Haley & Aldrich, Inc.
500 South Kraemer Blvd.
Suite 370
Brea, CA 92821-6723

Tel: 714.985.3434
Fax: 714.985.3433
HaleyAldrich.com

HALEY & ALDRICH

10 August 2007
File No. 32486-011

Department of Toxic Substances Control
Tiered Permitting and Corrective Action Branch
5796 Corporate Avenue
Cypress, California 90630

Attention: Mr. John Geroch

Subject: Corrective Measures Proposal
Delphi Corporation-Former Anaheim Battery Operations Facility
1201 North Magnolia Avenue
Anaheim, California

Dear Mr. Geroch:

On behalf of Delphi Corporation (Delphi), Haley & Aldrich, Inc. (Haley & Aldrich) is pleased to submit this Corrective Measures Proposal (CMP) for remediation of the former Delphi Corporation automotive battery facility located at 1201 N. Magnolia Avenue, Anaheim, California. The CMP has been prepared as required by the California Department of Toxic Substances Control (DTSC) in accordance with the Corrective Action Consent Agreement (CACA) to protect human health and the environment and allow for Site redevelopment.

This report includes a summary of the known existing site conditions based on substantial investigative work completed for a Phase I Environmental Site Assessment (ESA), Current Conditions Report (CCR) and Facility Investigation (FI) performed by Haley and Aldrich and others, as well as a assessment of potential risks from chemicals of potential concern (COPC) to establish cleanup criteria for protection of human health and the environment. The cleanup criteria determined by the risk assessment are based on requirements of the DTSC and the results of the findings from the investigations. The purpose of this report is to outline the proposed procedures to be implemented to remediate the site to the clean up criteria approved by the DTSC for redevelopment of the Site to a commercial/industrial land use.

Sincerely yours,
HALEY & ALDRICH, INC.

Original signed by Kelly Hoggan

Kelly Hoggan
Staff Geologist

Original signed by Dave Hagen

Dave Hagen
Officer in Charge

Original signed by Thomas Tatnall

Thomas S. Tatnall, CEG No. 1968, REA
Project Manager/Vice President

Enclosures

G:\CLIENTS & PROJECTS\Delphi-32486\Anaheim-32486\Reports\CMP-Corrective Measure Proposal\CMP Text Items\2007-0810-HAI-Delphi-Anaheim-CMP_F.doc

EXECUTIVE SUMMARY

Delphi Corporation (Delphi) has entered into a Corrective Action Consent Agreement (CACA) (No. SRPD05/06SCC-4344) with the California Department of Toxic Substance Control (DTSC) for the Former Anaheim Battery Operations Facility at 1201 North Magnolia Avenue, Anaheim, California (the Site). Required by the CACA issued by DTSC, Delphi is submitting this Corrective Measures Proposal (CMP) to DTSC.

This CMP describes the remedial actions recommended for remediation of the Site to protect human health and the environment. Additionally, where needed, the CMP proposes additional data gathering to determine if a release has occurred and to assess the potential risk from specific compounds to human health and the environment.

The purpose of the proposed remedial action is to mitigate chemicals of concern (COCs) identified at the facility during site characterization. The CCR and FI identified the following COCs: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and Title 22 California Assessment Method (CAM) metals (specifically antimony, arsenic, hexavalent chromium, and lead) in soil and VOCs in soil gas and groundwater. Based upon results of the characterization of AOIs performed during the CCR and FI, the following remedial action objectives (RAOs) were established for the Site to give direction and guidance during remedial activities:

- Groundwater RAOs: Prevent/minimize potential migration of COCs from soil to groundwater. Through monitoring and natural attenuation (MNA) return groundwater to its beneficial designated uses pursuant to regional board's basin plan.

- Soil RAOs: Prevent potential onsite exposure through ingestion, inhalation, and direct contact of soil contaminated at levels that may pose a risk to human health and the environment. Minimize potential migration of contaminants from soil to air, groundwater or surface water. Minimize potential erosion of contaminated soil by wind or water.

- Air RAOs: Protect human health and the environment by preventing the potential release and migration of onsite contaminants in to ambient air.

The proposed remedial actions include soil excavation and removal, periodic groundwater monitoring, and construction of a soil vapor extraction system (SVE). In addition, land-use restrictions will be implemented. The area, location, and depth of soil proposed for the remedial action were estimated based on the soil analytical data presented in the FI Report. Soil excavation and removal is proposed at twenty-nine of the 53 AOIs identified and investigated. Installation of an SVE system is proposed at AOI 26 to for reduction of mass and concentration of VOCs in subsurface soils to protect human health and groundwater quality. .

TABLE OF CONTENTS

TABLE OF CONTENTS
(continued)

TABLE OF CONTENTS
(continued)

TABLE OF CONTENTS
(continued)

Page

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION

This Corrective Measures Proposal (CMP) has been prepared by Haley & Aldrich, Inc. (Haley & Aldrich), as requested by the California Environmental Protection Agency Department of Toxic Substances Control (DTSC) Tiered Permitting Corrective Action Branch, on behalf of Delphi Corporation (Delphi) for the former Delphi Anaheim Battery Operations facility (Site) located at 1201 North Magnolia Avenue, Anaheim, California as shown on Figure 1. Delphi is working voluntarily with the DTSC Tiered Permitting Corrective Action Branch, under Corrective Action Consent Agreement (CACA) to adequately characterize Site conditions, protect human health and the environment, and return the Site for commercial/industrial use.

Upon review and approval of this CMP by the DTSC, it is the intent of Delphi to implement the scope of work contained herein to remediate chemicals of concern (COC) on the Site to concentrations below the site specific commercial/industrial health-risk criteria.

2. SITE BACKGROUND

2.1 Site Description

The Site consists of approximately 22+ acres located at 1201 North Magnolia Avenue in a commercial/industrial section of the City of Anaheim, Orange County, California (Figure 1). The original building was constructed in 1953 by Delco-Remy, a Division of General Motors, for the production of automotive batteries. A review of previous environmental reports indicates that additional major on-Site construction activities also occurred in 1963, 1974, and 1977 for a warehouse and production line buildings. Prior to the 2005 decommissioning and plant demolition, the Site included the following:

- Main Production Building,
- South Building (New Charge Building),
- Three warehouses (Warehouses No. 1, No.2 and No. 3),
- Railroad siding,
- Waste Water Treatment Unit,
- Storm Water Retention Basin, as well as,
- Numerous asphalt or concrete paved areas outside the buildings.

The Site is a relatively flat rectangular property with frontage along Magnolia Avenue. The area of the Main Production Building was approximately 187,000 square feet, with smaller production and storage buildings present to the south and west. The Site is shown on Figure 2 and plan of the former facility is shown on Figure 3.

The Main Production Building, which was built in 1953, was a concrete slab-on-grade with a steel frame structure with wall construction of brick and block. The ceiling of the Main Production Building was open with skylights and metal support beams. The office area, which comprised a relatively small portion of the eastern side of the Main Production Building had vinyl tile floors, suspended ceilings with fluorescent lights and wood paneled wall dividers.

The ancillary buildings were also constructed of concrete slab-on-grade construction and either walls consisting of metal frame with sheet metal or masonry block and wood and metal roofs.

Also associated with the Site were landscaped areas, employee parking lots, driveways, and loading docks. An open area (approximately 2 acres) on the far north part of the site was previously owned by Delphi but was sold to the City of Anaheim in 2002, along with access easements, for use as Little League baseball fields. Most of the Site is paved with the exception of lawn and planter areas located north and east of the Main Production Building, and a gravel-covered former storage and truck/van parking area located northwest of the Main Production Building adjacent to the storm water retention basin. These site features are shown on Figure 3.

The Site is bordered by the following properties:

North:	Interstate 5 (I-5) and Southern California Tow Equipment;
East:	Magnolia Avenue and farther east by Wickes Furniture, American Career College, and Talbert Medical Group;
South:	Regional Occupational Program (ROP) Career & Technical Institute and office buildings;
West:	Intercem, Micel, ICEE USA, CaliWest Car Wash Systems, a vacant office/commercial buildings, Ryan Herco Pumps and L&S Screw Machines.

There are no surface water bodies or water courses located on or immediately adjacent to the Site.

2.2 Site History

Information presented herein regarding Delphi's activities at the Site from 1953 to the present is based upon the various documents provided by Delphi and identified within the reference section of this report. The following sections summarize Site ownership, known operational history of the Site, manufacturing processes, regulatory history, waste generation, waste management, spill history, and previous Site investigations and corrective actions.

2.2.1 Ownership History

A review of historical aerial photographs and topographic maps indicates that prior to construction of the battery manufacturing facility, the Site was agricultural and likely used as an orange grove. Construction grading at the Site was evident in the 1953 aerial photograph included with the Environmental Data Resources, Inc. (EDR) report and historical aerial photographs included in Appendix A of the FI report. Delco-Remy (General Motors) originally began manufacturing lead-acid automobile batteries at this Site in 1954. From 1954 to 1999, the Site was owned by various divisions of General Motors (GM). In January 1999, Delphi Automotive Systems separated from GM to form a new company. Later, the company was renamed Delphi Corporation. Most recently, the Site operated as the Delphi Automotive Holdings Group, Division of Delphi Corporation.

Historically, the northernmost portion of the property included two baseball fields that were leased to and used by the local Little League baseball organization by the mid-1960s (EPA, 1991, Appendix A - EDR). In 2002, Delphi sold this northern area to the City of Anaheim for continued use as Little League baseball fields.

2.2.2 Operational History

The Site is located in a commercial/industrial section of the City of Anaheim, Orange County, California. The site was used as agricultural for citrus groves from around the 1920s until construction of the automotive battery manufacturing facility by Delco-Remy, a former Division of General Motors, in 1953. Delco-Remy used a wet soluble process to manufacture the various battery models. Approximately three million maintenance free lead acid automotive batteries were produced per year during the more recent years of operation. Various operations performed for the manufacture of lead acid batteries included the plastic battery casings; testing defective batteries returned under warranty; treating wastewater; storage of raw materials including lead and lead oxide; short term storage of hazardous waste; and maintaining the manufacturing equipment.

The following materials were used in the production of lead acid batteries at the Site:

- Lead and lead tetraoxide used in the production of lead plates: Lead was received in 2,000 pound ingots (hogs) and was stored in the production area on pallets. The majority of the lead was extruded and cut into plates. The remainder was converted into lead oxide, prepared by the oxidation of metallic lead, the major ingredient of the paste placed on the plates.

- Sulfuric acid, which acts as the battery electrolyte: Sulfuric acid was stored in tanks, mixed in the acid house, and transported to and from the acid filling and acid draining areas through overhead pipes.

- Battery cases and covers forming: Polypropylene pellets were delivered by train cars to two silos on-Site. This material was pneumatically transferred to the case and cover-forming areas in the plant where it was melted and extruded to form battery cases and covers.

- Polyethylene envelopes used to separate the oppositely charged plates: Polyethylene film was received in roll form by truck, stored in the production area, and formed into envelopes for the anion plates within the battery.

Smaller quantities of the following materials were also used in battery production or found in the major raw materials:

- Antimony (in lead alloy used in the early process prior to mid-1980s);
- Arsenic (in lead alloy used in manufacturing);
- Soluble Oil (used to lubricate the lead as it was rolled to a specified thickness);
- Anti-corrosion compound for terminals;
- Hot melt (glue used to bond the plastic case to the internal lead strap);
- Paper (wood pulp) (used to make the paper labels placed on the exterior case);
- Tin (in lead alloy used in the new process, circa mid-1980s);
- Calcium (in lead alloy used in the new process, circa mid-1980s);
- Lignosulfonic acid;
- Caustic soda;
- Silver; and
- Colloidal carbon.

Materials used in support operations include hydraulic oil; propane; water and wastewater treatment chemicals such as sodium hydroxide, coagulants, and biocides; gasoline; and maintenance-related chemicals. Oils and other chemicals were stored in underground or above ground tanks, containers, at points of use, or in the hallway near the boiler room. Other storage or staging areas also included the loading dock, paved areas on the west side of the site and later inside of the warehouses on the west side of the site. Finished batteries, containing approximately one gallon of acid solution each, were stored in the warehouses prior to shipping. The railroad line was used to deliver plastic pellets for the manufacture of battery casings and other materials. Sulfuric acid was delivered to the Site by trucks. Historic documents and Site personnel interviewed did not indicate that significant spills or releases of any of the chemicals were known to have occurred.

Manufacturing areas occupied most of the Main Production Building. The manufacturing areas included the encapsulation operations, battery case and cover plastic molding and assembly areas, lead plate manufacturing area, battery assembly, and battery wet finishing and charging areas, lead oxide manufacturing, and lead reclamation areas. Secondary containment/diversion generally consisted of the concrete floor (some floors were also covered with acid resistant brick) as well as trenches and drains. Other areas within the Main Production Building included the former hazardous waste storage room, boiler room, tool room, offices, machine shop and locker rooms.

Underlying the floors was a system of sewers and process water drain lines and air tunnels. Generally, the floor drains and trench drains were part of the process sewer system. In the wet finishing areas, the acid was collected in a separate trench system and recycled. In the case and cover molding areas, the used hydraulic oil was collected in a trench drain and sump that surrounded each molding machine. The oil collected in the sumps was pumped out on a regular basis and discharged to an associated oil recovery system that included a used oil aboveground storage tank (AST), and previously USTs located on the west portion of the site.

The AOIs identified at the Site, the potential Site-related chemicals associated with each and observations made at each of the AOIs identified are shown on Figure 4.

2.2.3 Manufacturing Processes

The battery manufacturing process included melting and reforming lead by heat treating and cooling. The plant received the lead from an outside source. The lead was melted and reformed into strips that were rolled into coils. The coils were heated and pressed into plates, which were covered with paste consisting of red lead (lead oxide), sulfuric acid, and water. The plates were heated in a humidity oven or steam oven, grouped and (as appropriate) wrapped in plastic, and placed into battery cases, which were also manufactured on-site. The batteries were filled with acid, charged for 8 hours, emptied of initial acid, and refilled with fresh acid. The batteries were then sealed and stored on pallets for delivery to customers.

On-site operations included lead oxide processing, lead processing for lead plate manufacture, plastic injection molding of battery cases and covers, lead paste plate coating and curing, lead plate encapsulation, battery assembly with welded posts (cast on strap), heat sealing of batteries, acid mixing, battery wet finishing and charging, labeling, palletizing for shipment, and autopsy of defective batteries. Operations also included lead reclamation until the mid-1980s. Attendant support services included tool repair and manufacture, quality control, engineering, warehousing, maintenance and utility services, wastewater pretreatment, stormwater treatment, and employee services.

2.2.3.1 Lead Tetraoxide Manufacturing

Lead oxide was formed when air was moved through molten lead with agitation in oxide reactors located on the west side of the Main Production Building toward the north half of the building From the oxide reactor, the lead oxide went to a settling chamber and to a storage hopper. The lead oxide was ground to particle size and sent through a cyclone collector and bag house, located on the west side of the Main Production Building, where lead oxide dust was collected. Bag houses provided down-draft ventilation. Air scrubbers cleaned the air of lead. The lead oxide manufacturing area is shown on Figure 4.

2.2.3.2 Lead Plate Manufacturing

The manufacture of lead acid batteries began with the manufacture of lead plates. This process involved melting of lead pigs or hogs (a pig equals 35 pounds of lead; a hog equals 1 ton), forming strips, and coiling the strips. Soluble oil (2 percent oil, 98 percent water) was used to lubricate the lead as it was rolled to a specified thickness depending on whether it was to be used for a negative or positive plate. The lead was then trimmed to a specified width (scraps were remelted). After the lead strip cooled and hardened, it was perforated. Soluble oil was used again as the lead was pressed and expanded to form a grid. The lead grid strip was cut into rectangular plates and lead oxide paste was applied (see materials used in process). Negative plates were stored to dry. Positive plates were exposed to 212 degree Fahrenheit steam to properly cure in a steam oven in the center of the Main Production Building. The lead plate pasting area is shown on Figure 4.

