 402 Wright Ave., Richmond, CA Title Search Documentation

# TitleSearch.com

50 State Coverage - Serving the Real Estate Industry since 1995

## PROPERTY AND OWNERSHIP INFORMATION

| | | | |
|---|---|---|---|
| Current Owner's Name | Levin Metals Corp | Order # | 27501 |
| Property Address | 402 Wright Ave | Completed Date | 04/21/2011 |
| City/State | Richmond, CA | Effective Date | 04/15/2011 |
| APN/Parcel/PIN | 560-380-008-6 | County | Contra Costa |

## DEED/VESTING INFORMATION

| | | | |
|---|---|---|---|
| Grantee(s) | Levin Metals Corporation | Deed Date | |
| Grantor/Prior Owner | United States Gypsum Company | Recorded Date | 04/30/1981 |
| Consideration Amount | | Instrument \|Book/Page | 52697 |
| Sale Price | | Deed Type | Corporation Grant Deed |

Notes:

## TAX INFORMATION

| Year | Property Tax Status | Due Date | Amount |
|---|---|---|---|
| 1st Half | PAID | PAID 11/17/2010 | 187,011.09 |
| 2nd Half | PAID | PAID 02/24/2011 | 187,011.09 |
| Notes: | | Land Value | 3,449,190 |
| | | Building/Improvements | 10,591776 |
| | | TOTAL ASSESSED VALUE | 17,580,956 |

## OPEN MORTGAGE/DEED OF TRUST INFORMATION

| | | | |
|---|---|---|---|
| Mortgagor | NO OPEN MORTGAGES FOUND | Date Signed | |
| Mortgagee | | Date Recorded | |
| Trustee | | Instrument \|Book/Page | |
| Mortgage Type | | Original Amount | |
| Assignment \|Related Doc | | Related Doc Book/Page | |
| Related Doc Date | | Related Doc Recorded | |
| Mortgagor | | Date Signed | |
| Mortgagee | | Date Recorded | |
| Trustee | | Instrument \|Book/Page | |
| Mortgage Type | | Original Amount | |
| Assignment \|Related Doc | | Related Doc Book/Page | |
| Related Doc Date | | Related Doc Recorded | |

## RELATED JUDGMENTS, UCC AND LIENS AGAINST OWNER

| Instrument # | Description | Date Recorded | Amount |
|---|---|---|---|
| | SEE ATTACHED LIST | | |
| | | | |

## EASEMENTS AND RESTRICTIONS FOR CURRENT OWNER AGAINST PROPERTY

| Instrument # | Description | Date Recorded |
|---|---|---|
| | SEE ATTACHED LIST | |
| | | |

Matters affecting the above real estate which do not directly appear among the land records, or are not indexed to the exact listed names and legal descriptions above are not included in this report. This is not a commitment for insurance nor is it an opinion on marketability of title. Subject to terms and conditions at TitleSearch.com

1. General and special taxes and assessments for the fiscal year 2011-2012, a lien not yet due or payable.

2. The lien of supplemental taxes, if any, assessed pursuant to Chapter 3.5 commencing with Section 75 of the California Revenue and Taxation Code.

3. The lien of bonds and assessment lien, if applicable, collected with the general and special taxes.

4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.

5. Additional matters, if any, following review by the Company's Waterways and Boundaries Underwriters.

6. Rights of the public in and to that portion of the land lying within any public road or highway.

7. "The 100 foot right of way for the canal now existing on the Southern end" of the Westerly portion of Parcel One, as disclosed by the Deed dated August 23, 1923, for H.C. Cutting Company, a corporation, to H.P. Lauritzen, et al, recorded August 5, 1927, Book 93, Page 133, Official Records.

8. Rights and easements over an across the waters covering portions of said land for the purposes of navigation thereon and including the mooring of vessels at or along the docks, wharves and piers situated on adjacent lands, as set forth in the Final Judgment of the District Court of the United States in and for the Northern District of California, Southern Division, Case No. 22732-G, a certified copy of which recorded November 21, 1947, Book 1150, Page 368, Official Records.

9. An easement for drainage pipe and incidental purposes, recorded March 8, 1948 as book 1181, Page 427, Official Records, and recorded August 14, 1948, Book 1275, Page 1 of Official Records.
   In Favor of: The United States of America
   Affects: A Westerly portion of Parcel One as set forth therein

10. An easement for pipelines and incidental purposes, recorded June 23, 1950 as Book 1580, Page 553 of Official Records.
    In Favor of: Time Oil Co., a Washington corporation
    Affects: Portions of Parcel One as set forth therein

11. An easement for railroad purposes and incidental purposes, recorded April 6, 1951 as Book 1743, Page 511 of Official Records.
    In Favor of: Parr Terminal Railroad, a California corporation
    Affects: Said land as set forth therein

12. An Easement for railroad purposes and incidental purposes, recorded March 26, 1952 as Book 1910, Page 241 of Official Records.

| | |
|---|---|
| In Favor of: | Parr Terminal Railroad, a California corporation |
| Affects: | A portion of Parcel One (The interest of Parr Terminal Railroad in and to the remaining property described in said Grant of Easement having been extinguished by Quitclaim Deed recorded April 24, 1998, Instrument No. 98-089402, Official Records. |

13. An easement for railroad purposes and incidental purposes, recorded November 23, 1966 as Book 5250, Page 420 of Official Records.

14. The terms and provision contain the Urban Renewal Plan for Project area No. 11-A ("The Harbour"), a certified copy of said Urban Renewal Plan, as amended, recorded November 7, 1991, Book 16997, Page 319, Instrument No. 91-235395, Official Records.

15. The terms and provisions contained in the document entitled "Agreement" recorded August 29, 1985 as Book 12483, Page 938 of Official Records.

16. The terms and provisions contained in the document entitled "Agreement" recorded November 5, 1985 as Book 13239, Page 834 of Official Records.

17. A right of first refusal in favor of Simsmetal USA Corporation, a Delaware corporation as contained in or disclosed by a document recorded February 4, 1988 as Book 14155, Page 914 of Official Records.

18. The terms, provisions, covenants, conditions and disclosures set forth in an unrecorded Settlement Agreement, dated May, 1991, pertaining to alleged contamination of property and Lauritzen Canal with residues resulting from the formulation and processing of pesticides, disclosed by Memorandum of said agreement, recorded May 30, 1991, Book 16628, Page 651, Instrument No. 91-101498, Official Records.

19. An easement of overhanging wires, cables, crossarms, fixtures, and appurtenances and incidental purposes, recorded September 9, 1991 as Book 16856, Page 554 of Official Records.

| | |
|---|---|
| In Favor of: | Pacific Gas and Electric Company |
| Affects: | The Northerly 625 feet of the Easterly 5 feet of Parcel One as set forth therein. |

20. The terms and provisions contained in the document entitled "Covenant to Restrict Use of Property" recorded August 2, 1996 as Instrument No. 96-145362 of Official Records.

| | |
|---|---|
| Affects: | The land and other property |

21. The effect of the disclosures contained in the "Covenant to Restrict Use of Property", recorded August 2, 1996, Instrument No. 96-145362, Official Records.

22. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.

23. Any facts, rights, interests or claims which would be disclosed by a correct ALTA/ACSM survey.

24. Rights of parties in possession.

**CONTRA COSTA, CA**

**04/21/2011 12:28PM** **PAGE 1 OF 1**

**CONTRA COSTA 2010-11 TAX ROLL** **INVESTIGATIVE SEARCH RESULTS**

**CUSTOMER SERVICE REQUEST ONLY**

**PAYMENTS AS OF 04/15/2011**

**SEARCH PARAMETERS**

**ENTERED APN:** 560-380-008-6

**APN: 560-380-008-6** **BILL: 344540**

**TRA:** 08-050 - CITY OF RICHMOND **ACQ DATE:** 04/30/1981 **DOC#:** 10305-344

**LEGAL:** POR SECS 13 & 24 T1N R5W & TRS ADJ
LT: 00001 BLK: BK: A0560 PG: 0380
LT: 00003 BLK: BK: A0560 PG: 0250 MORE LEGALS ON FILE

**SITUS:** 402 WRIGHT AVE

**MAIL:** 2150 TRADE ZONE BLVD #200 SAN JOSE CA 95131

| ASSESSED OWNER(S) | | 2010-11 ASSESSED VALUES |
|---|---|---|
| CRAWFORD PIMENTEL & CO INC ATP | LAND | 3,449,190 |
| LEVIN METALS CORPORATION | IMPROVEMENTS | 10,591,776 |
| | PERSONAL PROPERTY | 3,539,990 |
| | TAXABLE | **17,580,956** |

| 2010-11 TAXES | 1ST INST | 2ND INST | TOTAL TAX |
|---|---|---|---|
| STATUS | PAID | PAID | |
| PAYMENT DATE | 11/17/2010 | 02/24/2011 | |
| INSTALLMENT | 187,011.09 | 187,011.09 | 374,022.18 |
| PENALTY | 18,701.10 | 18,721.10 | 37,422.20 |
| BALANCE DUE | .00 | .00 | **.00** |

**ASSESSMENT DETAIL**

| FUND | TYPE | AMOUNT | DESCRIPTION OF ASSESSMENT(S) |
|---|---|---|---|
| **4295-RS** | **ASSMT DIST** | **122,454.28** | **HARBOR NAV DIST-1** |
| 2406-DY | PARAMEDIC | 5,000.00 | EMERGENCY MED-1 ZONE B |
| 7701-CL | SPEC LIEN | 4,349.88 | WCC USD PARCEL TAX |
| 4213-GR | SEWER | 2,461.00 | RICHMOND SEWER SERVICE |
| 3525-NR | SPEC LIEN | 1,040.00 | WCC HEALTH PARCEL TAX |
| 4213-IZ | SEWER | 960.00 | RICHMOND STORM DRAIN |
| 4005-FA | MISC ASSMT | 96.00 | AC TRANSIT MEASURE AA |
| 3301-DV | PEST ABATE | 13.80 | MOSQUITO ABATEMENT |
| 4026-KA | LNDSCP/LTG | 5.44 | EB REGIONAL PARK TRAILS LLD |
| | | 136,380.40 | TOTAL OF SPECIAL ASSESSMENTS |

**ADDITIONAL PROPERTY INFORMATION**

**TAX RATE:** 1.3517% **USE CODE:** 54-5

**END OF SEARCH**

RECORDING REQUESTED BY

WESTERN TITLE INSURANCE COMPANY

AND WHEN RECORDED MAIL TO

NAME: Levin Metals Corporation
ADDRESS: c/o Hanson, Bridgett, Marcus, Vlahos & Stromberg
CITY & STATE: 333 Market St., San Francisco, Ca. 94105
ATTN: Gerald Hinkley

Title Order No. W-481523 Escrow No. 80366

MAIL TAX STATEMENTS TO

NAME: Levin Metals Corporation
ADDRESS: 1800 Monterey Highway
CITY & STATE: San Jose, Ca. 95112

SURVEY MONUMENT FUND $10

RECORDED AT REQUEST OF WESTERN TITLE INSURANCE CO.
APR 30 1981
AT 7 O'CLOCK A.M.
CONTRA COSTA COUNTY RECORDS
FEE $ 10.00
J. R. OLSSON
COUNTY RECORDER

81 52697 APR 30 1981

SPACE ABOVE THIS LINE FOR RECORDER'S USE

Documentary transfer tax $.....
☐ Computed on full value of property conveyed, or
☐ Computed on full value less liens and encumbrances remaining thereon at time of sale.

Signature of declarant or agent determining tax — firm name

BOOK 10305 PAGE 344

# Corporation Grant Deed

WESTERN TITLE FORM NO. 102

FOR VALUE RECEIVED, UNITED STATES ~~GYPSUM~~ COMPANY, a Delaware corporation

GRANTS to LEVIN METALS CORPORATION, a California corporation

all that real property situate in the City of Richmond

County of Contra Costa, State of California, described as follows:

SEE EXHIBIT INCORPORATED HEREIN

Grantor does not warrant Grantee's title to subject property and hereby disclaims all warranties respecting title, both express and implied.

IN WITNESS WHEREOF, said corporation has executed these presents by its officers thereunto duly authorized, this 15th day of April, 19 81.