2.2.3.3 Plate Pasting

To make the lead oxide plate paste, the lead oxide was mixed with sulfuric acid and water and diluted to 50 percent concentration to form a paste that was 10 percent lead sulfate and 90 percent lead oxide. The lead oxide paste was spread on the lead grid strips in the plate pasting area in the north-center part of the Main Production Building. Process water from plate pasting operations was collected in a clarifier located south of the plate pasting area. Negative plates were stored to dry. Positive plates were exposed to 212 degree Fahrenheit steam to properly cure in a steam oven located in the center of the Main Production Building. The plate pasting area is shown on Figure 4.

2.2.3.4 Cast On Strap (COS)

The cast on strap (COS) process involved polyethylene envelopes used to separate the negative and positive plates and form group cells. Lead straps and terminal posts were formed at the COS lead pot, attached to the plate lugs, and dropped into battery containers. The intermediate straps were welded through the container wall to pass the electrical current from cell to cell. The cast on strap process area was located in the southeast part of the Main Production Building as shown on Figure 4.

2.2.3.5 Plastic Molding Process

The plastic injection molding process used plastic rolling machines to form the battery cases and covers. The use of these hydraulic molding units generated used hydraulic oil. The plastic molding machines were located on the west side of the Main Production Building near the center as shown on Figure 4.

2.2.3.6 Charging

During final assembly, the plates and lead battery terminals were placed into the plastic battery cases (made on-site), and sulfuric acid was added to the battery in the southeast corner of the Main Production Building. A plastic separator (purchased from an outside manufacturer) was used to allow the sulfuric acid to penetrate the plates while preventing the positive and negative plates from touching each other. Once assembled, the batteries were charged in the formation department (Old Charge Area) on the south end of the Main Production Building and in the “New Charge Building” located south of the Main Production Building as shown on Figure 4.

2.2.3.7 Labeling

After charging, batteries were labeled in the “Final Finish” area located most recently in the southwest part of the southern building. Labels were applied and the batteries were placed upon pallets for shipping using a hydraulic palletizer located in the northwest corner of the New Charge Building. The final finish labeling and palletizer areas are shown on Figure 4.

2.2.3.8 Autopsy Process

In addition, as part of its quality control program, the facility performed battery autopsies and testing of defective batteries since 1954. Approximately 20 failed batteries under warranty were received from customers per month.

During the battery autopsies, batteries were placed on a polyvinyl chloride (PVC)-coated workbench, the tops were cut off, and the acid was drained into a PVC-lined sink which drained to the wastewater treatment system. Acid was flushed from the batteries with water. The plastic battery tops were then banded back in place, and the batteries were stored on wooden pallets prior to shipment off-site. This process was performed in the southwest part of the Main Production Building in the battery tear-down area shown as SWMU No. 8. Defective batteries were stored on the west side of the Main Production Building at SWMU No. 11 and in the northwest field area at SWMU No. 12. The processing and storage areas are shown on Figure 4.

2.2.3.9 Process Cooling Water

During the manufacturing process, several components were cooled with water, creating wastewater containing lead, oil, or sulfuric acid. The dilution of sulfuric acid generated heat. Heat was removed by a heat exchanger, and water in the heat exchanger was sent to a cooling tower. The lead strip was also cooled with a heat exchanger. The hot water from the heat exchanger was sent to cooling towers located on the east part of the north side of the Main Production Building. After forming, plastic cases were cooled with water which was then sent to cooling towers on the southern end of the west side of the Main Production Building. The two cooling tower locations are shown on Figure 4.

2.2.3.10 Wastewater Processing

Wastewater from the Main Production Building was collected in a 25-foot by 30-foot by 20-foot deep holding basin located on the southeast part of the Site where caustic soda (sodium hydroxide) was added to neutralize the acid in the wastewater and to cause the lead to become insoluble. The neutralization process was as follows: Process water entered the neutralization system via the primary holding pit and passed through the two remaining sub-basins where in the third sub-basin sodium hydroxide was added to neutralize the acid in the wastewater and to cause the lead to become insoluble. Water was then filtered through rubber-lined cast iron units with stainless steel filter coated with diatomaceous earth. The filtered water was monitored for pH and lead before being discharged to the sewer. This process was used up until about 1992, when a Lamella clarifier, moving bed sand filter, and sludge dewatering filter press were added, replacing the diatomaceous earth filter. Waste water basin was located adjacent to the east side of the southern building and the process water treatment area was located inside the Southern Building as shown on Figure 4.

2.3 History of DTSC Involvement

According to Delphi representatives, no government agent or third party has asserted a claim of on-site treatment, storage or disposal liability against the Site. Delphi representatives indicated that it has not defended any environmental related claims or litigation asserted by any governmental agency or third party related to this Site, and no potential claims or litigation cases are presently known to exist.

Several regulated units were previously located on site. These included SWMUs that included a waste water treatment system, underground storage tanks (USTs) and above ground storage tanks (ASTs) and several hazardous waste storage areas. Presently, with the exception of the wastewater treatment unit (WWTU) basin, all known underground and aboveground tanks used for storage of chemicals, fuel or waste in the treatment process have been cleaned and removed under the oversight of the County of Orange. The primary WWTU basin and weir chambers still require the removal of wastewater and sludges, decontamination, and structure removal. A separate closure plan has been prepared for closure of the WWTU and submitted to DTSC as required by the DTSC (Haley & Aldrich, 2006).

During site demolition, closure of the wastewater treatment unit (WWTU) initially commenced pursuant to the requirements for a permit-by-rule (PBR) unit and a closure plan that was approved by the Certified Unified Program Agency (CUPA). However, in February 1991, Delphi's predecessor, General Motors, submitted a Resource Conservation and Recovery Act (RCRA) Part A application for the WWTU to the US EPA, Region IX. According to DTSC, the WWTU unit is technically an Interim Status Unit that is subject to the formal closure requirements of fully permitted treatment units and may require environmental site assessment and, if significant contamination is found, remediation as part of the unit closure activities. However, during demolition, the secondary treatment system portion of the WWTU was cleaned and removed in accordance with a PBR closure plan that was approved by the local Certified Unified Program Agency (CUPA). Subsequently due to the permit issues discovered, the DTSC suspended closure activities of the WWTU during demolition until this issue was resolved.

To complete closure in accordance with regulatory requirements, Haley & Aldrich prepared a closure plan for the WWTU which was subsequently submitted to the DTSC in July 2006. As part of this FI, several borings were advanced around the WWTU and the findings are presented in the Facility Investigation report. The WWTU will be removed in accordance with the closure plan, when approved by DTSC, and when site demolition resumes. Upon completion of WWTU closure activities, a closure documentation report will be prepared and submitted to DTSC.

The Closure Plan was prepared in accordance with the closure requirements for Interim Status Facilities in 22 CCR, Division 4.5, Chapter 15, and is consistent with the Department of Toxic Substances Control's Permit Writer Instructions for Closure of Treatment and Storage Facilities – Revision 1, January 1994. The activities contained in the closure plan are designed to meet the Closure Performance Standards prescribed in 22 CCR, Section 66265.111 and to achieve closure of the WWTU pursuant to facility closure requirements for Interim Status Facilities in 22 CCR, Division 4.5, Chapter 15, by demonstrating that hazardous waste and hazardous constituent residues have been removed or are left in place at levels that are protective of public health and the environment. At the conclusion of the establishment of the agreed-to remedial or monitoring activities, DTSC will issue a no further action letter and all PBR and RCRA Part A issues will be deemed closed. A separate closure plan will be available for review and comment at the local Anaheim public library. After the public comment period is closed, DTSC may approve both the CMP and Closure Plan

2.4 Site Assessment

Haley & Aldrich performed two significant site-wide Investigations, a Current Conditions Investigation and a Facility Investigation between 2005 and 2006. The investigation results are summarized in the Current Conditions Report dated February 2006 and the Facility Investigation Report dated March 2007 prepared by Haley & Aldrich. The sampling programs included 53 Areas of Interest (AOI) as well as additional features that were identified and added to the sampling programs. These investigations included sampling and testing of soil, soil gas, and groundwater.

2.5 Building Demolition

The initial phase of demolition in 2005 included demolition of:

- Main Production Building;

- South Building (New Charge Building);
- Three warehouses (Warehouses No. 1, No.2 and No. 3);
- Railroad siding; and
- Numerous asphalt or concrete paved areas outside the buildings.

Features remaining on the Site include the majority of the Main Production Building concrete slab, South Building concrete slab, concrete slabs of Warehouses No. 1 and 2, the original pavement beneath Warehouse No. 3, the WWTU and Storm Water Retention Basins, and the north and south concrete driveways and asphalt paved parking lot on the northeast side of the Site. Appropriate permits were obtained from the City of Anaheim for demolition by the demolition contractors (Permit numbers: BLD 2005-00976, ELE2005-0491, and PLM2005-00454)

2.6 Demolition Oversight

Demolition oversight was performed by Haley & Aldrich in 2005 and 2006. During this oversight PCB and arsenic impacts were identified on concrete slabs on the west side of the Site and in the Main Production Building. On the west side of the site, stains were observed or elevated concentrations detected in samples north of AOI 30, south of AOI 26, south of AOI 27 and adjacent to AOIs 41, 42 and 43. In the Main Production Building, purple stained concrete was observed in AOI 10 (the forklift repair area and former SWMU No. 9), AOIs 5 and 6 (Red lead oxide area and oxide conveyors), and in the AOI 13 area (AGM Containment and Green Group Maintenance areas).

3. SUMMARY OF INVESTIGATIONS AND CURRENT CONDITIONS

3.1 Summary of Investigations

Numerous environmental investigations of various site features were conducted at the Site between 1988 and 2006 to assess soil and groundwater quality at the Site. These investigations are summarized in the following subsections and presented in Appendix A of the FI report. The following summarizes previous investigations the historical documents reviewed for CCR and FI investigations:

- Between 1988 and 1991, various documents were prepared by Dames & Moore for the remediation of the northwest area of the Site (Northwest Field)

  These included the following:

  - November 1988: Report, Site Assessment and Remedial Action Plan, Delco-Remy Facility, Northwest Field and Storm Drain Ditch
  - October 1989: Revised Report, Evaluation of Remedial Action Alternatives and Selection of an Appropriate Alternative, Delco-Remy Site, Northwest Field Area
  - December 1989: Tank Closure Report (500-gallon gasoline UST), Delco-Remy Site, 1201 North Magnolia, Anaheim, California
  - March 1991: Work Plan for Remedial Action, Delco-Remy Site, Northwest Field Area
  - August 1991: Work Plan for Remedial Action, Delco-Remy Site, Northwest Field Area

- August 1986: Report, Site Characterization and Remedial Action Plan prepared by Dames & Moore

  This report documents that six underground storage tanks used for diesel fuel and used oil were investigated in two areas of the Site (UST Areas No. 1 and No. 2). Area No. 1 was located adjacent to the northwest corner of the Main Production Building and included four 19,000-gallon fuel oil tanks. Area No. 2 was located adjacent to the central portion of the west side of the Main Production Building, on the west side of the railroad spur and contained two 12,000-gallon used oil tanks. No contamination was detected in soil samples analyzed from Area No. 1. This report documents removal of the USTs from both areas.

- August 1987: Report, Final Report-Soil Sampling-Tank Area 2 prepared by Dames & Moore

  This report documents removal of petroleum hydrocarbon impacted soils from Tank Area No. 2, where used oil had been stored. The total petroleum hydrocarbons (TPH) impacted soils in Area No. 2 were investigated, excavated and hauled off-site under regulatory oversight.

In July 1986, monitoring well MW-1 was installed near Area No. 2. This well was installed in a shallow groundwater zone encountered at a depth of approximately 30 feet below ground surface (bgs). No detectable TPH were found in the groundwater samples although pH values of 9.0 and 9.6 were reported. Additionally, the water samples were observed to have a cloudy brown color.

- January 1989: Report, Soil Hydrocarbon Investigation, South End of Former Drainage Ditch, prepared by Dames & Moore

  This report presents the results of a soil sampling and analysis program for the southern end of the former unlined storm drainage ditch located in the northwest section of the Site. This ditch was used to collect surface drainage resulting from precipitation. This unlined drainage ditch discharged to the Magnolia storm drain channel under an NPDES permit. In September 1988, during the course of lining the ditch, Delco-Remy excavated a few feet of soil containing elevated lead concentrations. During soil sampling conducted prior to lining the ditch, hydrocarbon odors and discoloration were observed. Soil samples were collected and analyzed. No benzene, toluene, ethylbenzene, and xylenes (BTEX) or diesel fuel range TPH were detected. However, total recoverable petroleum hydrocarbons (TRPH) concentrations ranging from 1,300 milligrams per kilogram (mg/kg) to 2,600 mg/kg were detected. It was concluded that the soils were impacted due to a past minor hydrocarbon spill and that soil deeper than 7 feet bgs was not impacted. The estimated volume of impacted soil was approximately 2 to 7 cubic yards.

- August 1989: Report, Further Investigation of Groundwater Conditions prepared by Dames & Moore

  This report documents the additional groundwater investigation activities conducted to assess the cause of discoloration of groundwater samples collected from monitoring well MW-1 at the Site. This assessment was conducted pursuant to a request made by the RWQCB, Santa Ana Region, dated May 15, 1989.

  In July 1988, two additional monitoring wells (MW-2 and MW-3) were installed in areas several hundred feet to the northeast and southeast of MW-1. No TPH concentrations were detected and the pH values ranged from 7.36 to 7.42.

  To determine why the groundwater had a brownish color, groundwater samples were again collected from each of the three wells and analyzed for various parameters. It was discovered that the discoloration was due to dissolved natural organic substances (humic acids) present in the aquifer materials in the soil near MW-1.

- December 1989: Report, Tank Closure Report (500-gallon gasoline UST), Delco-Remy Site, 1201 North Magnolia, Anaheim, California prepared by Dames & Moore

  This report documents removal a former 500-gallon gasoline UST from the northwest part of the site. The removal, soil review and associated confirmation sampling was performed under the oversight of the Orange County Health Care Agency and Anaheim Fire Department. No impacts were observed by the agencies.

- July 1992: Final Report, Visual Site Inspection/Sampling Visit, prepared by PRG Environmental Management Inc.

  PRG inspected the facility to evaluate SWMUs described in the August 1990 Preliminary Assessment report for Delco-Remy and listed in a scope of work outlined by the EPA in October 1991. Based on PRG's review of these documents and the findings, 13 SWMUs were identified at the Site. All of the SWMUs identified by PRG were cross-referenced with the AOI numbers assigned by Haley & Aldrich in the Current Condition and Facility Investigation reports as shown on Figure 3. The SWMU numbers for the above-noted 13 SWMUs are listed below and cross-referenced with the AOI numbers assigned by Haley and Aldrich:

  - SWMU No. 1 (AOIs 22 and 47) - Wastewater Treatment Unit – lead-containing and corrosive wastewater

  - SWMU No. 2 (AOI 25) – New Hazardous Waste Storage Area in Warehouse No. 3 – operated as less than 90-day storage since 1983

  - SWMU No. 3 (AOIs 22 and 47) - Former Gondola Bin and Roll-off Bins – waste diatomaceous earth in south building

  - SWMU No. 4 (AOI 2) - Waste Lead Oxide Slurry Collection Channel in Main Production Building

  - SWMU No. 5 (AOI 2) - Former Vacuum Filter Machine in Main Production Building

  - SWMU No. 6 (AOI 8) - Hydraulic Oil Collection Channels for Plastic Molding Machines in Main Production Building

  - SWMU No. 7 (AOI 34) - Former Underground Waste Oil Storage Tanks (Area No. 2) west of Main Production Building

  - SWMU No. 8 (AOI 11) - Battery QA/QC and Autopsy Area (a RCRA-regulated unit) in southwest part of Main Production Building

  - SWMU No. 9 (AOI 5) - Soluble Oil Collection and Cleaning Area - formerly equipment wash down tank in north-center part of Main Production Building

  - SWMU No. 10 (AOI 41) – Pump House for Oily Waste Collection and Cleaning Area - formerly equipment wash down tank west of Main Production Building

  - SWMU No. 11 (AOI 43) - Former Defective Battery Storage Area west of Main Production Building

  - SWMU No. 12 (AOI 48) - Former dead battery storage area in northwest field

  - SWMU No. 13 (AOI 33) - Lead-Contaminated Steel Roll-Off Bin in northwest loading dock ramp area. This SWMU was identified during the Visual Site Inspection (VSI) following the 1990 Preliminary Assessment.