UNITED STATES GYPSUM COMPANY

By _____ Vice President

By _____ Asst. Secretary

(SEAL)

Seal Affixed

STATE OF ~~CALIFORNIA~~ Illinois } ss.
County of Cook

On April 15 19 81 before me, the undersigned a Notary Public, in and for said State, personally appeared W. R. Hogan and P. J. Freeda

known to me to be the Vice President and the Asst. Secretary of the corporation that executed the within instrument, and also known to me to be the persons who executed it on behalf of such corporation, and acknowledged to me that such corporation executed the same, and further acknowledged to me that such corporation executed the within instrument pursuant to its by-laws or a resolution of its Board of Directors.

Notary Public

FOR NOTARY SEAL OR STAMP

MAIL TAX STATEMENTS AS DIRECTED ABOVE

EXHIBIT A TO GRANT DEED DATED APRIL 15, 1981

These parcels of land in the City of Richmond, County of Contra Costa, State of California, described as follows:

PARCEL ONE

Portion of Tide Land Lots 26 and 27, Section 13, portion of Tide Land Lots 6, 7, 10 and 11, Section 24, Township 1 North, Range 5 West, Mount Diablo Base and Meridian, and a portion of Swamp and Overflow Lands in said Township and Range, described as follows:

Beginning on the south line of the 3.39 acre strip of land described in the deed to The City of Richmond, recorded August 11, 1948, Book 1272, Official Records, page 161, at the northwest corner of the 8.938 acre parcel of land described in the deed to Time Oil Company, recorded June 23, 1950, Book 1580, Official Records, page 553; thence from said point of beginning along the west lines of said 8.938 acre parcel south 7° 22' 42" east, 755.15 feet and south 39° 35' 54" west, 183.99 feet to the southwest corner thereof; thence continuing south 39° 35' 54" west, 148.21 feet to the south line of the parcel of land firstly described in the deed to Parr-Richmond Industrial Corporation, recorded June 17, 1949, Book 1394, Official Records, page 370; thence along the exterior boundary lines of said parcel (1394 OR 370), as follows: North 50° 45' 20" west, 837.27 feet; north 0°-08' east, 287.09 feet; north 41° 46' east, 94.75 feet; north 4° 45' east, 646.21 feet; south 89° 50' 50" east, 75.64 feet; north 12° 47' 24" east, 231.34 feet; north 89° 55' east, 39.57 feet; north 0° 05' west, 309.99 feet; north 16° 00' 31" east, 60.11 feet; north 6° 09' 11" east, 121.33 feet; north 89° 55' east, 8.55 feet and north 0° 08' east, 30.82 feet; thence leaving said exterior boundary line south 89° 35' east, 144.10 feet; thence south 6° 53' east, 49.45 feet; thence south 5° 04' west, 833.81 feet; thence south 84° 56' east, 173.95 feet to the west line of said 3.39 acre parcel; thence along the west and south lines of said 3.39 acre parcel, south 0° 31' west, 373.95 feet and south 89° 31' east, 195.48 feet to the point of beginning.

PARCEL TWO

Portion of Block 50 and a portion of Fourth Street as shown on the Revised Map of Santa Fe, filed August 24, 1915, in book 12 of Maps, page 280; portion of Lot 42 as shown on the map of San Pablo Rancho, filed March 1, 1894; portion of Tide Lot 27, Section 13 and a portion of Tide Lot 6, Section 24, Township 1 North, Range 5 West, Mount Diablo Base and Meridian, as shown on Map No. 1 Salt Marsh and Tide Lands, filed June 11, 1917, in Rack Map No. 9, in the office of the County Recorder of Contra Costa County, described as follows:

Beginning on the most western line of that certain strip of land containing 3.39 acres, more or less, described in the deed from Parr-Richmond Industrial Corporation to City of Richmond, recorded August 11, 1948, in book 1272 of Official Records, page 161, at the eastern terminus of the line given as "North 34° 56' West, 173.95 feet" the bearing of said line being taken as North 83° 58' 39" West for the purpose of this description, in the deed from Parr-Richmond

EXHIBIT A TO GRANT DEED DATED APRIL 15, 1981

BOOK 10305 PAGE 346

Industrial Corporation to Parr-Richmond Terminal Company, recorded December 30, 1955, in book 2681 of Official Records, page 353; thence from said point of beginning along the exterior lines of said parcel (2681 OR 353) as follows: North 83° 58' 39" West, 173.95 feet; North 6° 01' 21" East, 833.81 feet; North 5° 55' 39" West, 49.45 feet and North 88° 37' 39" West, 18.85 feet; thence North 4° 14' 09" West, 44.61 feet; thence northerly along the arc of a tangent curve to the right having a radius of 360 feet an arc distance of 51.31 feet; thence North 3° 55' 51" East, 88.52 feet to the south line of Cutting Boulevard; thence South 88° 39' 09" East along said south line 24.79 feet to the south line of the parcel of land described as Parcel One in the deed from Parr-Richmond Industrial Corporation to Southern Pacific Railroad Company, recorded August 7, 1953, in book 2172 of Official Records, page 514; thence along said south line as follows: South 83° 58' 13" East, 68.37 feet; easterly along the arc of a tangent curve to the right having a radius of 291.90 feet an arc distance of 35.37 feet and South 73° 32' 21" East, 7.49 feet to the extension North 1° 28' 21" East at the most western line of said City of Richmond Parcel (1272 OR 161); thence South 1° 28' 21" West along said extension and along said western line 1057.71 feet to the point of beginning.

PARCEL THREE

Portion of Tide Lots 5 and 6, Section 24, Township 1 North, Range 5 West, Mount Diablo Base and Meridian, as shown on Map No. One Salt Marsh and Tide Lands, filed June 11, 1917, in Rack Map No. 9, in the office of the County Recorder of Contra Costa County, described as follows:

Beginning on the east line of that certain parcel of land containing 3.39 acres, more or less, described in the deed from Parr-Richmond Industrial Corporation to the City of Richmond recorded August 11, 1948, in book 1272 of Official Records, page 161, distant thereon South 1° 28' 21" West, 571.95 feet from the south line of Cutting Boulevard; said point of beginning being at a point from which the center of a curve to the left having a radius of 182.06 feet bears North 30° 51' 51" East; thence easterly along the arc of said curve an arc distance of 67.36 feet to a point from which the center of a compound curve to the left having a radius of 343.80 feet bears North 9° 39' 51" East; thence easterly along the arc of said curve an arc distance of 50 feet; thence South 88° 40' 09" East tangent to the last mentioned curve 361.20 feet; thence easterly along the arc of a tangent curve to the right having a radius of 138 feet an arc distance of 66.07 feet; thence South 61° 11' 56" East 31.01 feet; thence easterly along the arc of a tangent curve to the left having a radius of 238 feet an arc distance of 113.96 feet to the most western line of the parcel of land described as Parcel One in the deed from Parr-Richmond Industrial Corporation to the Southern Pacific Railroad Company, et al, recorded October 2, 1953, in book 2202 of Official Records, page 341; thence South 1° 19' 51" West along said western line 40 feet to the southern line thereof; thence North 88° 40' 09" West 562.16 feet; thence westerly along the arc of a tangent curve to the right having a radius of 250.78 feet an arc

EXHIBIT A TO GRANT DEED DATED APRIL 15, 1981

BOOK 10305 PAGE 347

distance of 50.04 feet to a point from which the center of a compound curve to the right having a radius of 190.53 feet bears North 12° 45' 51" East; thence westerly along the arc of said curve an arc distance of 68.95 feet to the east line of said City of Richmond parcel (1272 OR 161); thence North 1° 28' 21" East along said east line 91.60 feet to the point of beginning.

PARCEL FOUR

A portion of Amendment to Map of Ellis Landing, filed October 28, 1913, in book 11 of Maps, page 247; and a portion of Tide Lots 5 and 12, Section 24, Township 1 North, Range 5 West, Mount Diablo Base and Meridian, as shown on Map No. 1, Salt Marsh and Tide Lands, filed June 11, 1917, said maps being filed in the office of the County Recorder of Contra Costa County and more particularly described as follows:

Beginning at a point on the western line of Eighth Street as said street is shown on said Amendment to Map of Ellis Landing, said point being also the southeast corner of the 3.39 acre strip described in deed from Parr Richmond Industrial Corporation to the City of Richmond for street purposes, (said portion of said strip being commonly called Wright Avenue), recorded August 11, 1948, in book 1272 of Official Records, page 161; thence South 1° 26' 21" West along the western line of said Eighth Street and its southerly projection 1229.02 feet to the southerly line of Dock Avenue as said Dock Avenue is shown on said Amendment to Map of Ellis Landing; thence South 62° 53' 39" East along said southerly line of Dock Avenue, 15.76 feet to the northern corner of the tract of land described as Parcel One in the deed from the Ellis Landing and Dock Co., a corporation, to the City of Richmond, dated February 10, 1926, recorded April 22, 1926, in book 29 of Official Records, page 283; thence South 4° 19' 34" East along the west line of said last mentioned parcel and along the west line of Parcel Two described in said deed (29 OR 283), 120.30 feet to the northerly U.S. Pierhead and Bulkhead Line of said Richmond Inner-Harbor; thence North 71° 04' 25" West along said northerly line, 467.06 feet to the southerly extension of the easterly line of the parcel of land described in deed from Parr Richmond Industrial Corporation to Time Oil Co., dated June 9, 1950 and recorded June 23, 1950, in book 1680 of Official Records, page 553; thence North 2° 38' 09" West along said southerly extension and said easterly line, 1218.26 feet to the southerly line of the said 3.39 acre strip (1272 OR 161); thence South 88° 33' 39" East along said southerly line, 505.76 feet to the point of beginning.

EXCEPTING THEREFROM: The parcel of land described in the deed to Time Oil Co., recorded November 23, 1966, Book 5250, Official Records, page 411.

PARCEL FIVE

Portion of Block 5, West Wharf, now vacated, and Ellis Canal, now vacated, as shown on amendment to map of Ellis Landing Subdivision, filed in Map Book 11, page 247, in the office of the County Recorder of Contra Costa County, and portion of Tide Lots 5 and 6, Section 24, Township 1 North, Range 5 West, Mount Diablo Base and Meridian, Map

No. 1, Salt Marsh and Tide Lands, filed June 11, 1917 as Rack Map No. 9, and Swamp and Overflowed Lands Survey No. 150, all in the office of the County Recorder of said county, described as a whole as beginning at a point in the northern line of the 3.39 acre strip described in the deed to the City of Richmond, for the purpose of public streets, dated May 6, 1948, recorded August 11, 1948, Book 1272, Official Records, page 161, distant thereon North 89° 31' west 275.53 feet from the western line of Eighth Street as said street is shown on said amendment to map of Ellis Landing Subdivision, the bearing of said western line of Eighth Street is taken as south 0° 29' west for the purpose of this description; thence along the northern, northeastern and eastern boundaries of said 3.39 acre strip, 1272 OR 61, north 89° 31' west 755.63 feet, along the arc of a curve concave to the northeast having a radius of 60 feet, an arc distance of 94.28 feet and north 0° 31' east 200.24 feet; thence leaving said strip, south 89° 31' east 174.34 feet; north 0° 31' east, 105.48 feet; south 89° 30' east, 641.05 feet to a point that bears north 0° 29' east from the point of beginning; thence south 0° 29' west 365.58 feet to the point of beginning.

PARCEL SIX

Beginning at the northwestern corner of the land designated as Parcel 2 in the Quit Claim Deed to Parr-Richmond Industrial Corporation, recorded June 1, 1949 in book 1394 of Official Records of Contra Costa County, page 370; running thence along the northern line of said land, being the Southern line of Cutting Boulevard, easterly, 88.61 feet to the eastern line of the land secondly described in the deed to Parr-Richmond Terminal Corporation, recorded December 30, 1953, in book 2681 of Official Records of Contra Costa County, page 353; thence along the last named line South 1° 56' West, said bearings used for the purpose of this description, 139.51 feet and south 6° 53' West 38.59 feet to the northern line of the land firstly described in said last mentioned deed; thence along the last named line North 89° 34' West 144.10 feet to the western line of said land firstly mentioned 1394 OR 370; and thence along the last named line North 83 feet and North 39° 53' East 84.13 feet to the point of beginning.

EXCEPTING THEREFROM: That portion thereof lying within the lines of the parcel of land described as Parcel One in the deed to Parr-Richmond Terminal Company, recorded October 4, 1951, Book 3966, Official Records, page 474.