No new RCRA-regulated units were identified among the SWMUs identified during the VSI.

Additional information regarding the above-listed SWMUs is presented below.

SWMU No. 1 (AOIs 22 and 47): Wastewater Treatment Unit - Delco-Remy's WWTU was located at the southeast corner of the Site. The WWTU's primary components were an approximately 60,000-gallon fiberglass-lined concrete wastewater holding basin, three approximately 12,000-gallon fiberglass-lined concrete wastewater neutralization basins, and an aboveground sodium hydroxide tank. The WWTU treated acid- and lead-contaminated wastewater collected from various areas of the facility (DHS, 1989 and Delco-Remy, 1992).

The WWTU was used to neutralize and precipitate metals from the influent wastewater. Precipitated metals (mostly lead) were collected from the clarifier sludge through the filter press. Filter press solids were collected in plastic-lined cardboard boxes and sent to RSR Quemetco for reclamation. Treated water was discharged to the Orange County sanitary sewer system after the discharge met publicly owned treatment works (POTW) requirements regulated under an industrial wastewater discharged permit issued by the Orange County Sanitation District (3-175) (DHS, 1989 and Delco-Remy, 1992).

SWMU No. 2 (AOI 25): Hazardous Waste Storage Area - This hazardous waste storage area was located inside Warehouse No. 3 along the north-center part of the east wall. The hazardous waste storage area was constructed of sealed concrete and was divided by epoxy-lined trenches into three areas including one waste storage area and two virgin product storage areas, measuring approximately 10 feet by 15 feet each, with a grated epoxy-lined trench around the perimeter. Wastes and virgin products stored in this area were contained in 55-gallon drums and may have included paint-related wastes, oil-contaminated items and drums of new oil (Delco-Remy, 1992).

SWMU No. 3 (AOIs 22 and 47): Former Gondola Bin and Roll-off Bins - The gondola bin and roll-off bins were taken out of use when the new wastewater treatment system was installed in February 1991. During the years when diatomaceous earth was used to filter wastewater, contaminated diatomaceous earth was placed into an indoor gondola bin, which was periodically placed into two larger plastic-lined, 20-cubic-yard roll-off bins (Delco-Remy, 1992).

SWMU No. 4 (AOI 2): Waste Lead Oxide Slurry Collection Channel - Waste lead oxide slurry, generated from the battery plate pasting operations, was directed to a grated concrete channel that surrounded each battery plate pasting machine. The slurry from the concrete channel was pumped through a filter press similar in design to the filter press in the WWTU. Solids generated from the filter press were sent off-site for lead reclamation. Residual liquids remaining after pumping the waste lead oxide slurry through the filter press were directed to the WWTU (Delco-Remy, 1992).

The filter press replaced the less efficient vacuum filter machine (SWMU No. 5) that was formerly used to filter solids from the waste lead oxide slurry (Delco-Remy, 1992).

SWMU No. 5 (AOI 2): Former Vacuum Filter Machine - The vacuum filter machine was replaced by a filter press in July 1991. As noted in the description of SWMU No. 4, the waste lead oxide slurry collection channel, the vacuum filter machine was formerly used to filter solids from waste lead oxide slurry generated in the facility's battery plate pasting department (Delco-Remy, 1992).

SWMU No. 6 (AOI 8): Hydraulic Oil Collection Channel - Epoxy-coated and grated concrete channels surrounded the plastic battery case molding machines known as "Cincinnatis" (after the Cincinnati, Ohio-based company that manufactured the machines). The concrete channels collected hydraulic oil and water that may have leaked from the plastic molding machines (Delco-Remy, 1992).

SWMU No. 7 (AOI 34): Former Underground Used Oil Storage Tank Area No. 2 - Located west of the Main Production Building and railroad tracks this area contained two 12,000-gallon underground storage tanks (USTs). Originally these tanks were used to store sodium hydroxide but were converted to store waste flux oil for rubber products in 1979. These tanks were removed in July 1986 under a permit issued by the Orange County Health Care Agency (OCHCA). Confirmation sampling was performed by Dames & Moore. A concrete pad up to 2-feet thick with slurry sidewalls was constructed prior to installation of the USTs and it is currently still in place at this location (D&M, 1985 & Delco Remy, 1992). Testing of samples from borings found hydrocarbon impacts approximately two feet thick beneath the tanks but did not find significant lateral migration. In December 1986, remedial excavation of impacted soils was performed to a depth of 21 feet bgs under oversight of OCHCA. Testing of confirmation samples found low levels of toluene and TPH but levels remaining were below the OCHCA action levels. Benzene, xylenes and chlorinated solvents were not detected in confirmation samples. One of the more impacted confirmation samples was tested for lead, and found to only contain 3.3 mg/kg of lead (Dames & Moore, 1987).

SWMU No. 8 (AOI 11): Battery QA/QC and Autopsy Area - The battery quality assurance and quality control (QA/QC) and autopsy area was located in the southwest part of the Main Production Building. During battery tests and autopsies, batteries were placed on a PVC-coated workbench, the tops were cut off, and the acid was drained into a PVC-lined sink, which drained to the WWTU. The batteries were then examined to determine why they failed. After examination, the plastic battery tops were banded back in place and the batteries were stored on wooden pallets on the concrete floor near the battery autopsy area and later moved outside to another storage area on the west side of the site (SWMU No 11) prior to shipment off-site for reclamation (PRC, 1992).

SWMU No. 9 (AOI 5): Soluble Oil Collection and Processing Tanks - The soluble oil collection and processing tanks were part of a soluble oil collection and processing system located in the north-west part of the Main Production Building to reclaim spent soluble machine oils from on-site manufacturing equipment. Spent soluble machine oils were transferred to the 6,000-gallon aboveground used oil storage tank (located east of Warehouse No. 3) prior to shipment off-site for reclamation (PRC, 1992).

During the VSI, four empty polyethylene plastic tanks were present in the proposed collection and processing area. Two of the empty tanks had an approximate capacity of 500 gallons each and were located within polyethylene containment structures. The other two empty tanks had an approximate capacity of 100 gallons each (Delco-Remy, 1992).

SWMU No. 10 (AOI 41): Oil Pump House/ Oily Waste Collection and Cleaning Area (Formerly Equipment Wash Down Tank) - The oil pump house/equipment wash down tank identified as SWMU No. 10 (PRC, 1992) refers to an enclosed equipment washing and used oil transfer area known as the "oil house" and the 6,000-gallon aboveground used oil storage tank. The oil house consisted of an approximately 300-square-foot sealed concrete area with a grated sump around the perimeter. The concrete area and sump were covered by a corrugated aluminum structure. The oil house was divided in half by a grated sump and a corrugated aluminum dividing wall (Delco-Remy, 1992).

One side of the oil house consisted of a spray washing area for cleaning oil-contaminated equipment. The opposite side contained an approximately 150-gallon used oil transfer tank that held used oils generated by the facility's manufacturing equipment. Used oil deposited in the transfer tank was periodically pumped into the 6,000-gallon used oil storage AST located adjacent to the east side of the oil pump house (Delco-Remy, 1992).

SWMU No. 11 (AOI 43): Former Defective Battery Storage Area - Defective batteries evaluated in the battery autopsy were temporarily stored indoors on pallets, adjacent to the battery autopsy area, and periodically moved to an outside storage area located on the west side of the Main Production Building in an area between the manufacturing building and Warehouse No. 3, on the west side of the cooling tower (Ecology and Environmental, Inc. [E&E], 1990) (Appendix A of the FI). These defective batteries were shipped to RSR Quemetco for lead reclamation (Delco-Remy, 1992).

SWMU No. 12 (AOI 48): Northwest Field - The northwest field at the Site refers to an open field located in the northwest corner of the Site. The northwest field is bordered by the Site property line fence on the north and west sides, the former Southern Pacific railroad spur on the east, and a fence separating the field from the former manufacturing area on the south. The Site's storm water retention basin, which receives runoff from the Site, is located in the southwest corner of the northwest field. Prior to construction of the storm water retention basin, runoff from the Site followed a drainage ditch on the west side of the northwest field, at the present location of the storm water retention basin (E&E, 1990).

In the past, elevated concentrations of lead were detected in surface soils obtained from the northwest field drainage ditch area. Soil samples analyzed by the California Waste Extraction Test [WET] method for soluble lead prior to excavating the Site for the construction of the stormwater retention basin were reported to have soluble concentrations of lead up to 39.6 milligrams per liter [mg/L] (Dames and Moore, 1989). The lead impacts in the northwest field were attributed to sulfuric acid containing lead leaking from the dead and defective lead acid batteries stored in this area up until the early 1970s (E&E, 1990). This area was later remediated by Delphi.

During May and August 1989, lead-impacted soil was removed from the northwest field drainage ditch and basin area. Confirmation soil sampling to confirm that the impacted soil had been removed along the ditch was performed under the oversight of the Orange County Health Care Agency's Environmental Health Unit. Excavated soils were chemically treated on-site using an Ensotech system to convert heavy metals into insoluble silicates. After analytical results demonstrated that the soils were no longer impacted, approximately 3,000 cubic yards of treated soil were sent to a Class 3 landfill. According to the Orange County Health Care Agency, soil remediation efforts thus far had addressed the western half of the northwest field (E&E, 1990). According to Delco-Remy's consultant, Dames and Moore, a lead-impacted area measuring approximately 300 feet by 18 feet still remained along the eastern side of the northwest field (Dames and Moore, 1989). This area is believed to be due to the presence of pipelines that were active at that time.

During the VSI, a pile of soil was observed on the north end of the northwest field. According to a Delco-Remy representative, these soils were identified as clean fill excavated during the stormwater retention basin construction. Lead levels in these soils were reportedly low (less than 5 mg/l by the California WET method). The decision to store these soils on-site was made in conjunction with Orange County Health Care Agency (Delco-Remy, 1992).

SWMU No. 13 (AOI 33): Lead-Contaminated Steel Roll-Off Bin - A roll-off bin used for temporary storage of lead–impacted steel prior to off-site disposal was the only SWMU identified during the VSI that was not identified in the Preliminary Assessment. On an occasional basis (up to once per year), an approximately 20-cubic-yard-capacity steel roll-off bin used for temporary storage of lead-impacted steel parts and equipment was placed outside of the northwest corner of the Main Production Building, between the building and the railroad tracks. These wastes were generated from repair or replacement of lead acid battery manufacturing equipment. The steel roll-off bin was constructed of steel and lined with plastic sheeting (Visqueen). When full, the bin was picked up by an outside vendor for use as scrap metal and another bin dropped off in its place. Although a definite start-up date could not be determined, the practice of occasionally using a roll-off bin in this location began in the early 1980s (Delco-Remy, 1992). According to Ken Rayle, former facility environmental manager, the roll-off bin was used for several years. Documents reviewed for the facility did not indicate that here had been any documented releases of hazardous materials from the roll-off bin or that any liquids or sludges were deposited in the bin.

- January 1999: Draft Soil Remediation Closure Report, Northwest Field prepared by ENV America Incorporated

  Between 25 and 31 August 1998, soils were excavated from the northwest field. The reason for the excavation was the presence of elevated lead in the shallow soils. Lead had been detected at concentrations ranging from 38 mg/kg to 9,850 mg/kg. The soil cleanup goal for this activity was 1,000 mg/kg. For each location excavated, confirmation soil samples were collected at depth to confirm removal of the lead-impacted soil above the remedial criteria. A total of 1,108 tons of soil were reportedly excavated and shipped to the Laidlaw Environmental Services/Safety-Kleen, Lone Mountain Facility in Waynoka, Oklahoma (ENV America 1999). Figure 8-12 of the FI documented the confirmation and delineation sample results from that investigation and clean up action.

- April 2003: Environmental Liability Assessment, prepared by Harding ESE, a MACTEC Company

  Delphi contracted Harding ESE to conduct a liability assessment of the Site to identify significant liabilities at the Site.

- November 2004: Phase I Environmental Site Assessment, Delphi Corporation, Anaheim Battery Operations, 1201 N. Magnolia Ave., Anaheim, California, prepared by Conestoga-Rovers & Associates

  Conestoga-Rovers Associates (CRA) performed a Phase I Environmental Site Assessment of the Site in conformance with the scope and limitations of American Society for Testing and Materials (ASTM) Practice E1527 00 (CRA, 2004). This assessment was performed before the battery operations had ceased and identified the existing and historical RECs listed below:

  Underground Storage Tanks (USTs) (AOIs No. 33 and 34): According to Site reports reviewed by CRA, six USTs were removed in 1986 from two areas of the Site. The database information from the EDR report indicated that the USTs were closed.

  Former Lead Reclamation Area (AOI 16): Until the mid-1980s, scrap lead was reclaimed in the area now occupied by the hazardous waste storage area located in the northwest corner of the Main Production Building.

  Above Ground Storage Tanks (ASTs) (AOIs No. 22 and 24): The acid ASTs were situated on top of acid resistant bricks that sat on top of the concrete slab. While secondary containment for spilled liquids was present, there was a significant amount of liquid pooled around the base of the tanks.

  Raw Material and Chemical Use and Storage (AOIs No. 1 through 8 and 13): At several locations within the production area, acid was drained and refilled in the individual batteries. This was done in areas where the floor was covered with acid resistant bricks.

  Battery Charging Tables (AOIs No. 14 and 23): There were battery charging tables with underflow ventilation trenches in the south end of the Main Production Building and center of the south charging building.

  Oil Processing Area (AOIs No. 30, 33, 41 and 42): Used oils were transferred from the production area to the used oil processing building via transport carts. Carts were then dumped into the used oil handling sump from which it was pumped through a particle separator and then to the holding tank.

  Solid Wastes (AOI No. 30): According to Site personnel and as observed by CRA, dry sweeper material from the cleaning of the outside pavement areas had been dumped in the northwest area of the Site, adjacent to the former gravel truck parking area.

  Spills/Releases of Lead Dust (AOIs No. 48, 49, 50, 51 and 52): Releases of lead oxide may have occurred at the Site.

All of these Phase I ESA RECs were investigated during the CCR and FI.

- March 2005: Phase II Environmental Site Assessment, Delphi Corporation, Anaheim Battery Operations, 1201 N. Magnolia Ave., Anaheim, California, Conestoga-Rovers & Associates

  A limited Phase II Environmental Site Assessment (ESA) investigation was designed and implemented to collect additional data to evaluate five of the eight RECs identified by CRA (CRA, 2005). The Phase II ESA field activities were conducted by CRA on November 16 and 17, 2004, before facility operations had ceased. The objective of the Phase II ESA was to screen the site for potential releases of compounds from Site-related operations which may have impacted or pose a potential risk to human health or the environment.