PARCEL SEVEN

An exclusive easement and right of way for the purpose of laying, operating, maintaining, repairing and restoring railroad tracks and the operation of locomotives and rail cars and for general railroad purposes over and upon:

Portion of Tide Lot 12, Section 24, Township 1 North, Range 5 West, Mount Diablo Base and Meridian, described as follows:

EXHIBIT A TO GRANT DEED DATED APRIL 15, 1981

10305 349

Beginning on the north line of the parcel of land firstly described in the deed from Parr-Richmond Industrial Corporation, a California corporation, to Time Oil Co., a Washington corporation, recorded June 23, 1950 in book 1580, Official Records, page 553 at the west line of the parcel of land described in the deed from Parr Industrial Corporation, a California corporation, to Parr-Richmond Terminal Company, a California corporation, recorded December 20, 1956, in book 2902, Official Records, page 513, distant thereon north 88° 33' 39" west 25.00 feet from the northeast corner thereof; thence from said point of beginning along the north line of said Time Oil Co., parcel (1580 OR 553) and along the west line of said Parr-Richmond Terminal Company parcel (2902 OR 513) as follows: South 88° 33' 39" East 25.00 feet and South 2° 38' 09" east 50.00 feet, to a point which bears South 28° 21' 07" East from the point of beginning; thence North 28° 21' 07" West 57.47 feet to the point of beginning.

PARCEL EIGHT

An easement over an in the real property owned by M. Dummus, Inc. in the County of Contra Costa, City of Richmond, State of California, 10 feet in width for the purpose of maintaining, operating, replacing, removing and renewing water mains which presently lie within said property, the center line of which easement is more particularly described as follows:

Commence at the point of intersection of the north line of Wright Avenue as said Avenue is described in the deed to the City of Richmond (recorded in the Contra Costa County Records on August 11, 1948 in Book 1272 on Page 161) with the westerly line of that parcel of land designated as Parcel One in the quit claim deed to the Pacific Railroad Company, et al, recorded October 2, 1953, in Book 2202 of Official Records of Contra Costa County on Page 341; thence along last mentioned westerly line as follows: North 0° 29' East 205.53 feet, North 10° 18' 11" West 120.38 feet, North 16° 02' 27" West 120.42 feet to a point from which the center of a curve to the left (radius = 352.24 feet) bears South 73° 57' 33" West; thence northerly along the arc of last mentioned curve (R = 352.24 feet) through a central angle of 6° 12' 12" to a point from which its center bears South 67° 45' 21" West, which point also marks the true point of beginning of Parcel One; thence South 56° 04' 40" West 249.62 feet to a point on the east line of that parcel of land now or formerly leased by Gar Wood Industries, which point bears South 0° 29' west along last mentioned east line and distant 31.49 feet from the northeast corner of said Gar Wood lease, said point being also the end of Parcel One, said description of Parcel One being the centerline of a strip of land 10 feet in width.

PARCEL NINE

An easement for the purpose of maintaining, operating, replacing, removing and renewing water mains which presently lie within said easement, over and in the following described property situated in the County of Contra Costa County, City of Richmond, State of California:

EXHIBIT A TO GRANT DEED DATED APRIL 15, 1981

Commence at a point marking the north end of a curve to the right (radius = 60 feet) with an interior angle 90° 02' as said curve is described in the deed to the City of Richmond, recorded on August 11, 1948 in Book 1272 of Contra Costa County Records on Page 161, said point being also on the east right of way line of Fourth Street as said street is also described in the above-mentioned deed to the City of Richmond (1272 OR 161); thence North 0° 31' east along last mentioned east line 200.24 feet; thence South 89° 31' east 174.34 feet; thence North 0° 31' east 35.02 feet to the true point of beginning; thence continue North 0° 31' east 230.00 feet; thence North 89° 31' west 24.76 feet; thence South 0° 31' west 230.00 feet; thence South 89° 29' east 24.76 feet to the true point of beginning.



END OF DOCUMENT

# TitleSearch.com

50 State Coverage - Serving the Real Estate Industry since 1995

## 402 WRIGHT AVE, RICHMOND, CA 94804-3532

### Owner Information:

| | | | |
|---|---|---|---|
| Owner Name: | LEVIN METALS CORPORATION | | |
| Mailing Address: | 2150 TRADE ZONE BLVD #200, SAN JOSE CA 95131-1730 C013 C/O CRAWFORD PIMENTEL & CO INC ATP | | |
| Phone Number: | | Vesting Codes: | / / |

### Location Information:

| | | | |
|---|---|---|---|
| Legal Description: | POR SECS 13 & 24 T1N R5W & TRS ADJ | | |
| County: | CONTRA COSTA, CA | APN: | 560-380-008-6 |
| Census Tract / Block: | 3780.00 / 1 | Alternate APN: | |
| Township-Range-Sect: | | Subdivision: | |
| Legal Book/Page: | | Map Reference: | / 608-F1 |
| Legal Lot: | | Tract #: | |
| Legal Block: | | School District: | W CONTRA COSTA |
| Market Area: | | Munic/Township: | |
| Neighbor Code: | | | |

### Owner Transfer Information:

| | | | |
|---|---|---|---|
| Recording/Sale Date: | / | Deed Type: | |
| Sale Price: | | 1st Mtg Document #: | |
| Document #: | | | |

### Last Market Sale Information:

| | | | |
|---|---|---|---|
| Recording/Sale Date: | / | 1st Mtg Amount/Type: | / |
| Sale Price: | | 1st Mtg Int. Rate/Type: | / |
| Sale Type: | | 1st Mtg Document #: | |
| Document #: | | 2nd Mtg Amount/Type: | / |
| Deed Type: | | 2nd Mtg Int. Rate/Type: | / |
| Transfer Document #: | | Price Per SqFt: | |
| New Construction: | | Multi/Split Sale: | |
| Title Company: | | | |
| Lender: | | | |
| Seller Name: | | | |

### Prior Sale Information:

| | | | |
|---|---|---|---|
| Prior Rec/Sale Date: | / | Prior Lender: | |
| Prior Sale Price: | | Prior 1st Mtg Amt/Type: | / |
| Prior Doc Number: | | Prior 1st Mtg Rate/Type: | / |
| Prior Deed Type: | | | |

### Property Characteristics:

| | | | | | |
|---|---|---|---|---|---|
| Year Built / Eff: | / | Total Rooms/Offices: | | Garage Area: | |
| Gross Area: | | Total Restrooms: | | Garage Capacity: | |
| Building Area: | | Roof Type: | | Parking Spaces: | |
| Tot Adj Area: | | Roof Material: | | Heat Type: | |
| Above Grade: | | Construction: | | Air Cond: | |
| # of Stories: | | Foundation: | | Pool: | |
| Other Improvements: | | Exterior wall: | | Quality: | |
| | | Basement Area: | | Condition: | |

### Site Information:

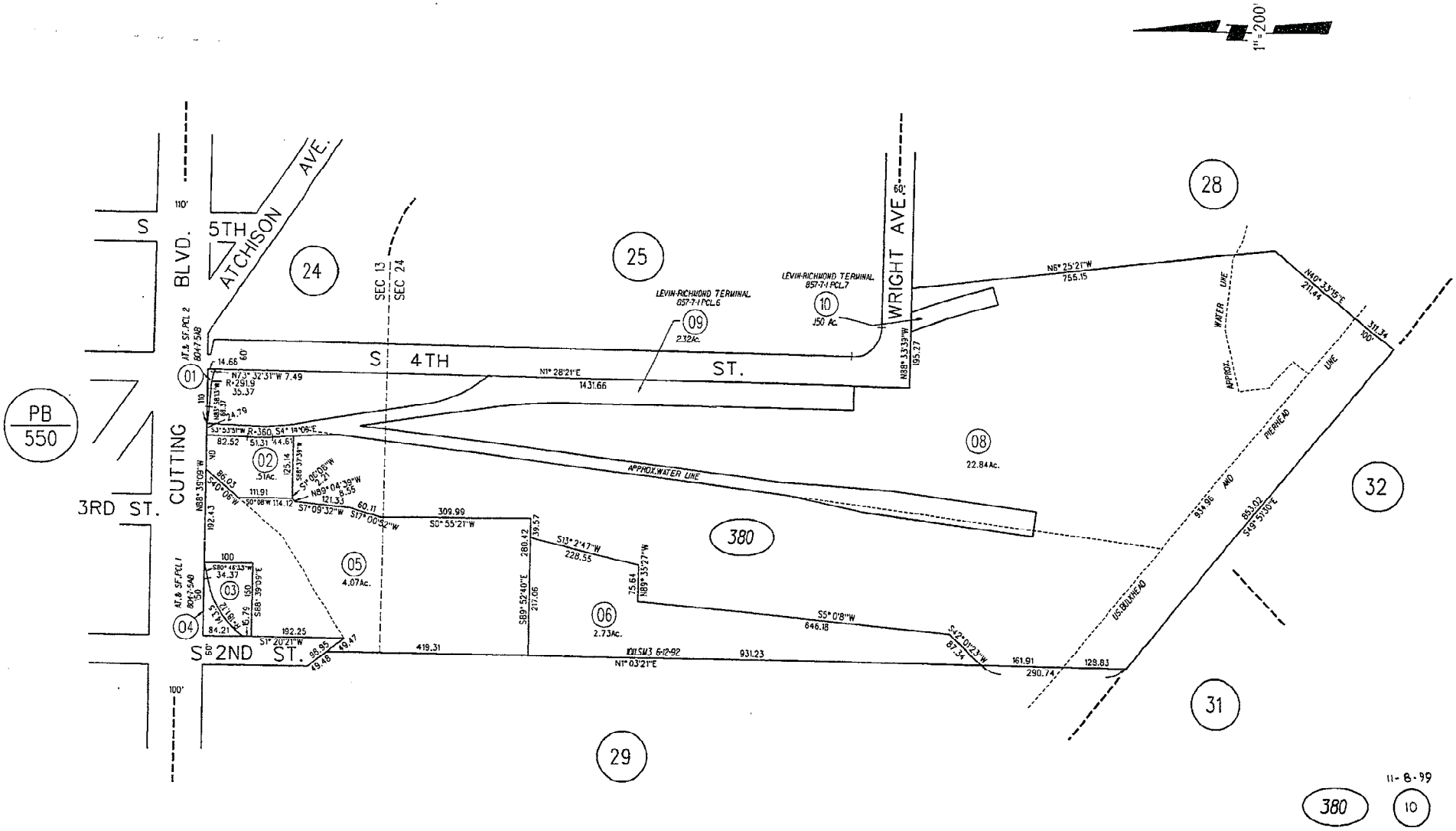
| | | | | | |
|---|---|---|---|---|---|
| Zoning: | | Acres: | 22.84 | County Use: | HEAVY INDUSTRIAL (54) |
| Flood Zone: | X | Lot Area: | 994,910 | State Use: | |
| Flood Panel: | 0600350030C | Lot Width/Depth: | x | Site Influence: | |
| Flood Panel Date: | 09/07/2001 | Commercial Units: | | Sewer Type: | |
| Land Use: | HEAVY INDUSTRIAL | Building Class: | | Water Type: | |

### Tax Information:

| | | | | | |
|---|---|---|---|---|---|
| Total Value: | $17,580,956 | Assessed Year: | 2010 | Property Tax: | $374,022.18 |
| Land Value: | $3,449,190 | Improved %: | 60% | Tax Area: | 08050 |
| Improvement Value: | $10,591,776 | Tax Year: | 2010 | Tax Exemption: | |
| Total Taxable Value: | | | | | |

Contra Costa, CA, 2011-2012 - 560-380-008-6, 402 WRIGHT AVE, RICHMOND, CA 94804-3532, Sheet: 1 of 1

POR. SECTIONS 13 & 24, T1N, R5W, MDB&M




ASSESSOR'S MAP
BOOK 560 PAGE 38
FM.1253 CONTRA COSTA COUNTY, CALIF.

DEC 0 8 1999

# Attachment 3
# APN 560-380-002, 312 Cutting Blvd., Richmond, CA Title Search Documentation

# TitleSearch.com

**50 State Coverage - Serving the Real Estate Industry since 1995**

## PROPERTY AND OWNERSHIP INFORMATION

| | | | |
|---|---|---|---|
| Current Owner's Name | LEVIN METALS CORPORATION | Order # | 27502 |
| Property Address | 312 W CUTTING BLVD | Completed Date | 4/25/11 |
| City/State | RICHMOND, CA, 94804 | Effective Date | 4/22/11 |
| APN/Parcel/PIN | 560-380-002-9 | County | CONTRA COSTA COUNTY, CA |

## DEED/VESTING INFORMATION

| | | | |
|---|---|---|---|
| Grantee(s) | LEVIN METALS CORPORATION | Deed Date | 4/15/81 |
| Grantor/Prior Owner | UNITED STATES GYPSUM COMPANY | Recorded Date | 4/15/81 |
| Consideration Amount | ------ | Instrument \|Book/Page | 10305-344 |
| Sale Price | ------ | Deed Type | CORPORATION GRANT |

Notes:

## TAX INFORMATION

| Year | Property Tax Status | Due Date | Amount |
|---|---|---|---|
| 2010/2011 1ST INSTALLMENT | PAID | | $1,701.46 |
| 2010/2011 2ND INSTALLMENT | PAID | | $1,701.46 |
| Notes: | | Land Value | $91,761 |
| | | Building/Improvements | $810 |
| | | TOTAL ASSESSED VALUE | $92,571 |

## OPEN MORTGAGE/DEED OF TRUST INFORMATION

| | | | |
|---|---|---|---|
| Mortgagor | NO OPEN MORTGAGES FOUND | Date Signed | |
| Mortgagee | | Date Recorded | |
| Trustee | | Instrument \|Book/Page | |
| Mortgage Type | | Original Amount | |
| Assignment \|Related Doc | | Related Doc Book/Page | |
| Related Doc Date | | Related Doc Recorded | |

## RELATED JUDGMENTS, UCC AND LIENS AGAINST OWNER

| Instrument # | Description | Date Recorded | Amount |
|---|---|---|---|
| | SEE LIST ATTACHED | | |

## EASEMENTS AND RESTRICTIONS FOR CURRENT OWNER AGAINST PROPERTY

| Instrument # | Description | Date Recorded |
|---|---|---|
| | SEE LIST ATTACHED | |

Matters affecting the above real estate which do not directly appear among the land records, or are not indexed to the exact listed names and legal descriptions above are not included in this report. This is not a commitment for insurance nor is it an opinion on marketability of title. Subject to terms and conditions at TitleSearch.com

1. General and special taxes and assessments for the fiscal year 2011-2012, a lien not yet due or payable.

2. The lien of supplemental taxes, if any, assessed pursuant to Chapter 3.5 commencing with Section 75 of the California Revenue and Taxation Code.

3. The lien of bonds and assessment lien, if applicable, collected with the general and special taxes.

4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.

5. Rights of the public in and to that portion of the land lying within any public road or highway.

6. Additional matters, if any, following review by the Company's Waterways and Boundaries Underwriters.

7. An easement for railroad purposes and incidental purposes, recorded March 26, 1952 as Book 1910, Page 241 of Official Records.
   In Favor of: Parr Terminal Railroad, a California corporation
   Affects: Portion of premises as set forth therein

8. An easement for railroad and vehicular traffic, pipelines, and utilities and incidental purposes, recorded December 30, 1955 as Book 2681, Page 353 of Official Records.
   In Favor of: Parr-Richmond Terminal Company, a corporation
   Affects: Said land as set forth therein

9. Ordinance No. 10-75 N.S. of the City Council of The City Richmond adopting the Urban Renewal Plan for Project 11-A (The Harbour), recorded June 11, 1975 in Book 7532, Page 710 Instrument No. 50562, Official Records.

10. Covenants, conditions, restrictions and easements in the document recorded June 29, 1980 as Instrument No. 80-74446, Book 9885, Page 439 of Official Records, but deleting any covenant, condition or restriction indicating a preference, limitation or discrimination based on race, color, religion, sex, sexual orientation, marital status, ancestry, disability, handicap, familial status, national origin, source of income (as defined in California Government Cod 12955(p)), to the extent such covenants, conditions or restrictions violate Title 42, Section 3604(c), of the United States Codes. Lawful restrictions under state and federal law on the age of occupants in senior housing or housing for older persons shall not be construed as restrictions based on familial status.

11. An easement for storm drainage and incidental purposes, recorded October 6, 1976 as Instrument No. 11556, Book 8044, Page 255 of Official Records.
    In Favor of: City of Richmond, a municipal corporation
    Affects: Said land as set forth therein

12. The terms and provisions contained in the document entitled “Memorandum of Agreement” recorded May 30, 1991 as Instrument No. 96-101498, Book 16628, Page 651 of Official Records.

    Affects: The land and other property.

13. The terms and provisions contained in the document entitled “Covenant to Restrict Use of Property” recorded August 2, 1996 as Instrument No. 96-145362 of Official Records.

    Affects: The land and other property.

14. Any facts, rights, interests, or claims that may exist or arise by reason of matters, in any, disclosed by that certain Record of Survey filed June 7, 2000 in Book 117, Page 41.

15. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.

16. Rights of parties in possession.

## OWNERSHIP INFORMATION

Parcel Number :560 380 002 Building Number: of
Units (Parcel) :
Owner :Levin Metals Corporation
CoOwner :
Site Address :312 W Cutting Blvd Richmond 94804
Mail Address :2150 Trade Zone Blvd #200 San Jose Ca 95131
Phone :Owner: Tenant:

## SALES AND LOAN INFORMATION

| | | | |
|---|---|---|---|
| Transferred | :04/30/1981 | Loan Amount | : |
| Document # | :10305-0344 | Lender | : |
| Sale Price | : | Loan Type | : |
| Deed Type | : | Vesting Type | : |
| % Owned | : | Interest Rate | : |

## ASSESSMENT AND TAX INFORMATION

| | | | |
|---|---|---|---|
| Land | :$91,761 | Exempt Type | : |
| Structure | :$810 | Exempt Amount | : |
| Other | : | Tax Rate Area | :08001 |
| Total | :$92,571 | 10-11 Tax | :$3,402.92 |
| % Improved | :1 | | |

## PROPERTY DESCRIPTION

Map Grid :608 E1
Census :Tract: 3780.00 Block: 1
Zoning :
Land Use :54 Ind,Heavy Industrial
Legal :POR SEC 13 T1N R5W .51 AC

## PROPERTY CHARACTERISTICS

| | | | |
|---|---|---|---|
| TotalRooms : | EffYearBuilt: | Lot Acres | :.51 |
| Bedrooms : | Pool : | Lot SqFt | :22,216 |
| Bathrooms : | View :None | Bldg SqFt | : |
| Units (Bldg): | | | |

| PLACER TITLE COMPANY, P03, DT05 | CONTRA COSTA, CA |
|---|---|
| 04/22/2011 11:11AM TD9H | PAGE 1 OF 1 |
| CONTRA COSTA 2010-11 TAX ROLL | INVESTIGATIVE SEARCH RESULTS |

CUSTOMER SERVICE REQUEST ONLY

PAYMENTS AS OF 04/15/2011

SEARCH PARAMETERS

**ENTERED APN:** 560-380-002-9

**APN: 560-380-002-9** **BILL: 344536**

**TRA:** 08-001 - CITY OF RICHMOND **ACQ DATE:** 04/30/1981 **DOC#:** 10305-344

**LEGAL:** POR SEC 13 T1N R5W .51 AC
LT: 00001 BLK: BK: A0560 PG: 0380
LT: 00003 BLK: BK: A0560 PG: 0250 MORE LEGALS ON FILE

**SITUS:** 312 CUTTING BLVD

**MAIL:** 2150 TRADE ZONE BLVD #200 SAN JOSE CA 95131

| ASSESSED OWNER(S) | | 2010-11 ASSESSED VALUES |
|---|---|---|
| CRAWFORD PIMENTEL & CO INC ATP | LAND | 91,761 |
| LEVIN METALS CORPORATION | IMPROVEMENTS | 810 |
| | TAXABLE | **92,571** |

| 2010-11 TAXES | 1ST INST | 2ND INST | TOTAL TAX |
|---|---|---|---|
| STATUS | PAID | PAID | |
| PAYMENT DATE | 11/17/2010 | 02/24/2011 | |
| INSTALLMENT | 1,701.46 | 1,701.46 | 3,402.92 |
| PENALTY | 170.14 | 190.14 | 360.28 |
| BALANCE DUE | .00 | .00 | **.00** |

**ASSESSMENT DETAIL**

| FUND | TYPE | AMOUNT | DESCRIPTION OF ASSESSMENT(S) |
|---|---|---|---|
| 3525-NR | SPEC LIEN | 1,040.00 | WCC HEALTH PARCEL TAX |
| **4295-RS** | **ASSMT DIST** | **567.20** | **HARBOR NAV DIST-1** |
| 4213-GR | SEWER | 328.00 | RICHMOND SEWER SERVICE |
| 4005-FA | MISC ASSMT | 96.00 | AC TRANSIT MEASURE AA |
| 4213-IZ | SEWER | 64.00 | RICHMOND STORM DRAIN |
| 2406-DY | PARAMEDIC | 30.00 | EMERGENCY MED-1 ZONE B |
| 3301-DV | PEST ABATE | 13.80 | MOSQUITO ABATEMENT |
| 7701-CL | SPEC LIEN | 7.20 | WCC USD PARCEL TAX |
| 4026-KA | LNDSCP/LTG | 5.44 | EB REGIONAL PARK TRAILS LLD |
| | | 2,151.64 | TOTAL OF SPECIAL ASSESSMENTS |

**ADDITIONAL PROPERTY INFORMATION**

**TAX RATE:** 1.3517% **USE CODE:** 54-5

RECORDING REQUESTED BY
WESTERN TITLE INSURANCE COMPANY
AND WHEN RECORDED MAIL TO
NAME Levin Metals Corporation
ADDRESS c/o Hanson, Bridgett, Marcus, Vlahos
CITY & STATE & Stromberg
333 Market St., San Francisco, Ca. 94105
ATTN: Gerald Hinkley
Title Order No. W-481523 Escrow No. 80366

SURVEY MONUMENT FUND $10.

RECORDED AT REQUEST OF
WESTERN TITLE INSURANCE CO.
APR 30 1981
AT 7 O'CLOCK A.M.
CONTRA COSTA COUNTY RECORDS
FEE $ 12.00
J. R. OLSSON
COUNTY RECORDER
81 52697 APR 30 1981

SPACE ABOVE THIS LINE FOR RECORDER'S USE

MAIL TAX STATEMENTS TO
NAME Levin Metals Corporation
ADDRESS 1800 Monterey Highway
CITY & STATE San Jose, Ca. 95112

Documentary transfer tax $.....
☐ Computed on full value of property conveyed, or
☐ Computed on full value less liens and encumbrances remaining thereon at time of sale.
.....
Signature of declarant or agent determining tax—firm name

# Corporation Grant Deed

WESTERN TITLE FORM NO. 102

FOR ~~VALUE~~ RECEIVED, UNITED STATES ~~GYPSUM~~ COMPANY, a Delaware corporation

GRANTS to LEVIN METALS CORPORATION, a California corporation

all that real property situate in the City of Richmond
County of Contra Costa State of California, described as follows:

SEE EXHIBIT INCORPORATED HEREIN

Grantor does not warrant Grantee's title to subject property and hereby disclaims all warranties respecting title, both express and implied.

IN WITNESS WHEREOF, said corporation has executed these presents by its officers thereunto duly authorized, this 15th day of April, 19 81.

UNITED STATES GYPSUM COMPANY

By [signature] Vice President

By [signature] Asst. Secretary

(SEAL)

Seal Affixed

STATE OF ~~COMMONWEALTH~~ Illinois
County of Cook } ss.

On April 15, 19 81 before me, the undersigned a Notary Public, in and for said State, personally appeared W. R. Hogan and F. J. Freeda known to me to be the Vice President and the Asst. Secretary of the corporation that executed the within instrument, and also known to me to be the persons who executed it on behalf of such corporation, and acknowledged to me that such corporation executed the same, and further acknowledged to me that such corporation executed the within instrument pursuant to its by-laws or a resolution of its Board of Directors.