  As part of the Phase II investigation, CRA advanced a limited number of soil borings (27) (SB1 to SB27) and selectively analyzed soil samples for chemicals of concern including lead, BTEX, MTBE and TPH. The soil borings targeted AOIs 16, 33, 34, 39, 41, 48, 49, 50, 51 and 52 and elevated concentrations of lead were reported in shallow soils in AOIs 39, 48, 49, 50, 51 and 52. Three RECs, aboveground storage tanks (REC 3), raw material and chemical storage (REC 4), and battery charging tables (REC 5), identified during the CRA Phase I were not specifically addressed in the Phase II ESA.

- January 2006: Current Conditions Report, Delphi Corporation, Former Battery Operations, 1201 North. Magnolia Ave., Anaheim, California, Haley & Aldrich, Inc.

  The 2005 CCR investigation was based on a detailed reconnaissance of the Site, information presented in existing environmental reports prepared for the Site, interviews with Delphi personnel, and on readily available information regarding the types of chemicals known to have been used or likely used in the various onsite operations in the manufacture of automotive batteries. The investigation included collection and analysis of soil, soil gas, groundwater, and concrete samples. Over 750 soil samples were tested for a variety of constituents including metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) (including polynuclear aromatic hydrocarbons (PAHs), petroleum hydrocarbons, and polychlorinated biphenyls (PCBs)), and metals. Over 150 soil gas samples were collected and analyzed for VOCs. Groundwater samples were collected from 10 groundwater wells and five offsite groundwater grab samples points and analyzed for metals and VOCs. Concrete chip and core samples were primarily analyzed for lead and PCBs.

  The CCR focused on subsurface investigation activities and presented a discussion of soil, soil gas, and groundwater impacts. The analytical results of the concrete chip and core samples and concrete were also presented in the CCR.

  The primary detected organic chemicals include the site-related, VOCs, PAHs, and PCBs in soil, and various VOCs in soil gas and groundwater. Metals identified and considered to be related with historical onsite operations include lead, antimony, arsenic, cadmium, chromium, mercury, and zinc. The determination of whether an impact area is considered delineated was based on observations of an apparent release (e.g., discolored concrete surface or soil) within or in proximity to an operational area, operational area configuration, decreasing chemical concentration trends from an apparent source area, and/or whether the chemical concentrations at the limits of the investigated area are less than derived delineation criteria. A delineation criterion was derived for each media and detected site-related chemical by developing chemical thresholds that are considered protective of groundwater quality and protective of human health. The lower of the chemical thresholds was determined to be the delineation criterion for that chemical in the given media. Based on the findings additional site characterization was recommended and performed.

- March 2007: Facility Investigation (FI) Report, Delphi Corporation - Former Battery Operations Facility, 1201 North. Magnolia Ave., Anaheim, California, Haley & Aldrich, Inc.

  The FI Report presents both historical data derived from archives, investigations by others, and data collected by Haley & Aldrich, Inc. during the Current Conditions Investigations (CCI), demolition oversight and the additional sampling (including step-down and step-out sampling) performed for the Facility Investigation during June through September 2006. This work included advancing and sampling an additional 233 soil borings, eight groundwater wells, five groundwater grab sample points, and 31 soil gas points.

  A human health risk assessment (HHRA) was performed for the Site-specific chemicals to assess potential human health risks to future onsite receptors, and to use this baseline risk evaluation to derive cumulative risk-based industrial use remediation criteria for the Site. Remediation criteria for soils were developed for antimony, arsenic, hexavalent chromium (Cr^{+6}), PCBs, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, lead, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and naphthalene. Remediation criteria for soil gas was developed for 1,1-dichloroethane, 1,1-dichloroethene, 1,2-dichloropropane, tetrachloroethene (PCE), and vinyl chloride.

  Results of the FI indicate that 25 of the 54 AOIs did not have impacts greater than the risk-based remediation criteria for COPCs in the soil and soil gas samples analyzed. Impacts that will require remediation were found in 29 of the 54 AOIs.

  Based on the information collected and reviewed, the following were recommended:

  - Additional soil sampling can be performed either prior to or during remedial activities at AOIs 6, 10, 18, 25, 26, 27, 28, 30, 31, 33, 34, 35, 36, 38, 41, 43, 44, 45, 46, 48, 49, 50, 51, 52, 53, and the Northwest Loading Dock area.

  - AOIs 7, 8, and 42 are considered sufficiently delineated but require remediation to remove soil with concentrations above DTSC approved risk-based remediation criteria.

  - No further action is recommended for AOIs 1, 2, 3, 4, 5, 9, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 29, 32, 37, 39, 40, and 47 because

COPCs were not detected at concentrations above the risk-based remediation criteria.

- Remediation of AOIs 6, 7, 8, 10, 18, 25, 26, 27, 28, 30, 31, 33, 34, 35, 36, 38, 41, 42, 43, 44, 45, 46, 48, 49, 50, 51, 52, 53, and the Northwest Loading Dock area is recommended due to the presence COPCs at concentrations greater than risk-based remediation criteria.

- For AOIs where lead is the primary chemical of concern, field screening with an XRF is recommended during removals and for confirmation analysis, with limited stationary laboratory analysis.

- Design and implementation of a pilot study for soil gas remediation of VOCs in soil gas from apparent releases in and around AOI 26.

- Additional groundwater grab sampling offsite along Knollwood Circle and if necessary, well installation to delineate the lateral and vertical extent of VOCs in groundwater west of the source area at AOI 26 in the northern portion of Warehouse No. 3.

- Concrete impacted with concentrations above site–specific risk-based remediation criteria should be removed, managed and disposed offsite to minimize the potential for leaving material onsite with concentrations of COPCs greater than the risk-based remediation criteria.

3.2 Summary of Geologic Conditions

The Site is situated within the Los Angeles Basin which lies between the Transverse and Peninsular Ranges of southern California and was formed during the late Cenozoic (Yerkes and others, 1965). The basin contains up to 10 kilometers of marine and alluvial sediments in the center of the basin which has undergone a complex multiphase structural history. The structural evolution includes extension and strike slip faulting in the Oligocene and Miocene. During the Pliocene Epoch and Quaternary Period, the basin underwent oblique contraction, through thrusting and strike-slip faulting. The Los Angeles Basin and surrounding areas are part of an active tectonic region with numerous documented seismically active faults that can produce small to large-sized earthquakes.

Within the Los Angeles Basin the Site lies on the southern portion of the Central Block of the Los Angeles Basin. The Central Block is wedge shaped in plan view and is bounded by active fault zones. The block extends approximately 55 miles from the Santa Monica Mountains on the northwest to the south end of the San Joaquin hills to the southeast. The block is approximately10 miles wide at the northwest end and broadens to 20 miles wide at the southern terminus. Sediments within the block have been folded into parallel, northwest-trending anticlinal and synclinal structures. The Site is situated within the Downey Plain part of the Coastal Plain of the Los Angeles Basin. The Downey Plain is located south and southeast of the La Brea, Montebello, and Santa Fe Springs Plains, and of the Coyote Hills, and northeast of the Newport -Inglewood Structural Zone (CDWR, 1961). It extends from Ballona Gap across the central lowland of the Coastal Plain of Los Angeles County into the Coastal Plain of Orange County nearly to Santa Ana. It is essentially a depositional feature, although erosion periods also occurred during deposition. Alluvial fans formed by the Los Angeles, Rio Hondo-San Gabriel River and Santa Ana River systems have coalesced to form a very gentle plain. The area surrounding and including the Site ranges in elevation from approximately 90 to 95 feet above mean sea level (msl) and appears to gently slope from the east toward the west.

Soils on the site have been observed to be interbedded alluvial deposits. The upper most soil, ground surface to 10 feet deep, on the Site consists of silty sand, sand, sandy silt and silt. Discrete beds of silty clay to clayey silt were noted at 7 feet, 15 feet and 22 feet below the ground surface in borings. Silty sands are the primary soil types at other intervals. The surficial soils were generally described as dry to slightly moist, various shades of brown loose to dense for sands and soft to hard for silts and clays. Location of cross-section lines are shown on Figure 5 and geologic profiles are shown on Figures 6 and 7.

3.3 Summary of Hydrogeologic Conditions

Surface drainage in the area surrounding the Site is toward the west-northwest following the general slope of the surface topography. Surface water on the Site is gathered in drains and exits the Site after passing through a stormwater retention basin. The nearest surface water body is Fullerton Creek, located approximately 4,000 feet downslope and northwest of the Site. Fullerton Creek joins Coyote Creek approximately 2 miles downstream from the Site. After approximately 6 miles, Coyote Creek merges with the San Gabriel River which runs for 4 miles before emptying into the Pacific Ocean. Both Fullerton Creek and Coyote Creek are concrete-lined channels with an average flow rate of 4.7 cubic feet per second (cfs). The San Gabriel River is also concrete-lined and has an average flow of 154.73 cfs. These creeks and the river appear to be used only for stormwater/wastewater discharge, including reclaimed sewage effluent. The Santa Ana River located east of the site is not concrete lined and has numerous groundwater recharge. The Site is located in a 100-year flood zone where shallow flooding occurs with an average depth of 1 foot.

There are no surface water bodies or water courses located on or immediately adjacent to the Site. Information obtained from EDR related to the National Wetlands Inventory database indicated that there are no wetlands areas identified within ½-mile of the Site. The closest water body to the Site is an intermittent stream, Fullerton Creek, located approximately 4,000 feet north-northwest of the Site.

The Site is located in the upper reaches of the Lower Santa Ana River Basin of Orange County, California. The groundwater basin beneath the Site consists of approximately 3,500 feet of interbedded sedimentary units representing multiple aquitards and aquifers with varying individual thickness and lateral extensiveness. The groundwater basin receives its recharge mainly from surface water brought into the region by the Santa Ana River, which has its origin in the San Bernardino Mountains. The river is slowed in many areas by series of berms to allow recharge of river runoff into the subsurface aquifers. At its closest point, the Santa Ana River is approximately 5 miles east of the site.

Literature indicates that there are three regional groundwater-bearing units underlying the Site: the upper, middle, and lower units. The upper system occurs in stream terrace and older alluvium deposits which extend from ground surface to 700 feet bgs. Discontinuous layers may cause hydraulic continuity between the ground surface and the Talbert aquifer. Depth to the Talbert aquifer beneath the Site is approximately 120 feet bgs. The middle system appears to be confined and occurs at approximately 700 to 2,000 feet bgs and consists of multiple layers of sands and gravel deposits. The Main aquifer of the middle system occurs at approximately 700 feet bgs. The lower aquifer system is comprised of Pleistocene and older sediments. It occurs at approximately 2,500 to 3,800 feet bgs, in conglomerate, sandstone, and siltstone (CDWR, 1964, 1965). The soils immediately below the Site are classified as belonging to the Bellflower aquitard unit of the Lakewood Formation. Soil borings performed during this investigation reported interlayered horizons of silty sand, sand, silt and clay to depths of 25 feet bgs as shown on Figures 6 and 7. Soil below 25 feet extending to the groundwater table generally consisted of sand with interlayered horizons of silt. Groundwater was encountered at approximately 28 feet bgs beneath the Site during the 2005-2006 investigation activities. Groundwater flow is in a westerly direction beneath the Site based on measurements from onsite wells.

Deep groundwater within the basin is used by many municipal water agencies as a potable water source. According to the Santa Ana Regional Water Quality Control Board, groundwater beneath the site is classified as beneficial use. The City of Anaheim's well No. 12 is the nearest potable well to the Site and is located 0.75 mile southeast of the Site (Cal-EPA, 1992). This well is reportedly screened from 450 to 498 feet bgs and is one of 36 wells in the City of Anaheim's system. The City of Anaheim uses 70 percent groundwater and 30 percent Metropolitan Water District (MWD) water, blended from Colorado River Water, state water, and treated water from Lake Matthews to provide drinking water service to 53,769 connections. Well No. 16 is located 1.8 miles east of the Site and is screened from 384 to 414 feet bgs. Well No. 106 is located 1.8 miles southwest from the Site and is reported to be screened between 182 to 202 feet bgs, 210 to 224 feet bgs, and 540 to 560 feet bgs.

The adjacent City of Fullerton obtains 60 percent of its drinking water from a system of 12 municipal wells and 40 percent from the MWD. Water from these sources is not blended. Water from the MWD serves the northern part of the city, while local groundwater serves the southern part. Groundwater serves an estimated population of 66,000 (60 percent of Fullerton's population of 110,000). Although the Fullerton wells are interconnected, they are usually dedicated to one of four service zones. Each of the City's wells taps the upper aquifer. The nearest Fullerton municipal well, airport well No. 9, is located upgradient approximately 1.5 miles northwest of the Site.

The Bastanchury Water Company owns a well located 2.3 miles northeast of the Site which produces approximately 5,000 five-gallon bottles of water per day (Cal-EPA, 1992).

The City of Buena Park has a well, located approximately 2.5 miles northwest of the Site which is blended with MWD water to serve 65,000 people (EPA, 1992).

3.4 Summary of Soil Sampling Results

Soil samples were collected at AOIs identified as areas where Site-related chemicals may have been released and other suspect areas, such as a loading dock, or just to screen areas for possible impacts such as in the parking lot area. During the CCI and FI, a total of 1,793 soil samples and step-out samples (including 156 field duplicates) including X-ray fluorescence (XRF) sampling for lead in perimeter areas were collected at 601 locations throughout the Site. Of the 1,793 samples, 384 soil samples were collected for XRF testing from 178 locations primarily from lawn and railroad spur areas. Primary compounds detected in soil above risk-based remediation criteria were lead, arsenic, antimony, PCBs and PAHs.

3.5 Summary of Soil Gas Sampling Results

Soil gas samples were collected at AOIs identified as areas where VOCs may have been used or accidentally released. A total of 257 soil gas samples were collected (including field duplicates and duplicate Summa canister confirmation samples) at 129 locations on the Site. Prior to initiating full scale sampling across the site, a standard purge volume test was performed on the first day of sampling to determine the optimum purge volume. The purge volume test was performed by collecting one purge volume, three purge volumes and seven purge volumes at the initial sample point. Based on this testing, it was determined that seven (7) purge volumes provided the optimum analytical recovery for this site.

3.6 Summary of Groundwater Sampling Results

Groundwater samples were collected to assess overall groundwater quality across the Site and at specific AOIs (26, 39, 41 and 47) identified during field activities as areas where chemical releases may have impacted groundwater. A total of 12 monitoring wells including a deep zone well (MW-8D) were installed, including ten on-site and two off-site. Three groundwater sampling events were performed during the Site investigation activities. Samples were analyzed for VOCs, CAM-17 metals, and/or pH. The wells were installed following standard requirements defined in Bulletin 74-81 (1981) and 74-90 (1990) of the California Department of Water Resources and permits issued by the City of Anaheim Department of Public Utilities Environmental Services Division.

Metals were not detected at concentrations greater than MCLs in groundwater monitoring well and grab samples collected. PCBs and SVOCs were not detected above MDLs in the ground water grab samples. Low concentrations of VOCs that would require further evaluation and monitoring were found in groundwater. MCLs were exceeded for five VOC compounds in samples from grab sample points and wells. However, in well samples only, only three VOC compounds from four wells exceeded MCLs down gradient of where VOCs in soil and soil gas appear to originate in AOI 26. In addition, samples from the two offsite wells, MW-10 and MW-11, did not have concentrations of VOCs above MCLs. Analysis of a water sample from well MW-8D, screened deep in the aquifer and downgradient from the source, did not have detectable concentrations of VOCs, except for acetone, a common laboratory contaminant. The existing data and the ratio of grab sample to well sample concentrations suggest that the concentrations of VOCs are likely to attenuate significantly offsite along Knollwood Circle.

3.7 Background Sample Data

Background sample data was collected from the employee parking lot area located north of the Main Production Building. The parking lot is approximately 300 by 450 feet and covered with asphaltic concrete.