[signature]
Notary Public

FOR NOTARY SEAL OR STAMP

MAIL TAX STATEMENTS AS DIRECTED ABOVE

EXHIBIT A TO GRANT DEED DATED APRIL 15, 1981

These parcels of land in the City of Richmond, County of Contra Costa, State of California, described as follows:

PARCEL ONE

Portion of Tide Land Lots 26 and 27, Section 13, portion of Tide Land Lots 6, 7, 10 and 11, Section 24, Township 1 North, Range 5 West, Mount Diablo Base and Meridian, and a portion of Swamp and Overflow Lands in said Township and Range, described as follows:

Beginning on the south line of the 3.39 acre strip of land described in the deed to The City of Richmond, recorded August 11, 1948, Book 1272, Official Records, page 161, at the northwest corner of the 8.938 acre parcel of land described in the deed to Time Oil Company, recorded June 23, 1950, Book 1580, Official Records, page 553; thence from said point of beginning along the west lines of said 8.938 acre parcel south 7° 22' 42" east, 755.15 feet and south 39° 35' 54" west, 183.99 feet to the southwest corner thereof; thence continuing south 39° 35' 54" west, 148.21 feet to the south line of the parcel of land firstly described in the deed to Parr-Richmond Industrial Corporation, recorded June 1, 1949, Book 1394, Official Records, page 370; thence along the exterior boundary lines of said parcel (1394 OR 370), as follows: North 50° 45' 20" west, 837.27 feet; north 0° 08' east, 287.09 feet; north 41° 46' east, 94.75 feet; north 4° 45' east, 646.21 feet; south 89° 50' 50" east, 75.64 feet; north 12° 47' 24" east, 231.34 feet; north 89° 55' east, 39.57 feet; north 0° 05' west, 309.99 feet; north 16° 00' 31" east, 60.91 feet; north 6° 09' 11" east, 121.33 feet; north 89° 55' east, 8.55 feet and north 0° 08' east, 30.82 feet; thence leaving said exterior boundary line south 89° 35' east, 144.10 feet; thence south 6° 53' east, 49.45 feet; thence south 85° 04' west, 833.81 feet; thence south 84° 54' east, 173.95 feet to the west line of said 3.39 acre parcel; thence along the west and south lines of said 3.39 acre parcel, south 0° 31' west, 373.95 feet and south 89° 31' east, 195.48 feet to the point of beginning.

PARCEL TWO

Portion of Block 50 and a portion of Fourth Street as shown on the Revised Map of Santa Fe, filed August 24, 1915, in book 12 of Maps, page 280; portion of Lot 42 as shown on the map of San Pablo Rancho, filed March 1, 1894; portion of Tide Lot 27, Section 13 and a portion of Tide Lot 6, Section 24, Township 1 North, Range 5 West, Mount Diablo Base and Meridian, as shown on Map No. 1 Salt Marsh and Tide Lands, filed June 11, 1917, in Rack Map No. 9, in the office of the County Recorder of Contra Costa County, described as follows:

Beginning on the most western line of that certain strip of land containing 3.39 acres, more or less, described in the deed from Parr-Richmond Industrial Corporation to City of Richmond, recorded August 11, 1948, in book 1272 of Official Records, page 161, at the eastern terminus of the line given as "North 34° 56' West, 173.95 feet" the bearing of said line being taken as North 83° 58' 39" West for the purpose of this description, in the deed from Parr-Richmond

EXHIBIT A TO GRANT DEED DATED APRIL 15, 1981

BOOK 10316 PAGE 346

Industrial Corporation to Parr-Richmond Terminal Company, recorded December 30, 1955, in book 2681 of Official Records, page 353; thence from said point of beginning along the exterior lines of said parcel (2681 OR 353) as follows: North 83° 58' 39" West, 173.95 feet; North 6° 01' 21" East, 833.81 feet; North 5° 55' 39" West, 49.45 feet and North 88° 37' 39" West, 18.85 feet; thence North 4° 14' 09" West, 44.61 feet; thence northerly along the arc of a tangent curve to the right having a radius of 360 feet an arc distance of 51.31 feet; thence North 3° 55' 51" East, 88.52 feet to the south line of Cutting Boulevard; thence South 88° 39' 09" East along said south line 24.79 feet to the south line of the parcel of land described as Parcel One in the deed from Parr-Richmond Industrial Corporation to Southern Pacific Railroad Company, recorded August 7, 1953, in book 2472 of Official Records, page 514; thence along said south line as follows: South 83° 58' 13" East, 68.37 feet; easterly along the arc of a tangent curve to the right having a radius of 291.90 feet an arc distance of 35.37 feet and South 73° 32' 21" East, 7.49 feet to the extension North 1° 28' 21" East at the most western line of said City of Richmond Parcel (1272 OR 161); thence South 1° 28' 21" West along said extension and along said western line 1057.71 feet to the point of beginning.

PARCEL THREE

Portion of Tide Lots 5 and 6, Section 24, Township 1 North, Range 5 West, Mount Diablo Base and Meridian, as shown on Map No. One Salt Marsh and Tide Lands, filed June 11, 1917, in Rack Map No. 9, in the office of the County Recorder of Contra Costa County, described as follows:

Beginning on the east line of that certain parcel of land containing 3.39 acres, more or less, described in the deed from Parr-Richmond Industrial Corporation to the City of Richmond recorded August 11, 1948, in book 1272 of Official Records, page 161, distant thereon South 1° 28' 21" West, 571.95 feet from the south line of Cutting Boulevard; said point of beginning being at a point from which the center of a curve to the left having a radius of 182.06 feet bears North 30° 51' 51" East; thence easterly along the arc of said curve an arc distance of 67.35 feet to a point from which the center of a compound curve to the left having a radius of 343.80 feet bears North 9° 39' 51" East; thence easterly along the arc of said curve an arc distance of 50 feet; thence South 88° 40' 09" East tangent to the last mentioned curve 361.20 feet; thence easterly along the arc of a tangent curve to the right having a radius of 138 feet an arc distance of 66.07 feet; thence South 61° 11' 56" East 31.01 feet; thence easterly along the arc of a tangent curve to the left having a radius of 238 feet an arc distance of 113.90 feet to the most western line of the parcel of land described as Parcel One in the deed from Parr-Richmond Industrial Corporation to the Southern Pacific Railroad Company, et al, recorded October 2, 1953, in book 2202 of Official Records, page 341; thence South 1° 19' 51" West along said western line 40 feet to the southern line thereof; thence North 88° 40' 09" West 562.16 feet; thence westerly along the arc of a tangent curve to the right having a radius of 250.78 feet an arc

EXHIBIT A TO GRANT DEED DATED APRIL 15, 1981

BOOK 10906 PAGE 347

distance of 50.04 feet to a point from which the center of a compound curve to the right having a radius of 190.53 feet bears North 12° 45' 51" East; thence westerly along the arc of said curve an arc distance of 68.95 feet to the east line of said City of Richmond parcel (1272 OR 161); thence North 1°-28' 21" East along said east line 91.60 feet to the point of beginning.

PARCEL FOUR

A portion of Amendment to Map of Ellis Landing, filed October 28, 1913, in book 11 of Maps, page 247; and a portion of Tide Lots 5 and 12, Section 24, Township 1 North, Range 5 West, Mount Diablo Base and Meridian, as shown on Map No. 1, Salt Marsh and Tide Lands, filed June 11, 1917, said maps being filed in the office of the County Recorder of Contra Costa County and more particularly described as follows:

Beginning at a point on the western line of Eighth Street as said street is shown on said Amendment to Map of Ellis Landing, said point being also the southeast corner of the 3.39 acre strip described in deed from Parr Richmond Industrial Corporation to the City of Richmond for street purposes, (said portion of said strip being commonly called Wright Avenue), recorded August 11, 1948, in book 1272 of Official Records, page 161; thence South 1° 26' 21" West along the western line of said Eighth Street and its southerly projection 1229.02 feet to the southerly line of Dock Avenue as said Dock Avenue is shown on said Amendment to Map of Ellis Landing; thence South 62° 53' 39" East along said southerly line of Dock Avenue, 15.76 feet to the northern corner of the tract of land described as Parcel One in the deed from the Ellis Landing and Dock Co., a corporation, to the City of Richmond, dated February 10, 1926, recorded April 28, 1926, in book 29 of Official Records, page 283; thence South 4° 19' 34" East along the west line of said last mentioned parcel and along the west line of Parcel Two described in said deed (29 OR 283), 128.30 feet to the northerly U.S. Pierhead and Bulkhead Line of said Richmond Inner Harbor; thence North 71° 04' 25" West along said northerly line, 467.06 feet to the southerly extension of the easterly line of the parcel of land described in deed from Parr Richmond Industrial Corporation to Time Oil Co., dated June 9, 1950 and recorded June 23, 1950, in book 1580 of Official Records, page 553; thence North 2° 38' 09" West along said southerly extension and said easterly line, 1218.26 feet to the southerly line of the said 3.39 acre strip (1272 OR 161); thence South 88° 33' 39" East along said southerly line, 505.76 feet to the point of beginning.

EXCEPTING THEREFROM: The parcel of land described in the deed to Time Oil Co., recorded November 23, 1966, Book 5250, Official Records, page 411.

PARCEL FIVE

Portion of Block 5, West Wharf, now vacated, and Ellis Canal, now vacated, as shown on amendment to map of Ellis Landing Subdivision, filed in Map Book 11, page 247, in the office of the County Recorder of Contra Costa County, and portion of Tide Lots 5 and 6, Section 24, Township 1 North, Range 5 West, Mount Diablo Base and Meridian, Map

EXHIBIT A TO GRANT DEED DATED APRIL 15, 1981



No. 1, Salt Marsh and Tide Lands, filed June 11, 1917 as Rack Map No. 9, and Swamp and Overflowed Lands Survey No. 150, all in the office of the County Recorder of said county, described as a whole as beginning at a point in the northern line of the 3.39 acre strip described in the deed to the City of Richmond, for the purpose of public streets, dated May 6, 1948, recorded August 11, 1948, Book 1272, Official Records, page 161, distant thereon North 89° 31' west 275.53 feet from the western line of Eighth Street as said street is shown on said amendment to map of Ellis Landing Subdivision, the bearing of said western line of Eighth Street is taken as south 0° 29' west for the purpose of this description; thence along the northern, northeastern and eastern boundaries of said 3.39 acre strip, 1272 OR 61, north 89° 31' west 755.63 feet, along the arc of a curve concave to the northeast having a radius of 60 feet, an arc distance of 94.28 feet and north 0° 31' east 200.24 feet; thence leaving said strip, south 89° 31' east 174.34 feet; north 0° 31' east, 105.48 feet; south 89° 30' east, 641.05 feet to a point that bears north 0° 29' east from the point of beginning; thence south 0° 29' west 365.58 feet to the point of beginning.

PARCEL SIX

Beginning at the northwestern corner of the land designated as Parcel 2 in the Quit-Claim Deed to Parr-Richmond Industrial Corporation, recorded June 1, 1949 in book 1394 of Official Records of Contra Costa County, page 370; running thence along the northern line of said land, being the Southern line of Cutting Boulevard, easterly, 88.61 feet to the eastern line of the land secondly described in the deed to Parr-Richmond Terminal Corporation, recorded December 30, 1953, in book 2681 of Official Records of Contra Costa County, page 353; thence along the last named line South 1° 56' West, said bearings used for the purpose of this description, 139.51 feet and south 6° 53' West 38.59 feet to the northern line of the land firstly described in said last mentioned deed; thence along the last named line North 89° 34' West 144.10 feet to the western line of said land firstly mentioned 1394 OR 370; and thence along the last named line North 83 feet and North 39° 53' East 84.13 feet to the point of beginning.

EXCEPTING THEREFROM: That portion thereof lying within the lines of the parcel of land described as Parcel One in the deed to Parr-Richmond Terminal Company, recorded October 4, 1951, Book 3966, Official Records, page 474.

PARCEL SEVEN

An exclusive easement and right of way for the purpose of laying, operating, maintaining, repairing and restoring railroad tracks and the operation of locomotives and rail cars and for general railroad purposes over and upon:

Portion of Tide Lot 12, Section 24, Township 1 North, Range 5 West, Mount Diablo Base and Meridian, described as follows:

EXHIBIT A TO GRANT DEED DATED APRIL 15, 1981

Beginning on the north line of the parcel of land firstly described in the deed from Parr-Richmond Industrial Corporation, a California corporation, to Time Oil Co., a Washington corporation, recorded June 23, 1950 in book 1580, Official Records, page 553 at the west line of the parcel of land described in the deed from Parr Industrial Corporation, a California corporation, to Parr-Richmond Terminal Company, a California corporation, recorded December 20, 1956, in book 2902, Official Records, page 513, distant thereon north 88° 33' 39" west 25.00 feet from the northeast corner thereof; ence from said point of beginning along the north line of said Time Oil Co., parcel (1580 OR 553) and along the west line of said Parr-Richmond Terminal Company parcel (2902 OR 513) as follows: South 88° 33' 39" East 25.00 feet and South 2° 38' 09" east 50.00 feet, to a point which bears South 28° 21' 07" East from the point of beginning; thence North 28° 21' 07" West 57.47 feet to the point of beginning.