To assess the parking lot for potential impacts and evaluate background metal concentrations, six borings (XR0209 through DP0214) were advanced to 4 feet bgs. Soil samples were collected at multiple near-surface depths and analyzed for lead and arsenic. Reported concentrations of lead in the 18 soil samples collected ranged from 2.65J mg/kg to 335 mg/kg (XR0212 at 0 foot bgs). This elevated concentration of lead is thought to be the result of getting some asphalt in the sample analyzed. Reported concentrations of arsenic in the 8 samples analyzed ranged from 1.05J mg/kg to 2.4J mg/kg. Laboratory results from the investigations are included the FI Report.

4. SUMMARY OF RISK EVALUATION, REMEDIAL ACTION OBJECTIVES AND SITE CLEANUP CRITERIA

The following sections summarize the chemicals of potential concern, remedial action objectives and site-specific clean up criteria developed for the site based on the findings of the investigations.

4.1 Chemicals of Potential Concern

All organic chemicals detected in soil were included in the risk assessment as a COPC. Metal concentrations detected at the Site were compared to the background data across the Site. The background evaluation process for metals is discussed in the FI report.

The chemicals of potential concern (COPC) identified included metals (primarily lead, arsenic and antimony), VOCs, PAHs, and PCBs in soil, and various VOCs in soil gas and groundwater. Analytical results of some soil, soil gas and concrete samples indicated that, based on the assumed risk-based cleanup criteria, some areas of impacted concrete, soil and soil gas will require remediation either on or offsite. In addition, elevated concentrations of VOCs that would require remediation, based groundwater protection calculations, were found in soil and soil gas. Low concentrations of the VOCs detected in soil and soil gas were also detected at relatively low concentrations in groundwater and will require further evaluation and monitoring.

As discussed below, the human health risk assessment conservatively assumed that each of the potential future onsite receptors would be exposed, over their entire exposure duration, to the maximum concentrations of Site-related chemicals (chemicals of potential concern [COPCs]) no matter where they occurred at the Site. The exposure duration for a commercial/industrial worker was assumed to be 25 years, and for construction worker was assumed to be 1 year.

4.2 Summary of Human Health Risk Assessment

A human health risk assessment (HHRA) was performed for the Site to

1. Assess potential human health risks to future onsite receptors, and

2. Use this baseline risk evaluation to derive cumulative risk-based industrial use remediation criteria for the Site.

<u>Summary of Human Health Risk Assessment</u>

The HHRA is presented in Appendix G of the FI report, and is summarized below. For the purposes of this HHRA, it was assumed that the Site would be redeveloped for commercial/industrial uses. The receptors identified in the HHRA are those that could potentially have the greatest exposure to onsite impacts. These receptors are the future onsite construction worker and the commercial/industrial worker.

The risk evaluation was conducted following relevant U.S. Environmental Protection Agency (EPA), California Department of Toxic Substance Control (DTSC), and Office of Environmental Health Hazard Assessment (OEHHA) guidance, and using reasonable worst-case exposure assumptions. The primary guidance documents used are as follows:

- *Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Properties*, prepared by Cal-EPA, and dated January 2005 (Cal-EPA, 2005).

- *Human-Exposure-Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil*, prepared by the California Office of Environmental Health Hazard Assessment (OEHHA), and dated November 2004 (revised January 2005) (OEHHA, 2005).

- *Preliminary Endangerment Assessment (PEA) Guidance Manual*, prepared by the Cal-EPA Department of Toxic Substances Control (DTSC), and dated January 1994 (revised June 1999) (DTSC, 1999).

- *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A), Interim Final*, prepared by EPA, and dated December 1989 (EPA, 1989).

- *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites*, prepared by EPA, and dated December 2002 (EPA, 2002).

- *Interim Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air*, prepared by DTSC, and dated 15 December 2004, revised 7 February 2005 (DTSC, 2005).

It was conservatively assumed in the HHRA that each of the potential future onsite receptors would be exposed, over their entire exposure duration, to the maximum concentrations of Site-related chemicals (chemicals of potential concern [COPCs]) no matter where they occurred at the Site. The exposure duration for a commercial/industrial worker was assumed to be 25 years, and for construction worker was assumed to be 1 year.

Human health risks were calculated based on assumptions regarding potential exposures to noncarcinogens and carcinogens. With the exception of lead, total risk from potential exposure to noncarcinogens is quantitatively expressed as a total hazard index (HI). The Cal-EPA and EPA typically default to a total HI of 1.0 as an acceptable target noncancer risk threshold. This noncancer risk threshold was used in this HHRA as the acceptable total HI to assess whether exposure to COPCs at the site may pose an adverse noncarcinogenic affect.

For the evaluation of exposure to lead, an acceptable blood lead level threshold was established based on the Preliminary Remediation Goal (PRG) developed using Version 7 of the DTSC Lead Risk Assessment Spreadsheet (LeadSpread) Model and the EPA Region IX Industrial Soil PRG developed using the EPA Integrated Exposure Uptake Biokinetic Model for Lead (IEUBK).

Total risk from potential exposure to carcinogens is quantitatively expressed as a cumulative incremental lifetime cancer risk (ILCR). Cumulative ILCRs of 10^{-6} to 10^{-4} correspond to theoretical probabilities of 1 chance in 1 million to 1 chance in ten thousand, which is in addition to or in excess of the background cancer risk. Within this range, the Cal-EPA and EPA typically default to an acceptable cumulative ILCR threshold of 10^{-5} in risk management decision-making in commercial/industrial land use scenarios. In addition, California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986, Proposition 65, Health and Safety Code Section 25249.5 et seq.) requires specific notification and warning for exposure to carcinogens above the "no significant risk level", which is based on a 10^{-5} excess lifetime cancer risk. This value was used in this HHRA as the acceptable cumulative ILCR to assess whether exposure to COPCs at the Site may pose an unacceptable cumulative ILCR.

Cumulative Risk-Based Remediation Criteria

The above risk assessment thresholds were exceeded in the HHRA for both the future onsite construction worker and the commercial/industrial worker receptors. The COPCs with a maximum concentration or a 95 percent upper confidence limit of the mean (95%UCL) concentrations that contributed the most to the risk threshold exceedances were identified. These concentrations were lowered in the risk assessment calculations until the risk thresholds were met. These lowered concentrations were identified as the target exposure point concentrations from which cumulative risk-based remediation criteria were derived, with the exception of arsenic. An additional evaluation was conducted to assess the potential of leaving "hot spots" of arsenic impacted soil at concentrations greater the maximum Site-specific background concentrations for arsenic. Based on that evaluation, the cumulative risk-based arsenic remediation criterion was lowered from 21.9 mg/kg to 9.05 mg/kg.

The initial remediation criterion developed for lead using the LeadSpread Model was 6,650 mg/kg, based on the post-remediation calculated 95%UCL concentration. However, Delphi has decided to set the remediation criteria to 800 mg/kg as the remediation criterion for lead at the Site to be consistent with the EPA Region IX industrial soil PRG.

The human health risk-based remediation criteria for soil and soil gas, and for the groundwater protection criteria for protection of groundwater from further degradation of vadose zone soil impacts are presented in Table 1.

4.3 Summary of Ecological Risk Receptors

An ecological screening evaluation was not conducted for the Site because sensitive ecological receptors were not identified. The Site is a disturbed environment and is surrounded by developed properties and has been used for industrial purposes since 1953.

5. REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) provide a general description of what the corrective measures will accomplish. The RAOs are media-specific goals for protecting human health and the environment. The process for developing RAOs includes identification of the following:

- Constituents of concern (COCs) and constituents of ecological concern (COECs);
- Media of concern;
- Potential exposure pathways, routes and receptors of concern; and
- Remediation goals that establish acceptable exposure levels that are protective of human health and the environment.

RAOs for protecting human health and environmental receptors generally address constituents of concern and their exposure route(s) because protectiveness may be accomplished by reducing or eliminating exposure, as well as by reducing constituent concentrations.

The RAO development process is carried out in the following sections. Site-specific data regarding constituents of concern, media of concern, and exposure pathways, routes and receptors of concern are based on findings of the FI Report, including the risk assessments.

5.1 Media of Concern

Media of concern were identified and evaluated by the human health risk assessment and ecological screening. As discussed below, soil (both shallow soil less than 10-feet deep and unsaturated deep soil greater than 10-feet deep), soil gas (less than 15-feet deep) and groundwater are the media of concern.

5.1.1 Media of Concern from Human Health Risk Assessment

Based on the human health risk assessment, the following are media of concern for the anticipated future exposure scenarios:

- Shallow soil (less than 10-feet deep)
- Deep soil (greater than 10- feet deep)
- Soil gas (less than 15-feet deep)
- Groundwater

5.1.2 Media of Concern from Ecological Risk Assessment

Because the Site is located in a developed, industrial area, there are no media of concern for ecological receptors.

5.2 Human Health Exposure Receptors, Pathways and Routes of Exposure

The human health risk assessment identified potential future receptors, pathways and routes of exposure as described on Figure 1of the HHRA in Appendix G of the FI report and summarized below.

The on-site construction or redevelopment worker could potentially be exposed to soil and ambient air through the routes of soil ingestion, soil dermal contact, and ambient air (vapors or dust) inhalation.

The on-site commercial/industrial worker could potentially be exposed to soil, ambient air and indoor air through the routes of soil ingestion, soil dermal contact, ambient air (vapors and dust) inhalation, and indoor air (vapors) inhalation.

In addition, soil constituents leaching to groundwater must be protective; therefore, groundwater protection criteria were established through the risk assessment.

5.3 Constituents of Concern

Constituents of concern were identified by the human health risk assessment. Table 1 identifies the COCs for soil, groundwater protection and soil gas. The COCs are grouped as follows:

- Inorganic metals including lead, arsenic, antimony and hexavalent chromium (Cr^{+6})
- VOCs including chlorinated compounds, benzene compounds and others
- SVOCs including the halogenated group of PCBs, and non-halogenated PAHs and naphthalene.

5.4 Applicable, or Relevant and Appropriate Requirements

Applicable or relevant and appropriate requirements (ARARs), and to-be considered (TBC) guidance can aid development of appropriate remediation criteria. The terms ARARs and TBC guidance are defined as follows:

Applicable Requirements – Cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State environmental or facility siting law that specifically address a hazardous substance, pollutant, constituent, remedial action, location or other circumstances at the Site.

Relevant and Appropriate Requirements – Cleanup standards that address problems or situations sufficiently similar to those encountered at the Site.

To-Be-Considered Guidance – Non-promulgated advisories or guidance documents issued by Federal or State government that are not legally binding. Such criteria may be useful where no specific ARARs exist, for example in determining the appropriate level of cleanup for protection of human health and the environment.

ARARs and TBC guidance are divided into three categories: chemical-specific, location-specific, and action-specific, as described in the following sections.

5.4.1 Potential Chemical-Specific ARARs

Chemical-specific requirements set health-based or risk-based concentration limits or ranges for specific constituents in various media. These potential ARARs provide cleanup levels as a basis for calculating such levels for COCs. Chemical-specific ARARs may also be used to determine an acceptable level for discharge, to determine treatment and disposal requirements, and to assess the effectiveness of a remedial alternative.

5.4.2 Potential Location-Specific ARARs

Location-specific ARARs restrict the types of remedial activities that could be performed based on certain site characteristics or the site location. Remedial alternatives may be restricted or precluded, for example, based on hazardous-waste siting laws, or proximity to wetlands, floodplains, or local historical buildings.

5.4.3 Potential Action-Specific ARARs

Action-specific ARARs control or restrict the design, implementation or performance of remedial actions. These ARARs may specify performance levels, actions, or technologies and specific discharge concentrations. Action-specific ARARs provide a basis for assessing the feasibility and effectiveness of remedial alternatives. An example of an action-specific ARAR could be the RCRA hazardous waste management regulations for wastes that are transported and disposed at an off-site disposal facility.

5.4.4 California Environmental Quality Act (CEQA)

The California Environmental Quality Act (CEQA) requires that Delphi disclose to other public agencies and the general public significant environmental effects of the subject site. However, as the oversight agency for approval of the CMP, DTSC will make the appropriate determinations under CEQA, will comply with CEQA requirements, and prepare and process the appropriate CEQA documents.

As part of the CMP approval process, DTSC will assess whether the project meets a General Rule Exemption and whether a Notice of Exemption (NOE) is prepared. A 30-day public comment period for the CMP is required, regardless of whether an NOE is prepared. Other applicable requirements include the CEQA. CEQA exemptions are categorically exempt pursuant to California Code of Regulations, Title 14, Article 19, Section 15330 (14 CCR §15330). A class 30 consists of minor cleanup actions taken to prevent, minimize, stabilize, mitigate, or eliminate the release or threat of release of a hazardous waste or substance which are small or medium removal actions costing one million dollars or less. If the cost associated with the proposed removal is less than one million dollars and therefore meets the requirement for a categorical exemption. The NOE is not subject to public review and comment; however, it is placed with the CMP document in the repository to show compliance with CEQA.

The following activities related to CEQA may be performed prior to implementing the removal action. These include the following:

- ■ • Developing a Community Profile through interviews and surveys;
- ■ • Distributing a fact sheet;
- ■ • Organizing a public meeting; and
- ■ • Preparing a Public Participation Plan.

5.4.5 Public Participation

Public participation efforts may include, but are not limited to, developing a Community Profile through interviews or surveys, developing and distributing a Fact Sheet, posting public notices in newspapers. The level of effort is based on review of the Community Profile. Comments or concerns received from the community may also affect the level of effort. As part of the Public Participation Plan for this site, information repositories will be established at the City of Anaheim Haskett Public Library located at 2650 West Broadway, Anaheim, California, and the DTSC administrative offices at 5796 Corporate Avenue, Cypress, California. In addition, Delphi will deliver a site information fact sheet and event letter to residences and businesses within the line-of-sight or ¼ mile of the border of the site to inform the community of the project as required by the DTSC Public Participation office, prior to the initiation of field activities.

5.5 Site-Specific Remedial Action Objectives

Site-specific remedial action objectives are based on the COCs, media of concern, exposure pathways, exposure routes, potential receptors and allowable risk levels. The Site-specific remediation criteria for protection of human health and groundwater are summarized on Table 1 for the reasonably anticipated future commercial/industrial redevelopment scenario. For each medium of concern, the following RAOs have been identified:

The RAOs for shallow soil (less than 10-feet deep) at the site are as follows:

- ■ Prevent human exposure through dermal contact, ingestion and inhalation of vapor or dust to hazardous substances in soil at concentrations above the remediation criteria tabulated on Table 1. COCs include inorganic metals, SVOCs including PCBs and PAHs, and several VOCs.

- ■ Protect groundwater from potential leaching of constituents of concern in shallow soil at concentrations that might exceed the drinking water protection criteria for soil. Constituent concentrations in vadose zone soil that are protective of groundwater are tabulated on Table 1. COCs include VOCs.

The RAO for deep soil (greater than 10-feet deep) at the Site is as follows:

- ■ Protect groundwater from potential leaching of constituents of concern in deep soil at concentrations that exceed the drinking water protection criteria for soil. Constituent concentrations in vadose zone soil that are protective of groundwater are tabulated on Table 1. COCs include VOCs.

The RAO for soil gas (less than 15-feet deep) at the Site is as follows:

- Prevent human exposure through inhalation of constituents that could potentially volatilize to indoor air through soil gas. COCs include VOCs.

The RAO for groundwater is as follows:

- Prevent/minimize potential migration of COCs from soil to groundwater. Through monitoring and natural attenuation (MNA) return groundwater to its beneficial designated uses pursuant to regional board's basin plan..

6. GENERAL RESPONSE ACTIONS

General response actions (GRAs) are media-specific response actions, such as institutional controls, engineering controls, treatment or containment, which satisfy the remedial action objectives. This section generically introduces the GRAs that are potentially applicable to the concrete, shallow soil (less than 10-feet depth), deep soil (10-feet or greater depth), soil gas (above 15 feet) and groundwater. Identification of these generic actions is the initial step to identification of site-specific potentially applicable technologies which will subsequently be developed in the following Section. General Response Actions are summarized below.

6.1 No Action

A no-action alternative has no components of corrective measures or remedial action. Consideration of the no-action alternative can serve as a baseline when evaluating several alternatives.

6.2 Institutional Controls

Institutional controls (ICs) are non-engineered instruments such as administrative and/or legal controls that would minimize the potential for human exposure by limiting land or resource use. ICs would generally be used in conjunction with engineering measures such as waste removal, treatment or containment. USEPA recommends that ICs be "layered" (i.e. use multiple ICs simultaneously) or implemented in a series to provide overlapping assurances of protection. Some examples of ICs would include easements, covenants, well drilling prohibitions, zoning restrictions, and special requirements for building permits.

There are four categories of ICs:

- Governmental Controls
- Proprietary Controls
- Enforcement and Permit Tools
- Informational Devices

6.3 Monitoring

A corrective measure or remedial action, by definition, includes any monitoring reasonably required to insure that such measures protect human health, welfare and the environment. Monitoring alone may not constitute a GRA, but is often a component of an overall corrective measure. In addition to the monitoring component, there is also a monitored natural attenuation component. (MNA) considers natural subsurface processes of biodegradation, sorption, dilution, dispersion, volatilization, and abiotic chemical reactions to demonstrate the naturally occurring reduction of COC concentrations that migrate from a source area. At a site where MNA is an appropriate alternative for corrective measures, COCs released from the source area typically attenuate to acceptable concentrations prior to reaching receptors.

6.4 Containment

Containment technologies may include contact barriers, engineered low-permeability caps, and vertical barrier walls. Groundwater containment technologies also include hydraulic controls such as groundwater collection/treatment/discharge.

6.5 Source Removal, Source Destruction/Treatment and Source Disposal

6.5.1 Source Removal

Source removal may require excavation, dewatering, dredging or demolition to remove hazardous substances or wastes. The complexity and associated risks and hazards generally increase with depth of the excavation, soil instability, and presence of groundwater, developments or receptors, vibrations or other complicating conditions. Excavation is a well-developed process with proven procedures; however, it is labor intensive with little potential for automation. Fugitive dust and air emissions are common concerns during source excavation/removal although they can be monitored and are commonly controlled by using dust suppressing techniques such has water spaying or application of specialty chemicals.

6.5.2 Source Destruction / Treatment

Source destruction or treatment could include methods that physically reduce the mass of source waste. Some of these technologies have in-situ applications; others have ex-situ applications either onsite or offsite after the source has been removed. These technologies include:

- In-situ treatment: enhanced bioremediation, chemical treatment such as stabilization, and physical treatment such as soil vapor extraction

- Ex-situ treatment: biological treatment such as enhanced bioremediation, chemical treatment such as stabilization or chemical extraction, physical treatment such as solidification, and thermal treatment such as incineration or thermal desorption methods

6.5.3 Off-Site Disposal

Off-site disposal would first require source removal followed by loading and transportation off site for treatment/disposal at suitable commercial treatment/storage/disposal facilities (TSDFs) such as landfills, waste treatment facilities or incinerators. The availability of suitable transport containers and the distance to the appropriate facilities would affect costs as might limitations on the number of loads per day that might occur due to certain regulations on emissions, working hours or traffic controls. Transportation through populated areas may affect community acceptability. Off-site disposal has the advantage of more options and flexibility for reliable, efficient, well-established, permitted facilities with capacity for treatment/disposal of a myriad of waste streams.

Disadvantages of off site treatment can include additional exposure, spills during transportation and additional costs for excavation and offsite transportation.

7. IDENTIFICATION AND EVALUATION OF POTENTIAL CORRECTIVE MEASURE TECHNOLOGIES

7.1 Identification and Initial Screening of Potential Corrective Measure Technologies

Potentially applicable technologies for COCs in effected media that may be used to achieve the remedial action objectives are briefly described in the following section. Advantages and disadvantages, limitations and information needs are also discussed. These technologies are Site-specific and will initially be screened based on Site conditions and data from the facility investigations. Technologies will be either retained for further evaluation against the required criteria or screened out and not considered further. Initially, some of these technologies are media-specific and some are constituent specific; however, as the evaluation proceeds, technologies that are retained may be assembled into corrective measure alternatives that address all Site media and constituents of concern. The following potential technologies have been identified and are summarized below.

- Soil excavation and off-site treatment/disposal
- In-situ soil vapor extraction
- In-situ enhanced bioremediation
- Containment capping
- Sub-slab depressurization

It is assumed, based on the Site-specific human health risk-based assessment and reasonable future use scenarios, that future use of the Site will be restricted to industrial/commercial use. This is an important institutional control that must be layered over any of the following treatment technologies or engineering controls because the remediation criteria were calculated only for future industrial/commercial use.

7.1.1 Soil Excavation and Off-Site Treatment/Disposal

This technology would be appropriate to all of the Site COC types including metals, SVOCs and VOCs in unsaturated soils. Different COC types would require different handling and treatment prior to disposal; however, that treatment, if necessary, would be accomplished off Site at a suitably permitted commercial treatment/disposal facility. The approach is well established, reliable, typically acceptable to regulators, and readily implemented in a relatively short time period. The concentrations of COCs that exceed remediation criteria would be removed from the Site, which mitigates future on-site risk for the planned use scenario and protects groundwater.

Limitations could include difficulty controlling dust and emissions during excavation during poor weather conditions, on-site handling and backfilling; volume of soil ultimately generated; depth of excavations; costs due to the distance to treatment/disposal facilities; unacceptability of transportation of hazardous materials through populated areas; necessity to import replacement backfill to restore Site grades; future Site redevelopment plans could be delayed due to extended remediation; and there is potential for future liability for wastes relocated to other facilities should the disposal facility leak, go out of business and turn into a Site where all depositors could be identified as a potentially responsible party (PRP). Future land use of the Site would be restricted only to commercial/industrial use; no other restrictions would be anticipated. Subsequent monitoring, however, might be limited.

This approach addresses all COC types in a timely manner and is particularly well-suited to shallow soil. Therefore, this technology is retained for further evaluation against the corrective measure evaluation criteria.

7.1.2 In-Situ Soil Vapor Extraction

This technology would be appropriate only for VOCs in soil, and to a lesser extent could enhance biodegradation of some SVOCs. Metals and PCBs would not be affected. SVE is the primary presumptive remedy for VOCs in soil. SVE is effective only in the unsaturated vadose zone unless groundwater extraction is also utilized to lower groundwater levels or enhancements such as multi-phase extraction (MPE) to extract groundwater and vapor under high vacuum are utilized. Extracted vapors would require subsequent vapor-phase treatment or recovery, for example by vapor oxidation or carbon adsorption. SVE is readily implemented, generally acceptable to regulators, could be incorporated into site redevelopment plans, and would be expected to achieve site remediation goals within one to three years. Effective SVE would mitigate the vapor risk and enhance protection of groundwater. The effectiveness of SVE is measurable because of the understanding of Site soil types, heterogeneity, degree of saturation and other soil and chemical properties. Operation and maintenance costs are incurred for the several years duration of an SVE system. Subsequent confirmation sampling/analysis would be required at the end point. SVE technology has been effectively used to prevent VOCs from migrating through building foundations and floor slabs into occupied building spaces. Therefore, SVE could accomplish both source removal and mitigation of vapor intrusion. Limitations of in-situ treatment such as SVE include that it typically requires a longer period of time, for treatment and confirmation of remediation through rebound testing than do ex-situ treatment methods.

This technology could accomplish source removal, mitigate vapor intrusion and protect groundwater and is particularly well-suited to deeper soil, soil gas and groundwater protection. Based on the above analysis this technology is retained for further evaluation against the corrective measures evaluation criteria and is the presumptive remedy for VOCs in soil.

7.1.3 Containment Capping

Containment is often the remedy of choice for subsurface contamination at sites where excavation/removal is precluded and is the presumptive remedy for metals in soil that are not targeted for treatment. Capping is the most common form of remediation because it cost effectively manages risks with a short implementation time, is well proven, reliable and implementable in a short time period soil, and engineered containment could prevent or significantly reduce contaminant migration and leachate generation. However, containment capping would be applicable only to metals and SVOCs and may not effectively preclude vapor migration of VOCs. Subsequent long-term monitoring would be required because concentrations of COCs are not reduced by containment. Future land use or subsequent redevelopment could be restricted; for example buried foundations, utilities and structures could damage the cap continuity and effectiveness.

This technology is screened out and will not be evaluated further because it does not address VOCs, it may not be protective of groundwater, and no treatment is accomplished for metals or SVOCs. Continued Site restrictions and monitoring would unnecessarily hinder redevelopment of the Site.

7.1.4 Passive Groundwater Remediation

Monitored natural attenuation (MNA) is a type of passive groundwater remediation which considers natural processes that cause a reduction of COC concentrations that migrate from a source area. MNA relies on monitoring and documenting naturally occurring processes such as: biodegradation, sorption, dilution, dispersion, volatilization, and abiotic chemical reactions. Sometimes enhancements are applied to the processes in order to enhance or expedite reduction of COC concentrations to acceptable concentrations. For MNA to be an appropriate alternative for corrective measures, COC concentrations released from the source area typically attenuate to acceptable concentrations prior to reaching receptors. MNA may combine Site characterization, predictive modeling, risk assessment, and long-term monitoring to determine if natural processes are capable of achieving the desired results.

This technology is particularly well-suited to the site specific COCs and known concentrations in groundwater as well as protection of groundwater. Future land use and Site development would be restricted and long-term monitoring would be required. Based on the above analysis, this technology is retained for further evaluation against the corrective measures evaluation criteria and is the presumptive remedy for groundwater

7.1.5 Active Groundwater Remediation

Two types of active groundwater remediation are groundwater pump and treat (P&T) and chemical injection.

P&T utilizes mechanical pumps to remove groundwater and cycle it through treatment vessels to remove VOCs. In addition, this method can help reduce the potential for further migration of impacts. This application of P&T technology would focus on mitigating existing VOCs in groundwater and not on soil source removal. Metals, SVOCs and PCBs in soil, but not detected in and around water at the Site, would not be affected. Future land use and Site redevelopment would be restricted and long-term monitoring would be required.

Groundwater treatment by chemical injection can enhance biodegradation of treatable COCs or other mechanisms such as oxidation. This method would utilize a series of injection points or wells to disperse compounds. A benefit of this method is that it treats groundwater in-situ. However, this method is highly dependent on site conditions such as heterogeneity, porosity, temperature, water chemistry and others, which would necessitate further investigation and pilot testing. Also in-situ treatment such as bioremediation or chemical oxidation might require longer periods than ex-situ methods to achieve remediation goals and the effectiveness of bioremediation is more difficult to predict than other in-situ treatment methods because it relies more heavily on natural processes. Operation and maintenance costs are incurred for the duration of treatment project and subsequent confirmation sampling/analysis would be required to determine the end point. In addition, chemicals can be costly and if not properly distributed additional treatments may be required, increasing the duration and costs significantly. In addition, metals, SVOCs and PCBs detected in soil, but not in groundwater would not be affected. Future land use and Site redevelopment would be restricted and long-term monitoring would be required.

Both technologies are screened out and will not be evaluated further because they are expensive compared with other alternatives and very little treatment is accomplished. However, should other methods prove to be inadequate, chemical injection may be a viable alternative.

7.2 Corrective Measures Evaluation Criteria and Process

The evaluation criteria and process for analysis of the retained potential corrective measures alternatives is described in this section. RCRA established a two-phased evaluation for selection of corrective measures. Including:

- Threshold Criteria; and
- Balancing Criteria

The first phase screens potential remedies against three "threshold criteria" that are screening goals. Remedies that meet the threshold criteria are subsequently evaluated using seven "balancing criteria" to identify the remedy that provides the best relative combination of attributes. The threshold criteria and balancing criteria are defined in the following sections. The California DTSC, in the Scope of Work for a Corrective Measures Proposal (Attachment 5 to the Consent Agreement), refers to these evaluation criteria as the remedy selection decision factors. Obviously, only remedies that meet the three threshold criteria can be selected.

In conducting this corrective measures evaluation, Delphi determined that a focused evaluation is appropriate. Detailed evaluation of multiple alternatives, as may have been presented in more traditional corrective measures studies is not warranted for this Site. This focused approach is supported by USEPA's advance notice of proposed rulemaking (ANPR) "Corrective Action for Releases from Solid Waste Management Units at Hazardous Waste Management Facilities" (Federal Register, Vol. 61, No. 85, p. 19447) dated May 1, 1996. The ANPR stated: "EPA continues to emphasize that it does not want studies to be undertaken simply for the purpose of completing a perceived step in a perceived process. …at many sites, the preferred remedial approach will be apparent early in the cleanup process and the analysis of remedial alternatives should be highly focused." In addition, the 1990 RCRA Corrective Action Plan discussed situations where the corrective measures study could be combined with the site characterization, such as facilities where removal remedies were proposed by the owner/operator, facilities with straightforward remedial solutions or where presumptive remedies can be applied.

7.2.1 Threshold Criteria

Initially USEPA identified four threshold criteria for identifying remedies (USEPA "RCRA Corrective Action Plan", May 1994); subsequently, USEPA recognized that the fourth criteria, "complying with applicable standards for waste management", is already required by law (USEPA "Handbook of Groundwater Protection and Cleanup Policies for RCRA Corrective Action" April 2004). The three threshold criteria recommended by USEPA as screening tools for potential remedies are listed below:

Protect human health and the environment. Corrective measure remedies must be protective of human health and the environment. This goal is considered the primary and overarching criterion for remedy selection. Remedies may include those measures that are protective, but are not directly related to other threshold criteria (i.e., media cleanup and source control). Examples of such protective remedies would include providing alternative drinking water supplies (to eliminate potable water exposure) and other controls (to eliminate direct contact or vapor exposure).

Attain media cleanup objectives. Corrective measure remedies should strive to attain media cleanup objectives, which may incorporate specific media cleanup levels and points of compliance. Attaining media cleanup objectives does not necessarily entail removal or treatment of all contaminated media above specific constituent concentrations. Corrective measures may attain media cleanup objectives through various combinations of removal, treatment, engineering controls and institutional controls. Media cleanup objectives may be derived from existing regulations or from site-specific risk assessments. Media cleanup objectives should reflect the potential risks of the site and media by considering the toxicity of the constituents of concern, exposure pathways, and fate and transport characteristics. The media cleanup objectives often play a large role in determining the extent of a remedy and technical approaches to a remedy.

Control the source(s) of releases to reduce or eliminate, to the extent practicable, further release of hazardous waste (including hazardous constituents) that may pose threats to human health and the environment. A critical objective of corrective action is to stop further environmental degradation by controlling or eliminating further releases that may pose a threat to human health or the environment. An effective source control program ensures the long-term effectiveness and protectiveness of the corrective measure. Protective source control remedies include capping/containment, groundwater migration control, and partial waste removal. Technical limitations may be encountered in achieving effective source control. In case of technical limitations in achieving source control, source controls may need to be combined with other measures, such as plume management or exposure controls, to ensure an effective and protective remedy.