PARCEL EIGHT

An easement over an in the real property owned b M. Lummus, Inc. in the County of Contra Costa, City of Richmond, State of California, 10 feet in width for the purpose of maintaining, operating, replacing, removing and renewing water mains which presently lie within said property, the center line of which easement is more particularly described as follows:

Commence at the point of intersection of the north line of Wright Avenue as said Avenue is described in the deed to the City of Richmond (recorded in the Contra Costa County Records on August 11, 1948 in Book 1272 on Page 161) with the westerly line of that parcel of land designated as Parcel One in the quit claim deed to the Pacific Railroad Company, et al, recorded October 2, 1953, in Book 2202 of Official Records of Contra Costa County on Page 341; thence along last mentioned westerly line as follows: North 0° 29' East 205.53 feet, North 10° 18' 11" West 120.38 feet, North 16° 02' 27" West 120.42 feet to a point from which the center of a curve to the left (radius = 352.24 feet) bears South 73° 57' 33" West; thence northerly along the arc of last mentioned curve (R = 352.24 feet) through a central angle of 6° 12' 12" to a point from which its cente bears South 67° 45' 21" West, which point also marks the true point of beginning of Parcel One; thence South 56° 04' 40" West 249.69 feet to a point on the east line of that parcel of land now or formerly leased by Gar Wood Industries, which point bears South 0° 29' wes along last mentioned east line and distant 31.49 feet from the northeast corner of said Gar Wood lease, said point being also the end of P rcel One, said description of Parcel One being the centerline of a strip of land 10 feet in width.

PARCEL NINE

An easement for the purpose of maintaining, operating, replacing, removing and renewing water mains which presently lie within said easement, over and in the following described property situated in the County of Contra Costa County, Cit of Richmond, State of California:

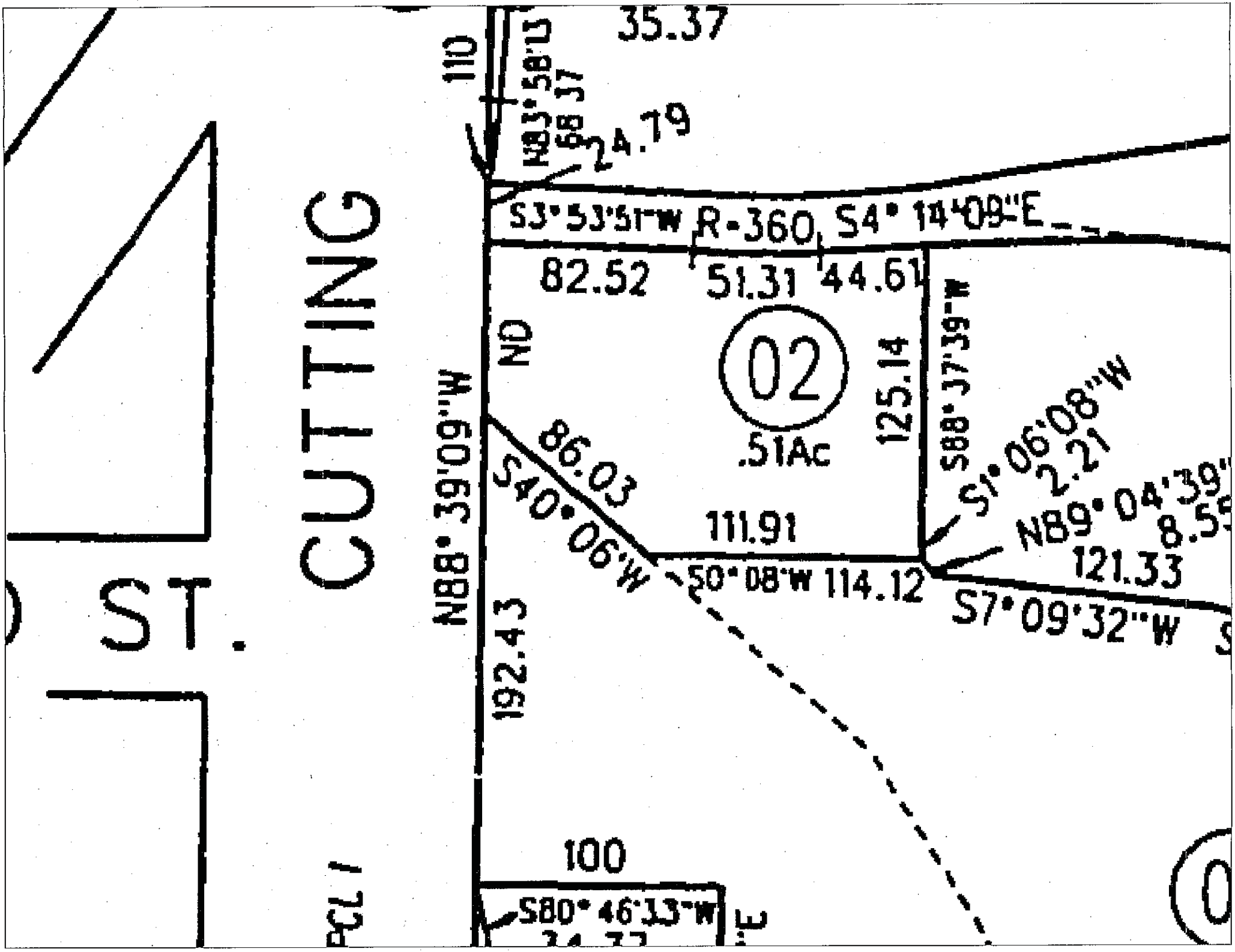
EXHIBIT A TO GRANT DEED DATED APRIL 15, 1981

Commence at a point marking the north end of a curve to the right (radius = 60 feet) with an interior angle 90° 02' as said curve is described in the deed to the City of Richmond, recorded on August 11, 1948 in Book 1272 of Contra Costa County Records on Page 161, said point being also on the east right of way line of Fourth Street as said street is also described in the above-mentioned deed to the City of Richmond (1272 OR 161); thence North 0° 31' east along last mentioned east line 200.24 feet; thence South 89° 31' east 174.34 feet; thence North 0° 31' east 35.02 feet to the true point of beginning; thence continue North 0° 31' east 230.00 feet; thence North 89° 31' west 24.76 feet; thence South 0° 31' west 230.00 feet; thence South 89° 29' east 24.76 feet to the true point of beginning.

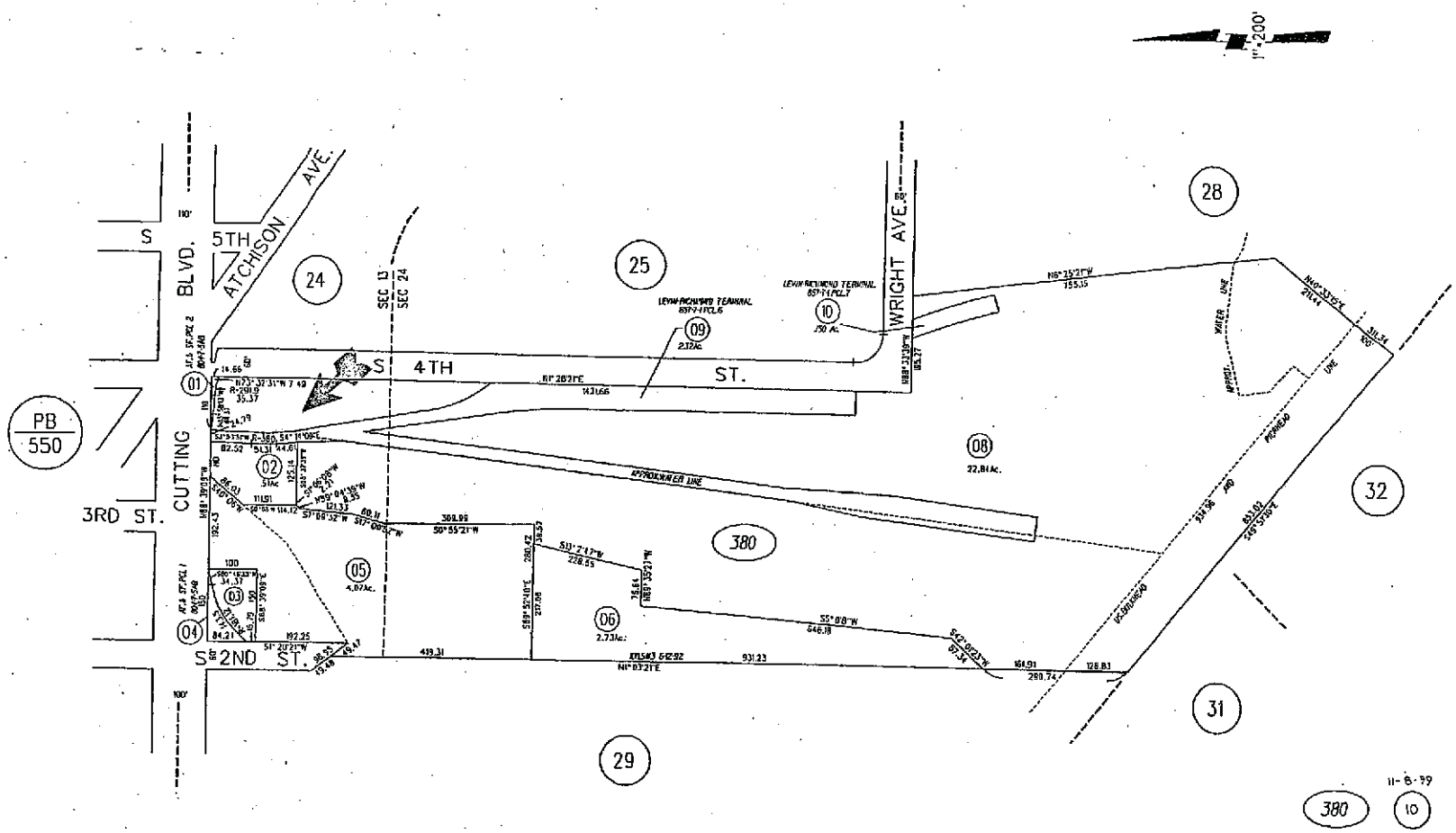
BOOK 10304 PAGE 350



END OF DOCUMENT


ST.
CUTTING
PCL 1
110
35.37
N83°58'13"
68.37
24.79
S3°53'51"W
R=360
S4°14'09"E
82.52
51.31
44.61
02
.51Ac
125.14
S88°37'39"W
S1°06'08"W
2.21
N89°04'39"
8.59
121.33
S7°09'32"W
86.03
S40°06'W
111.91
S0°08'W 114.12
N88°39'09"W
192.43
100
S80°46'33"W

POR. SECTIONS 13 & 24, T1N, R5W, MDB&M




ASSESSOR'S MAP
BOOK 560 PAGE 38
CONTRA COSTA COUNTY, CALIF.

DEC 0 8 1999

TitleSearch.com

50 State Coverage - Serving the Real Estate Industry since 1995

# 312 W CUTTING BLVD, RICHMOND, CA 94804

## Owner Information:

| | | | |
|---|---|---|---|
| Owner Name: | LEVIN METALS CORPORATION | | |
| Mailing Address: | 2150 TRADE ZONE BLVD #200, SAN JOSE CA 95131-1730 C013 C/O CRAWFORD PIMENTEL & CO INC ATP | | |
| Phone Number: | | Vesting Codes: | / / |

## Location Information:

| | | | |
|---|---|---|---|
| Legal Description: | POR SEC 13 T1N R5W .51 AC | | |
| County: | CONTRA COSTA, CA | APN: | 560-380-002-9 |
| Census Tract / Block: | 3780.00 / 1 | Alternate APN: | |
| Township-Range-Sect: | 1N-5W-13 | Subdivision: | |
| Legal Book/Page: | | Map Reference: | / 608-E1 |
| Legal Lot: | | Tract #: | |
| Legal Block: | | School District: | W CONTRA COSTA |
| Market Area: | | Munic/Township: | |
| Neighbor Code: | | | |

## Owner Transfer Information:

| | | | |
|---|---|---|---|
| Recording/Sale Date: | / | Deed Type: | |
| Sale Price: | | 1st Mtg Document #: | |
| Document #: | | | |

## Last Market Sale Information:

| | | | |
|---|---|---|---|
| Recording/Sale Date: | 05/19/1970 / | 1st Mtg Amount/Type: | / |
| Sale Price: | | 1st Mtg Int. Rate/Type: | / |
| Sale Type: | | 1st Mtg Document #: | |
| Document #: | 6131-184 | 2nd Mtg Amount/Type: | / |
| Deed Type: | DEED (REG) | 2nd Mtg Int. Rate/Type: | / |
| Transfer Document #: | | Price Per SqFt: | |
| New Construction: | | Multi/Split Sale: | |
| Title Company: | | | |
| Lender: | | | |
| Seller Name: | | | |

## Prior Sale Information:

| | | | |
|---|---|---|---|
| Prior Rec/Sale Date: | / | Prior Lender: | |
| Prior Sale Price: | | Prior 1st Mtg Amt/Type: | / |
| Prior Doc Number: | | Prior 1st Mtg Rate/Type: | / |
| Prior Deed Type: | | | |

## Property Characteristics:

| | | | | | |
|---|---|---|---|---|---|
| Year Built / Eff: | / | Total Rooms/Offices: | | Garage Area: | |
| Gross Area: | | Total Restrooms: | | Garage Capacity: | |
| Building Area: | | Roof Type: | | Parking Spaces: | |
| Tot Adj Area: | | Roof Material: | | Heat Type: | |
| Above Grade: | | Construction: | | Air Cond: | |
| # of Stories: | | Foundation: | | Pool: | |
| Other Improvements: | | Exterior wall: | | Quality: | |
| | | Basement Area: | | Condition: | |

## Site Information:

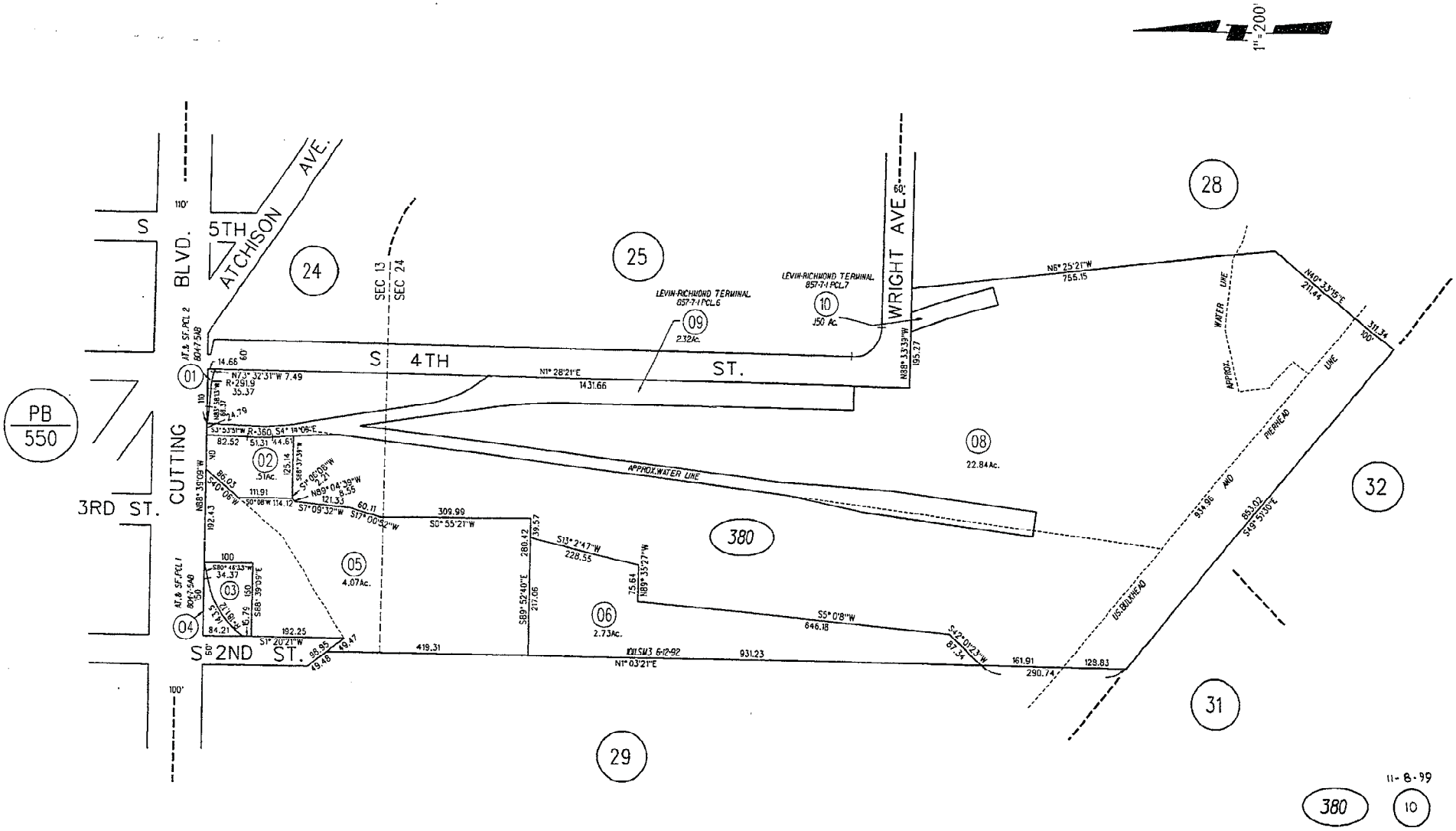
| | | | | | |
|---|---|---|---|---|---|
| Zoning: | | Acres: | 0.51 | County Use: | HEAVY INDUSTRIAL (54) |
| Flood Zone: | X | Lot Area: | 22,216 | State Use: | |
| Flood Panel: | 0600350030C | Lot Width/Depth: | x | Site Influence: | |
| Flood Panel Date: | 09/07/2001 | Commercial Units: | | Sewer Type: | |
| Land Use: | HEAVY INDUSTRIAL | Building Class: | | Water Type: | |

## Tax Information:

| | | | | | |
|---|---|---|---|---|---|
| Total Value: | $92,571 | Assessed Year: | 2010 | Property Tax: | $3,402.92 |
| Land Value: | $91,761 | Improved %: | 1% | Tax Area: | 08001 |
| Improvement Value: | $810 | Tax Year: | 2010 | Tax Exemption: | |
| Total Taxable Value: | | | | | |

Contra Costa, CA, 2011-2012 - 560-380-002-9, 312 W CUTTING BLVD, RICHMOND, CA 94804, Sheet: 1 of 1

POR. SECTIONS 13 & 24, T1N, R5W, MDB&M




ASSESSOR'S MAP
BOOK 560 PAGE 38
FM.1253 CONTRA COSTA COUNTY, CALIF.

DEC 0 8 1999

CH2M HILL
155 Grand Avenue
Suite 800
Oakland, CA
94612
Tel 510.251.2888
Fax 510.622.9000

April 18, 2012

419426

U.S. Environmental Protection Agency Region IX
75 Hawthorne Street
San Francisco, California 94105

Subject: Errata for Five-Year Review
United Heckathorn Site Richmond, California
September 2011

Dear Ms. Reddy:

Per your request this letter provides corrections to the Third Five Year Review Report for the United Heckathorn Site in Richmond, California. The Five-Year Review was approved by the U.S. Environmental Protection Agency on September 21, 2011. These corrections do not change the conclusions of the report but are provided for the record and for future Five Year Reviews.

The corrections are summarized as follows and page substitutions are attached.

1. Appendix B, Table 4, Mussel Tissue Results. Data for resident and transplanted mussel tissue data collected in 2009 were incorrectly reported on laboratory reports as dry weight concentrations. These mussel tissue results and all results on the table are wet weight concentrations as confirmed by the EPA Contract Laboratory and the EPA Chemist. A revised Table 4 is attached.
2. Appendix B, Section 2.2.2 , Page 7. The text states that "anchovy DDT concentrations increased by an approximate factor of 30 (average of 21 ug/kg in 1994 to average of 640 ug/kg in 2008)". This conclusion was originally presented in the February 2010 technical memorandum prepared by CH2M HILL and titled *Draft Reassessment of Remediation Levels to Address the Fish Consumption Pathway*. The DDT concentration of 21 ug/kg wet weight for anchovy is the sum of the two DDT isomers and does not include the four DDD and DDE isomers.) The correct concentration for comparison is 98 ug/kg which is the total DDT including DDE and DDD isomers. Therefore, the correct increase in total DDT between 1994 and 2008 is 6 times. The revised page 7 is attached.

If you have any questions, please let us know.

Sincerely,

CH2M HILL

Diane L. Sarmiento
Senior Project Manager

Attachments: Revised Table 4, Appendix B
Revised Text page 7, Appendix B

c: Julie Spahn, CH2M HILL

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TABLE 4
Mussel Tissue Results
*United Heckathorn Superfund Site*

| Location ID | 303_1R | 303_1a | 303_1b | 303_1c | 303_1d | 303_2R | 303_2a | 303_2b | 303_2c | 303_2d | 303_3R | 303_3a | 303_3b | 303_3c | 303_3d | 303_4R | 303_4a | 303_4b |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Type | Resident | Transplant | Transplant | Resident | Resident | Resident | Transplant | Transplant | Resident | Resident | Resident | Transplant | Transplant | Resident | Resident | Resident | Transplant | Transplant |
| Percent Lipids | | | | | | | | | | | | | | | | | | |
| Sample Date | 6/19/2007 | 10/1/2009 | 10/1/2009 | 11/13/2009 | 11/13/2009 | 6/19/2007 | 10/1/2009 | 10/1/2009 | 11/13/2009 | 11/13/2009 | 6/19/2007 | 10/1/2009 | 10/1/2009 | 11/13/2009 | 11/13/2009 | 6/19/2007 | 10/1/2009 | 10/1/2009 |
| Lab | GPL | STLV | STLV | STLV | STLV | GPL | STLV | STLV | STLV | STLV | GPL | STLV | STLV | STLV | STLV | GPL | STLV | STLV |
| Basis | Wet | Wet | Wet | Wet | Wet | Wet | Wet | Wet | Wet | Wet | Wet | Wet | Wet | Wet | Wet | Wet | Wet | Wet |
| **Analyte** | **All Analytical Results in ug/kg** | | | | | | | | | | | | | | | | | |
| **Pesticides** | | | | | | | | | | | | | | | | | | |
| 2,4-DDD | 1.5 J | 4.5 J | 4.6 J | 7 J | 7.4 J | 48 | 73 J | 63 J | 160 J | 130 J | 230 | 340 J | 290 J | 380 J | 410 J | 17 | 31 J | 35 J |
| 2,4-DDE | 1.3 NJ | 3.1 J | 3.1 J | 3.6 J | 3.8 J | 5.9 NJ | 13 J | 9.8 J | 22 J | 19 J | 18 J | 25 J | 22 J | 33 J | 36 J | 1.6 J | 14 J | 15 J |
| 2,4-DDT | 1.5 NJ | 2 R | 2 R | 2.9 J | 2.9 J | 30 J | 40 J | 34 J | 100 J | 80 J | 160 J | 270 J | 230 J | 460 J | 540 J | 10 J | 8.5 J | 9.8 J |
| 4,4-DDD | 4.4 NJ | 12 J | 13 J | 18 J | 17 J | 97 | 180 J | 150 J | 380 J | 300 J | 470 | 700 J | 590 J | 780 J | 820 J | 36 | 110 J | 120 J |
| 4,4-DDE | 3.4 | 6.7 NJ | 7.1 NJ | 15 NJ | 16 NJ | 41 | 84 NJ | 79 NJ | 200 NJ | 160 NJ | 170 | 240 NJ | 200 NJ | 420 NJ | 440 NJ | 14 | 66 NJ | 76 NJ |
| 4,4-DDT | 3.4 NJ | 2.4 J | 2.6 J | 6.9 J | 8.3 J | 56 | 100 J | 88 J | 220 J | 170 J | 220 | 490 J | 410 J | 930 J | 1,100 J | 15 | 20 J | 23 J |
| **Total DDT** | **15.5** | **28.7** | **30.4** | **53.4** | **55.4** | **277.9** | **490** | **423.8** | **1,082** | **859** | **1,268** | **2,065** | **1,742** | **3,003** | **3,346** | **93.6** | **249.5** | **278.8** |
| Dieldrin | 1.5 NJ | 4.1 J | 3.1 J | 3.3 J | 3.3 J | 26 | 51 J | 39 J | 67 J | 48 J | 81 | 230 J | 190 J | 110 J | 90 J | 7.3 | 18 J | 20 J |
| Aldrin | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 7.1 NJ | --- | --- | --- | --- | 3.3 U | --- | --- |
| alpha-BHC | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 3.3 U | --- | --- |
| alpha-Chlordane | 1.7 U | --- | --- | --- | --- | 3.2 NJ | --- | --- | --- | --- | 9.9 NJ | --- | --- | --- | --- | 3.3 U | --- | --- |
| beta-BHC | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 3.3 U | --- | --- |
| Chlordane | 33 U | --- | --- | --- | --- | 170 U | --- | --- | --- | --- | 670 U | --- | --- | --- | --- | 67 U | --- | --- |
| delta-BHC | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 3.3 U | --- | --- |
| Endosulfan I | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 3.3 U | --- | --- |
| Endosulfan II | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 3.3 U | --- | --- |
| Endosulfan sulfate | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 3.3 U | --- | --- |
| Endrin | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 0.98 NJ | --- | --- |
| Endrin aldehyde | 1.3 NJ | --- | --- | --- | --- | 7.3 NJ | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 0.82 J | --- | --- |
| Endrin ketone | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 3.3 U | --- | --- |
| Gamma-BHC (Lindane) | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 3.3 U | --- | --- |
| gamma-Chlordane | 1.7 NJ | --- | --- | --- | --- | 7.1 NJ | --- | --- | --- | --- | 26 NJ | --- | --- | --- | --- | 2.8 NJ | --- | --- |
| Heptachlor | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 3.3 U | --- | --- |
| Heptachlor epoxide | 1.7 U | --- | --- | --- | --- | 4.3 NJ | --- | --- | --- | --- | 16 NJ | --- | --- | --- | --- | 1.5 NJ | --- | --- |
| Methoxychlor | 1.7 U | --- | --- | --- | --- | 8.3 U | --- | --- | --- | --- | 33 U | --- | --- | --- | --- | 3.3 U | --- | --- |
| Toxaphene | 33 U | --- | --- | --- | --- | 170 U | --- | --- | --- | --- | 670 U | --- | --- | --- | --- | 67 U | --- | --- |