7.2.2 Balancing Criteria

Seven balancing criteria can also be considered when evaluating a corrective measure that meets the three threshold criteria. The following balancing criteria represent a combination of technical measures and management controls for addressing environmental solutions:

Long-term reliability and effectiveness. Demonstrated and expected reliability of a corrective measure is a way of assessing the risk and effect of failure. Evaluation of alternative remedies may consider whether the technology (or combination of technologies) has been used effectively under similar site conditions. This is particularly important when considering in-situ technologies. The evaluation also considers whether failure of any one component would have an immediate impact on receptors, and whether the alternative would have flexibility to adapt to uncontrollable changes (e.g., heavy rain storms, earthquake, etc.) at the site. USEPA recognizes that most corrective measure technologies deteriorate over time, with the exception of destruction or removal technologies. Deterioration may be managed through proper operation and maintenance; however, some technology systems may require replacement. Therefore, each corrective measure alternative should be evaluated in terms of projected useful life of the overall alternative and of its component technologies. Useful life is defined as the length of time during which the level of effectiveness can be maintained. Technologies that require frequent or complex operation and maintenance activities are regarded as less reliable than technologies that require little or straightforward operation and maintenance. The evaluation of long-term effectiveness includes possible threats to the safety of nearby communities, workers and environmentally sensitive areas (e.g., oceans, wetlands) during operation of the corrective measure(s).

Reduction in the toxicity, mobility or volume of wastes. In simple settings where contaminants are readily accessible, remedies capable of eliminating or substantially reducing the potential for wastes to cause future releases or other risks may be deployed. However, at complex sites, particularly with recalcitrant contaminants, achieving substantial reductions in toxicity, mobility or volume may not be practicable. Reduction in toxicity, mobility and/or volume refers to changes in one or more characteristics of the contaminated media by the use of corrective measures that decrease inherent threats associated with the media. Corrective measures that have a high degree of permanence and reduce toxicity, mobility and volume are desirable.

Short-term effectiveness and short-term risks. Corrective measures alternatives may offer varying levels of human health and environment protection during the construction and implementation phase until corrective action objectives have been met. Short-term effectiveness may be particularly relevant and beneficial when corrective measures will be conducted in populated areas, or where special protective measures are necessary to control current risks. The risks posed to workers and the community during remedy implementation can be evaluated either qualitatively or quantitatively, depending on conditions at the site. A quantitative evaluation of short-term risks is most likely to be useful when the types, levels and or exposure of hazardous substances are expected to change significantly as a result of remediation. Evaluation of short-term effectiveness includes possible threats to the safety of nearby communities, workers, and environmentally sensitive areas (e.g., oceans, wetlands) during construction. Factors to consider are fire; explosion; exposure to hazardous substances; and potential threats associated with excavation, treatment, transportation and re-disposal or containment of waste material.

Implementability. The ease of remedy implementation is often a determining factor in evaluating corrective measures alternatives. Implementability is assessed by considering the following factors: administrative activities such as permits, rights of way, off-site approvals and the time consumed by these activities; constructability, time for implementation, and time for beneficial results; availability of adequate off-site treatment, storage capacity, disposal services, necessary technical services and materials; and availability of prospective technologies for each corrective measure alternative.

Cost. Relative cost of a remedy is an appropriate consideration where several different technical alternatives for remediation will offer equivalent protection but may vary widely in cost. In those situations where only one remedy is proposed, the issue of cost would not need to be considered. Cost estimates could include costs for engineering, site preparation, construction, materials, labor, sampling/analysis, waste management/disposal, permitting, health and safety measures, training, operation and maintenance, etc. For cost comparisons between alternatives to be accurate, USEPA recommends they should include capital costs plus operation and maintenance costs for the anticipated life of the remedy, and the net present value of these costs.

Community acceptance. Comparisons of corrective measures alternatives should consider the degree to which remedies will be acceptable to the surrounding community. These considerations could come from public comments to the proposed plan.

State Acceptance. Corrective measures alternatives comparisons should consider the degree to which remedies will be acceptable to the State.

It should be noted that the last two balancing criteria (community and State acceptance) were not explicitly stated in the May 1, 1996 ANPR; however, USEPA's subsequent "Handbook of Groundwater Protection and Cleanup Policies for RCRA Corrective Action" recommended including these criteria as important considerations.

7.2.3 USEPA Remedy Expectations

USEPA has learned (ANPR, 1996) that certain combinations of site-specific circumstances are often addressed by similar corrective measure approaches. Based on their experience, USEPA has also developed certain expectations for remedies, including the following:

- Use treatment to address principal threat source wastes that are highly toxic, highly mobile, or cannot be reliably contained.
- Use engineering controls for wastes that can be reliably contained, pose relatively low long-term threats, or for which treatment is impracticable.
- Use a combination of methods (e.g., treatment, engineering controls and institutional controls), as appropriate, to achieve protection.
- Use institutional controls primarily to supplement engineering controls to prevent or limit exposure; institutional controls will not often be the sole corrective measure.
- Consider using innovative technology.
- When restoration of groundwater is not practicable, prevent or minimize further plume migration, prevent exposure to groundwater, and evaluate further risk reduction. Control or eliminate sources of groundwater contamination.

- Remediate contaminated soils as necessary to prevent or limit direct contact exposure, and prevent the transfer of unacceptable concentrations from soils to other media.

7.3 Evaluation of Potential Alternative Technologies Using Threshold and Balancing Criteria

Four remedial alternatives were selected to be evaluated using Threshold and Balancing criteria. Each of the potential corrective measure technologies are briefly described in the sections below. Table 2 presents a comparative analysis of the remedial alternatives using the three threshold criteria and seven balancing criteria.

7.3.1 Alternative 1: No Further Action

In the No Action alternative, no cleanup occurs at the Site, the planned redevelopment activities proceed, and the presence of contaminated concrete, soil, soil gas, and groundwater is ignored. The analysis of this remedial alternative compared with the other three alternatives is presented in Table 2.

7.3.2 Alternative 2: Land Use Covenant and Engineering Controls

In the Land Use Covenant and Engineering Controls alternative, it uses institutional controls as mentioned in Section 6.2 to prohibit unrestricted development and activities and also uses containment methods such as caps, vertical barriers, slurry walls, and surface controls to reduce contact or potential exposures with impacted materials. The analysis of this remedial alternative compared with the other three alternatives is presented in Table 2.

7.3.3 Alternative 3: Proposed Remedy

The Proposed Remedy alternative combines a land-use covenant restricting the Site to industrial/commercial use, soil excavation and off-site disposal of metals, PCBs, VOCs, and/or SVOCs-impacted soil and concrete, in-situ soil vapor extraction for VOCs in soil and soil gas, and groundwater monitored natural attenuation (MNA) for VOCs in groundwater. If MNA indicates that process are not sufficient, then MNA data can be used to evaluate and select other technologies to supplement and cost effectively enhance MNA, as needed, while providing data that provide alerts for protection of human health and the environment. Alternatively an active system could be designed and installed if necessary. Delphi would obtain proper permits and approval from DTSC prior to going active on groundwater remediation. The analysis of this remedial alternative compared with the other three alternatives is presented in Table 2.

7.3.4 Alternative 4: Complete Soil Removal

In the Complete Soil Removal alternative all soil with metals, PCBs, SVOCs, and VOC concentrations above human health protective and groundwater protection criteria would be excavated with onsite or offsite treatment and disposal. The analysis of this remedial alternative compared with the other three alternatives is presented in Table 2.

7.4 Satisfaction of Remedy Selection Criteria

The selected remedial alternative will meet the three threshold criteria that any corrective measure technology must meet in order to be selected, including:

- Protecting human health and the environment,
- Attaining remediation criteria; and
- Controlling the source to eliminate further releases.

The selected remedial alterative meets the seven balancing criteria referred to by DTSC as remedy selection decision factors, as follows:

- Long-term reliability and effectiveness;
- Reduction in the toxicity, mobility or volume of wastes;
- Short-term effectiveness and short-term risks;
- Implementability;
- Cost;
- Community acceptance; and
- State acceptance.

Implementation of the selected Alternative 3 should achieve all of the RAOs necessary for protection of human health and the environment at this Site.

Excavation and off-site disposal will meet the RAOs for shallow soil by addressing metals, SVOCs including PCBs, and VOCs. This prevents human exposure through the necessary routes. Excavation and off-site disposal will also protect groundwater from potential leaching of soil constituents.

Soil vapor extraction will also meet the RAO for groundwater and soil gas by removing VOCs that might leach to groundwater or to indoor air.

Land use covenant will prohibit unrestricted development and control future development and activities on the Site.

Monitored Natural Attenuation meets the RAOs for groundwater by regularly monitoring natural degradation processes to evaluate if leaching of soil constituents is continuing and if natural process occurring are sufficient to reach he RAOs for groundwater. If MNA indicates that process are not sufficient, then MNA data can be used to evaluate and select other technologies to cost effectively enhance MNA and design and install an active system, as needed. MNA also provides alerts for protection of human health and the environment.

8. CORRECTIVE MEASURES PLAN

The proposed Corrective Measure Plan will be implemented under the oversight of the DTSC-Tiered Permitting Branch. The clean up will be based on the findings of the CCI and FI as well as any new data collected during the remedial activities. The plan will include various phases as outlined below to address ARARs and RAOs for clean up of the Site.

8.1 Implementation Planning

The first part of the implementation of the proposed corrective measures will involve team meeting between DTSC, Delphi, Haley and Aldrich and contractor personnel to define lines of authority and communication. The meeting will address expectations, health and safety, transportation issues, public safety concerns, proposed schedules, coordination with oversight officials and stakeholders and working hours.

8.1.1 Public Participation

Public participation is also an integral part of the implementation planning. As discuss previously this CMP is available in a public library and at the DTSC for review by the public. In addition, DTSC require that newspaper adds be published and notices be mailed to all addresses within ¼ mile of the Site to notify the public that the clean proposed in this CMP will be occurring and affording the public the opportunity to review and comment on this CMP in advance of the clean up action.

8.1.2 Site Preparation

Site preparation activities will include obtaining required permits, delineation of excavation, set up of security measures and staging excavation process, and conducting a site utility survey.

Prior to commencement of field activities, the location of the excavation will be clearly marked and Underground Service Alert (USA) will be notified at least 48 hours prior to performing subsurface activities to mark the location of any nearby utility lines. USA will contact utility owners of record within the Site vicinity and notify them of our intention to conduct subsurface investigations in proximity to buried utility lines. The utility owners of record, or their designated agents, will be expected to clearly mark the position of their utilities on the ground surface throughout the area designated for investigation.

Access to power and a water source will be secured and equipment necessary for dust control will be brought onsite. In addition appropriate signage will be posted and privacy screening will be placed on the chainlink fence around the perimeter of the site.

8.1.3 Storm Water Pollution Prevention

Water pollution control measures may include, but are not limited to, temporary berming of nearby storm drains, or placement of filtration fabric and hay bales in the flow path between the loading area and the storm drain and use of plastic sheeting.

Accumulations of sediment shall be removed with a shovel or loader, as necessary, and will be placed in a stockpile testing or disposal.

8.1.4 Site Security

The Site access will be secured by means of a chain link fence around the site that is covered with privacy screen. Access to the site will be only through two access points along the east side of the site. These gates will remain locked during non-working hours and will remain closed at all times unless they are guarded at times such as during trucking operations onto or off of the Site. If gates are not in use they will be secured.

Signage shall be visibly posted on the fencing that reads to the effect of "Warning, Lead and Hazardous Materials Work Area, Poison, No Smoking or Eating – Unauthorized Personnel Keep Out" and/or "Danger Hazardous Waste Area – Unauthorized Personnel Keep Out", as per 8 CCR §66264.14.

Exclusion zones will include the excavation area, stockpile area, loading area, and the truck route through the Site and will be delineated to prevent unauthorized entry. Caution tape or temporary orange plastic mesh fencing attached to the outer Site fencing will be used for exclusion zone delineation. Unauthorized personnel will not be allowed in the exclusion zone.

8.2 Site Controls

Control of the Site is critical for effect and safe implementation of corrective measures. In addition, site controls are necessary for precisely locating and mapping site features, removal limits, sample locations, temporary stockpiles and imported fill materials, and ensuring safety of workers and the surrounding community.

8.2.1 Site Access

Site access and security is the responsibility of the excavation contractor. The following information is provided as a means of convenient reference and to meet with the requirements of the DTSC; however, it may not be entirely complete, or inclusive.

Personnel access to the Site will be controlled by a sign in sheet and all workers and visitors will be required to sign in and out of the Site on a daily sign in sheet. Workers will be required to have 40-hour CFR 1910.120, 8 CCR 5192(e), training and receive instruction on the Site requirements and conditions presented in the site specific HASP prior to entering the Site.

Traffic routes onsite will also be delineated by stakes and tape as necessary, posted maps, and designated personnel. Signs will be posted at the entry points instructing Site visitors to sign in and be escorted by designated Site personnel.

During ingress and egress of equipment, the gates will be monitored by personnel in charge of site security to prevent unauthorized entry. During non-working hours the gates will be locked and equipment and materials will be stored behind the locked gates.

8.2.2 Health and Safety

Prior to performing any work health and safety meetings will be held with all workers. All workers on the Site will be required to have 40-hour CFR 1910.120, 8 CCR 5192(e), training and receive instruction on the Site requirements and conditions presented in the site specific HASP prior to entering the Site. Visitors without 40-hour training will not be allowed to enter work areas onsite. Workers will be required to be knowledgeable about and comply with Site specific health and safety plans (HASPS). Haley and Aldrich personnel will comply with all requirements of the HASP included herein in Appendix A.

Excavation pits shall be marked and surrounded with caution tape and stakes, and if necessary additional plastic "snow fencing" to provide temporary safety measures and delineation around the excavations.

8.2.3 Dust Monitoring

The Dust Monitoring Plan presented in this report describes the mitigation procedures for air emissions that may result from the soil and concrete excavation and management activities performed during the implementation of the site-specific CMP at the Site. During the implementation of the CMP, steps will be taken that will prevent and reduce fugitive dust emissions during soil handling operations at the site. Particulate air monitoring will be conducted for worker safety and air monitoring will also be conducted along the fence line to assess if any particulates are leaving the site. This plan is included as Appendix B.

8.2.4 Mapping and Surveying Control System

Locations of site features will be controlled using a NAD 83 coordinate system that has been established by a California licensed land surveyor. Site coordinates will use the NAD 83 northing and easting coordinates and elevation controls above mean sea level. Control points with X, Y and Z coordinates will be established across the Site. In addition, site workers may utilize a GPS system for locating and mapping site features. Gridlines for the coordinate system are shown on Figure 3.

A grid system will be established along property boundaries that stakes or marks intervals every 25 feet and that are tied in to the NAD 83 coordinate system. Coordinates away from these points can be made by measuring with a tape measure and using a laser level to establish elevation from established bench mark or other control points set on the site.

8.2.5 Identification of Removal Areas

Estimated limits of concrete and soil removal areas as shown on Figures 8 through 27 will be established by marking the areas with stakes and paint prior to initiation of removals. Completed removals will be mapped by filed measurement from control points and/or a licensed land surveyor and the coordinates of the completed removal areas tied to the NAD 83 coordinate system. All areas removed will be mapped either by measurement from control points, a hand held GPS and /or a licensed land surveyor. Estimated limits of removals and the various waste types are shown for the various AOIs and other impacted areas on Figures 13 through 27.

Sufficiency of removals will be verified by comparing confirmation sampling results with the site-specific commercial/industrial remediation criteria presented in Table 1.

8.3 Demolition and Soil Excavation

8.3.1 Removal Methodology

Removals will be performed using conventional earth moving equipment such as loaders, excavators, earth movers and/or back hoes as appropriate for site conditions. Materials to be removed will be excavated and placed in segregated stockpiles onsite pending profile for disposal. Based on the analytical data the impacted soils will generally be removed in layers approximately 0.5 to 2-feet thick, depending on the concentrations detected in soils in the various areas to be remediated. This segregation is necessary to reduce mixing of lesser impacted materials with highly impacted materials that may have different disposal and handle requirements. Oversight and direction of segregation of materials will be performed by field geologists and engineers familiar with Site conditions. The field managers will have the authority to increase or decrease removal areas based on their observations and the findings of any new analytical results that may be collected during removal activities to determine the sufficiency of removals.