Notes:

ug/kg: microgram per kilogram (ppb)
FD: Field dupllicate
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

TABLE 4
Mussel Tissue Results
*United Heckathorn Superfund Site*

| Location ID | 303_4T | 303_6a | 303_6b | 303_6c | 303_6d | 303_7a | 303_7b | 303_7c | 303_7d | 303_8a | 303_8b | 303_9a | 303_9b | 303_10a | 303_10b | L01R | L02R | L03R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Type | Resident | Transplant | Transplant | Resident | Resident | Transplant | Transplant | Resident | Resident | Transplant | Transplant | Transplant | Transplant | Transplant | Transplant | Resident | Resident | Resident |
| Percent Lipids | | | | | | | | | | | | | | | | | | |
| Sample Date | 10/1/2009 | 10/1/2009 | 10/1/2009 | 11/13/2009 | 11/13/2009 | 10/1/2009 | 10/1/2009 | 11/13/2009 | 11/13/2009 | 10/1/2009 | 10/1/2009 | 10/1/2009 | 10/1/2009 | 10/1/2009 | 10/1/2009 | 6/19/2007 | 6/19/2007 | 6/19/2007 |
| Lab | STLV | STLV | STLV | STLV | STLV | STLV | STLV | STLV | STLV | STLV | STLV | STLV | STLV | STLV | STLV | GPL | GPL | GPL |
| Basis | Wet | Wet | Wet | Wet | Wet | Wet | Wet | Wet | Wet | Wet | Wet | Wet | Wet | Wet | Wet | Wet | Wet | Wet |
| **Analyte** | **All Analytical Results in ug/kg** | | | | | | | | | | | | | | | | | |
| **Pesticides** | | | | | | | | | | | | | | | | | | |
| 2,4-DDD | 25 J | 41 J | 37 J | 170 J | 190 J | 230 J | 170 J | 320 J | 330 J | 2.6 J | 3 J | 2 J | 3.4 J | 1.8 J | 1.7 J | 79 | 48 | 180 |
| 2,4-DDE | 11 J | 12 J | 10 J | 29 J | 33 J | 21 J | 15 J | 36 J | 34 J | 1.9 J | 2.5 J | 1.9 J | 2.9 J | 2.4 J | 2 J | 7.4 J | 3.3 J | 16 J |
| 2,4-DDT | 5.6 J | 13 J | 11 J | 300 J | 410 J | 61 J | 54 J | 190 J | 180 J | 1.9 R | 1.9 R | 1.9 R | 3.8 J | 2 R | 2 R | 74 J | 51 J | 58 NJ |
| 4,4-DDD | 77 J | 140 J | 120 J | 360 J | 390 J | 630 J | 440 J | 900 J | 930 J | 6.8 J | 8.3 J | 5.5 J | 10 J | 5 J | 4.7 J | 170 | 94 | 460 |
| 4,4-DDE | 43 NJ | 46 NJ | 45 NJ | 270 NJ | 340 NJ | 130 NJ | 110 NJ | 330 NJ | 300 NJ | 4.3 NJ | 5.3 NJ | 3.4 NJ | 5.5 NJ | 4 NJ | 4.1 NJ | 79 | 45 | 100 |
| 4,4-DDT | 14 J | 56 J | 34 J | 620 J | 790 J | 150 J | 140 J | 430 J | 420 J | 1.8 J | 1.7 J | 2.3 J | 25 J | 1.6 J | 1.2 J | 130 | 82 | 80 |
| **Total DDT** | **175.6** | **308** | **257** | **1,749** | **2,153** | **1,222** | **929** | **2,206** | **2,194** | **17.4** | **20.8** | **15.1** | **50.6** | **14.8** | **13.7** | **539.4** | **323.3** | **894** |
| Dieldrin | 17 J | 21 J | 17 J | 36 J | 38 J | 190 J | 120 J | 130 J | 110 J | 2.4 J | 2.6 J | 1.3 J | 1.8 J | 1.3 J | 1.4 J | 39 | 24 | 59 |
| Aldrin | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 1.9 NJ | 33 U |
| alpha-BHC | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 8.3 U | 33 U |
| alpha-Chlordane | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 2.4 NJ | 5 J |
| beta-BHC | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 8.3 U | 33 U |
| Chlordane | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 330 U | 170 U | 670 U |
| delta-BHC | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 8.3 U | 33 U |
| Endosulfan I | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 8.3 U | 33 U |
| Endosulfan II | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 8.3 U | 33 U |
| Endosulfan sulfate | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 8.3 U | 33 U |
| Endrin | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 3.7 J | 1.7 J | 9.2 J |
| Endrin aldehyde | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 4.2 NJ | 8.3 U | 33 U |
| Endrin ketone | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 8.3 U | 33 U |
| Gamma-BHC (Lindane) | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 8.3 U | 33 U |
| gamma-Chlordane | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 12 NJ | 6.6 NJ | 27 NJ |
| Heptachlor | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 8.3 U | 33 U |
| Heptachlor epoxide | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 3.3 NJ | 33 U |
| Methoxychlor | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 17 U | 8.3 U | 33 U |
| Toxaphene | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 330 U | 170 U | 670 U |

Notes:

ug/kg: microgram per kilogram (ppb)
FD: Field dupllicate
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

TABLE 4
Mussel Tissue Results
*United Heckathorn Superfund Site*

| Location ID | L04R | PCR |
|---|---|---|
| Sample Type | Resident | Resident |
| Percent Lipids | | |
| Sample Date | 6/19/2007 | 6/19/2007 |
| Lab | GPL | GPL |
| Basis | Wet | Wet |
| **Analyte** | **All Analytical Results in ug/kg** | |
| **Pesticides** | | |
| 2,4-DDD | 120 | 6.7 |
| 2,4-DDE | 11 J | 1.8 NJ |
| 2,4-DDT | 55 J | 4.8 J |
| 4,4-DDD | 300 | 15 |
| 4,4-DDE | 81 | 8.8 |
| 4,4-DDT | 90 | 9 |
| **Total DDT** | **657** | **46.1** |
| Dieldrin | 46 | 4.5 |
| Aldrin | 33 U | 1.7 U |
| alpha-BHC | 33 U | 1.7 U |
| alpha-Chlordane | 4.7 J | 0.86 NJ |
| beta-BHC | 33 U | 1.7 U |
| Chlordane | 670 U | 33 U |
| delta-BHC | 33 U | 1.7 U |
| Endosulfan I | 33 U | 1.7 U |
| Endosulfan II | 33 U | 1.7 U |
| Endosulfan sulfate | 33 U | 1.7 U |
| Endrin | 7.4 NJ | 1.7 U |
| Endrin aldehyde | 33 U | 1.6 NJ |
| Endrin ketone | 33 U | 1.7 U |
| Gamma-BHC (Lindane) | 33 U | 1.7 U |
| gamma-Chlordane | 18 NJ | 2.3 NJ |
| Heptachlor | 33 U | 1.7 U |
| Heptachlor epoxide | 11 NJ | 0.98 NJ |
| Methoxychlor | 33 U | 1.7 U |
| Toxaphene | 670 U | 33 U |

Notes:

ug/kg: microgram per kilogram (ppb)
FD: Field dupllicate
J: Estimated result
NJ: Estimated and presumptively identified
U: Not detected at reporting limit
Total DDT is bolded

2008) and anchovy DDT concentrations increased by an approximate factor of 6 (average of 98 µg/kg in 1994 to average of 640 µg/kg in 2008). DDT concentrations in surf perch caught in 2008 (6,300 µg/kg) were similar to those caught in 1994 (average 9,400 µg/kg).

Fish tissue risk-based concentrations (RBCs) and sediment RBCs were developed and are considered more appropriate for use in future remedial decisions than the remediation objectives contained in the 1994 ROD. These RBCs are shown below.

Summary of Potential Site Specific Remediation Goals Based on Human Health Risks
*United Heckathorn Superfund Site*

| Matrix | DDTs | Dieldrin | Risk Endpoint | Consumption Rate (g/day) |
|---|---|---|---|---|
| Fish tissue concentration (fillet) (ug/Kg wet weight) | 860 | 25 | DDTs: HQ=1<br>Dieldrin: ELCR= $10^{-4}$ | 85.1 |
| Sediment concentration (ug/Kg dry weight) | 450 | 13 | DDTs: HQ=1<br>Dieldrin: ELCR= $10^{-4}$ | 85.1 |

**Note:**
Sediment concentration is based on sediment-biota regressional relationship in Section 8.

Source: *Reassessment of Total DDT and Dieldrin Remediation Levels to Address the Fish Consumption Pathway* Technical Memorandum (CH2M HILL 2010a).

Ecological RBCs developed for dieldrin and total DDT in sediment using the trophic trace model were higher than the human health RBCs shown above except for bay shrimp, where the RBC for sediment was 148 µg/kg dry weight. It should be noted that Human Health RBCs is based on a fish consumption rate of 85.1 grams/day.

### 2.2.3 Conclusions of Marine Data Review

A review of the data collected in the Lauritzen Channel and adjacent waterways indicates the following:

1. Sediment within the Lauritzen Channel contains DDT and dieldrin at concentrations above ROD remediation goals. The 1996-1997 Sediment Removal Action was unable to address all areas within the channel. As directed in the ROD (USEPA 1994), the remedial action for the marine sediment mandated the removal of Young Bay Mud (YBM) sediment by dredging or excavation. For the accessible areas of the Lauritzen Channel, a Cable Arm Environmental Bucket dredge was used to remove the YBM. The completion report (Chemical Waste Management, Inc. 1997) notes that although mechanical dredging was used to effectively remove YBM within accessible portions of the Lauritzen Channel, dredging equipment was not able to penetrate into Old Bay Mud surfaces, and many areas under the existing pier and abandoned pilings on the east side of the Lauritzen Channel were not accessible with the equipment used. Data also indicates that some redistribution and sloughing of sediment along the eastern side of the channel has occurred and resulted in DDT concentrations higher than the concentrations reported in confirmation samples. A comparison of the average total DDT concentration from the post-dredging confirmation samples in 1996-1997 to the nearest (less than 50 feet away) surface sediment sample collected from investigations performed between 1999 through 2007 indicates that the total average DDT in dry