8.3.2 Concrete Removals

Existing concrete slabs will be marked out to delineate the known impacted areas that will require segregation and management separate from apparent non-impacted concrete. During removals by the demolition contractor oversight will be performed by environmental technicians, geologists and /or engineers who will observe the concrete for visible evidence of potential impacts. Should any potential evidence of impacts be observed the observers will inform the equipment operators that that area should be segregated for testing. Should any discoloration be identified in the concrete the concrete will be segregated in a separate stockpile and analyzed for COCs. Should the concrete be found to be impacted with COC above the remediation criteria, the soil area beneath the slab will be flagged off for potential additional testing. Estimated limits of known concrete impacts are shown on Figures 7, 8 and 9.

8.3.3 Soil Excavation - Shallow Soil (Less than 10-foot depth)

Soils present at depths of less the 10 feet and containing concentrations of metals, SVOCS, and PCBs greater than the Site-specific remediation criteria listed in Table 1 will be excavated for disposal off site. The estimated area of soils requiring removal of impacted soil are summarized on Figure 11. Most excavations will be shallow and less than 5 feet deep. Only a few locations have impacts deeper than 5 feet that will be excavated. Details regarding the estimated removals depths and waste types for segregation for individual impacts are shown on Figures 13 through 27, Figure 12 is the index map for the removal area maps.

VOCs in soil and soil gas and that require remediation for protection of human health and /or groundwater protection will be addressed using soil vapor extraction technology as discussed herein unless the findings of the vapor extraction pilot test proposed herein indicate soil excavation is necessary for the upper 10-foot zone. Sample location exceeding human health and/or groundwater protection criteria are shown on Figures 28 and 29. In that event VOC impacted soil exceeding the Site-specific remediation criteria as shown by isoconcentration contours on Figures 30 through 31 will be excavated. Verification that removals have been adequately performed for each excavation area will be accomplished by collection and laboratory analysis of bottom and sidewall sample as for COC and comparison of any residual concentrations of COC with the Site-specific remediation criteria. Limits of excavations will be supported by confirmation samples and previous sample locations.

8.3.4 Confirmation/Verification Sampling

To confirm removal of soils with concentrations of COC greater than the Site-specific clean up criteria all excavations will have confirmation sampling performed. Confirmation testing will differ from lead impacted only areas to area with other COC such as VOCs, arsenic, antimony, SVOCs and PCBs. The sampling is outlined below and presented in the Confirmation Sampling and Waste Management Plan included as Appendix C.

8.3.4.1 Lead Removal Area Confirmation Sampling

For removals with lead only confirmation sampling will be performed using and XRF instrument combined with 20% of the total number of samples being analyzed by EPA method 6010B. Confirmation samples will be obtained at rate of approximately one for every 400 square feet (20 feet x 20 feet) of removal bottom and one for approximately every 200 square feet (5 feet by 40 feet) of side excavation side wall. If field screening indicates that the clean criteria are exceeded addition removals will be performed on those areas and additional confirmation sampling performed. This process will be repeated as necessary to achieve the clean up criteria. Duplicate analyses will be performed on approximately 10% of the XRF and laboratory samples.

8.3.4.2 Confirmation Sampling of Areas Other Than Lead Only

For removals with COC other that lead only confirmation sampling will be performed using discrete soil samples and laboratory analysis. For metals such as arsenic and antimony analysis by EPA Method 6010B will be performed the total number of samples being analyzed by EPA method 6010B. For VOCs, PCBs, metals and SVOCs EPA Methods 8260B, 8310, 6010B and 8270 will be used, respectively. Confirmation samples will be obtained at rate of approximately one for every 400 square feet (20 feet x 20 feet) of removal bottom and one for approximately every 200 square feet (5 feet by 40 feet) of side excavation side wall. If field screening indicates that the clean criteria are exceeded addition removals will be performed on those areas and additional confirmation sampling performed. This process will be repeated as necessary to achieve the clean up criteria. Duplicate analyses will be performed on approximately 10% of the XRF and laboratory samples.

8.3.5 Quality Assurance Project Plan (QAPP)

This QAPP contains general and specific details regarding field sampling, laboratory, and analytical procedures that apply to activities described in the CMP. It provides field and laboratory personnel with instructions regarding activities to be performed before, during, and after field investigations. These instructions will insure data collected for use in project decisions will be of the type and quality required to meet the data quality objectives (DQOs) for the project. The QAPP is included as Appendix D.

8.3.6 Control Measures

Control measures will be implemented to minimize the potential for dust generation and fugitive dust and accidental entry into impacted zones and excavation by unauthorized personnel.

8.3.6.1 Dust Control

Several dust and vapor control measures may be implemented during excavation. The excavation will be conducted in a manner to reduce the potential to generate dust and vapor. Dust suppression during excavation will be performed by lightly spraying or misting the work areas with water. If vapor or odors are generated during the excavation process, suppressant foam will be used to control these emissions. Water mist and/or suppressant foam may also be used on soil placed in dump trucks prior to transporting the material to an offsite facility.

Equipment and vehicles used to load and move the impacted soil will be operated at speeds that minimize generating airborne particulates. During soil transfer operations, the distance that soil is dropped onto stockpiles or into trucks will be minimized and soil transfer will take place on the leeward side of trucks and/or stockpiles to reduce the potential to generate particulates. If possible, soil stockpiles will be placed in areas that are shielded from prevailing winds. Soil stockpiles will also be shaped to minimize generating particulates. During transport of impacted soil offsite, trucks will be covered with a tarp and other dust/vapor control measures will be employed to reduce the potential to generate odors and particulates.

Impacted soil may be temporarily staged and handled onsite before it is removed for offsite treatment or disposal. Soil in the temporary stockpiles will be placed on and covered with polyethylene or equivalent sheeting to reduce the potential to generate dust and/or vapor and to protect the surrounding environment and comply with South Coast Air Quality Management District (SCAQMD) requirements. Material used to cover the stockpiled soil will be secured by placing sandbags around the perimeter of the stockpiles.

To limit the potential for wind blown dust to be carried offsite the existing security fence will be covered with privacy screening.

The excavated areas will be secured using temporary fencing to reduce the potential for unauthorized personnel to enter the excavation area. If necessary, the bottom of the excavation will be covered with polyethylene sheeting to collect rainwater and reduce the potential to generate dust and/or vapors from the excavation, if any. Collected rainwater will be pumped from the hole and transferred to an aboveground storage tank. Disposition of the water will be determined following analysis of the collected water to detect potential impact from COCs. Impacted water will be disposed of in accordance with federal, state and local regulations.

8.3.7 Decontamination

8.3.7.1 Equipment

Equipment demobilization will include cleaning and decontaminating equipment used to excavate and load impacted soil before it is removed from the Site. Prior to leaving the excavation any large pieces of dirt will be removed by sweeping the equipment down and or scraping dirt off as necessary.

Plastic sheeting will be installed as part of the decontamination pad to contain free-draining materials. The stockpiled soils will be loaded into the transport trucks using a loader or excavator. The truck will then be moved forward to the decontamination area. Wheels, fenders, top rail and ties will be dry brushed to remove soil. Soil removed in the decontamination area will be collected using brooms and shovels and will be returned to the soil stockpile. The truck loading area and truck decontamination area will be cleaned at the end of the work and sampling performed to confirm removal of soil containing chemicals of concern above remedial goals.

The trucks will be equipped with tarps to reduce the release of dust once the trucks are off-site. In the event that a tarp rips or comes loose, the truck will be stopped and the tarp repaired or replaced. If the tarp is not repairable, the truck will not be moved until a new tarp can be obtained and placed on the truck.

8.3.7.2 Worker

Haley & Aldrich is not responsible for Site worker decontamination (other than its own personnel) at the Site, the following recommendations are made to the excavation contractor. Haley & Aldrich personnel will discuss with a representative of the excavation contractor expectations and responsibilities of Site worker decontamination before and during the removal project. The following information is provided as a means of convenient reference and to meet with the requirements of the DTSC; however, it may not be entirely complete, or inclusive.

Personnel shall not be allowed to leave the site without first going through decontamination procedures, except in the event of a Site emergency.

The decontamination procedures are to be followed if protective gear is severely contaminated or damaged, before eating lunch, before using the restroom and before leaving the Site. The procedure for decontamination is as follows:

- Remove outer gloves and protective suit
- Wash and rinse out gloves and boots in portable buckets
- Remove respirator, if one is being used, and place used respirator cartridges in a plastic bag, thoroughly clean the respirator and store properly.
- Remove work boots and place in an individual plastic bag for later use, and put on street shoes.
- Immediately wash hands and face using clean water and soap.
- Shower as soon as possible.

8.4 Soil and Concrete Management

8.4.1 Stockpile Management

Stockpiles will be generated for each waste type as identified on the removal figures included as Figures 13 through 27. Each waste type removed will be placed in a pile either separately or with similarly classified materials from other excavations. After a stockpile is completed, or as it is added to, samples for laboratory analysis will be collected to obtain data sufficient to profile the pile for disposal. Locations of stock piles will be mapped and each pile will be identified with a specific number. The estimated volume and the AOI number from which soil or concrete originated will also be tracked for each stockpile. Details of the stockpile sampling are included in the Confirmation Sampling and Water Management plan is included in Appendix C.

8.4.2 Waste Transportation

Stockpiles of waste that have been adequately profiled and approved for transportation and disposal offsite will be load on to end dump trucks that are California licensed to transport hazardous waste. Trucks will be loaded on site in a staging area. Filled trucks will be covered with tarps, properly manifested in accordance with applicable State and Federal requirements using Uniform Hazardous Waste Manifests. Each truck load will be recorded on a log sheet that will list the transporters name, trailer license number, waste manifest number and the stockpile from which the soil is loaded.

Waste will be transported offsite in accordance with the Transportation Plan included in Appendix E.

8.4.3 Waste Disposition

Waste will be disposed of at a facility that is appropriately permitted to accept the type of waste being disposed of. The disposal facility will sign the waste manifest for each load to acknowledge receipt of the waste. Copies of the waste manifest showing receipt and load weights for each truck load removed from the site will be included in a final report documenting removal and disposal of impacted materials.

8.5 Remediation of VOCs in Soil by Vapor Extraction

To remove VOCs in soil and soil gas media a vapor extraction system will be installed and operated. The system will be installed in two parts. The first part will include equipment installation for pilot test and the second part will be installation of the full scale system, or addition of necessary components to the pilot study system. The pilot study and full-scale VES programs are outlined below.

8.5.1 Vapor Extraction Pilot Test

The VES pilot study will include installing wells for evaluation and treatment of both shallow soil (upper 10 feet) and deep soil (greater that 10 feet deep) and full-scale system design. VOCs in soil above groundwater and human health protective criteria are shown on Figure 28, 30 and 31. Soil gas VOCs (1,1-DCA and 1,1-DCE, primary compounds of concern) concentrations isocontours compared to human health protective criteria are shown on Figure 32. The shallow soil will be evaluated and treated with a horizontal well and three observation wells to evaluate the radius of influence from the well under given operating parameters. The deep soil will be evaluated and treated with four vertical wells. One well initially be used for extraction and the other three wells used to evaluate the radius of influence from the well under given operating parameters. The VES Pilot Study Work Plan is included herein as Appendix H and summarized below.

8.5.1.1 Scope of Pilot Test

It is anticipated that this SVE pilot test will operate for approximately 5 days to collect data for full-scale system design. During this time, SVE operational parameters will be collected and evaluated. These will include soil vapor concentrations, mass removal rates, flow and vacuum radius of influence (ROI), and treatment system efficiency. During the pilot test operation, the data will be reviewed to evaluate if continued SVE operation is advantageous to the Site, in which case, the extraction and observation wells can be incorporated into a full-scale SVE application. After initial data is collected extraction will continue from all four wells until the full scale system is designed and installed.

8.5.1.2 Pilot Study SVE System Design

One single-completion extraction well, two single-completion observation wells, and one dual-completion observation well will be installed in the vicinity of Warehouse No. 3 and operated for the SVE pilot test as shown in the Pilot Study Work Plan included in Appendix H.

The pilot test system will consist of the following elements:

- One shallow horizontal soil vapor extraction well and three observation wells.
- One deep vertical extraction well and three observation wells.
- One transportable 500-standard cubic foot per minute (scfm) vacuum blower skid equipped with a vapor liquid separator (knockout tank).
- Two 1,000-pound vapor phase granular activated carbon (GAC) adsorption vessels connected in series.
- A manifolded piping system.
- A fenced enclosure.
- 55-gallon drums, as needed.

The actual specifications for blower size, carbon units, and storage containers will be chosen based on selection and availability of qualified equipment vendors.

It is expected that the primary and secondary carbon beds will not require change-out during this first phase of the pilot test.

8.5.1.3 Pilot Test Equipment Compound

The trailer-mounted SVE unit will be placed along the west side of the site, north of the former Warehouse No. 3. The location of the VES compound is shown in the Pilot Study work plan in Appendix H. Although the entire Site is fenced and an additional security compound will be constructed to house the VES equipment.

8.5.1.4 Electrical Service

Electrical service will be set up by a temporary power contractor. Power to the Site will be extended from a transformer at 1240 Knollwood Circle. Electrical power connection will be made to the treatment equipment in accordance with local building codes pertaining to temporary service and manufacturer specifications.

8.5.1.5 SVE Well Installation

The wells will be installed using hollow-stem auger drilling methods. Wells will be constructed of 2-inch diameter, schedule 40 PVC well casing, 0.020-inch factory slotted well screen. Each well casing will consist of nominal 2-inch diameter, schedule 40 PVC well casing, 0.020-inch factory slotted well screen, and No. 3 Monterey sand filter pack, concrete, and six inches of soil overlying the concrete at ground surface. Following construction, the SVE wells will be surveyed or mapped.

The SVE extraction well (VEW-1) will be constructed in the unsaturated zone to a depth of approximately 25 feet below ground surface (bgs). Individual SVE well screened intervals will be set within zones of high concentrations of VOCs and based on field data obtained using a photoionization detector (PID) and existing data. The SVE extraction well wellhead will include a sample collection port, a vacuum gauge, a flow measurement port, and an isolation valve.

The SVE observation wells (VEW-2, VEW-3, and VEW-4A/B) will be located approximately 25, 40, and 50 feet from VEW-1, respectively. The observation wells will be completed to a depth of approximately 25 feet bgs and will be screened above the water table from 5 to 25 feet bgs. Observation wells VEW-4A and VEW-4B will contain two separate extraction casings screened at different intervals: 5 to 10 feet bgs and 20 to 25 feet bgs.

Soil samples will be collected from the SVE well borings at 5-foot depth intervals, starting at approximately 5 feet bgs to the total depth of the boring. The soil samples will be analyzed for VOCs by Environmental Protection Agency (EPA) Method 8260B.

8.5.1.6 Data Collection

Influent and effluent data will be monitored and collected daily during the pilot study. In addition, vacuums in the observation wells will be measured regularly during the study to evaluate the radius of influence in the shallow and deep soil zones.

8.5.1.7 Reporting

Upon completion of the pilot test a report of findings will be submitted to DTSC within 30-days. Upon completion a final design report will also be submitted to DTSC for review and approval.

8.5.2 Vapor Extraction Full Scale System

Subsequent to collection and evaluation of the proposed VES pilot test data, a full scale system will be designed and installed as part of this CMP. VES will be modified and/or expanded as needed to achieve remedial goals. Monitoring of influent and effluent concentration will continue as required by DTSC and AQMD requirements.

8.5.2.1 AQMD Permit

The site-specific operating permit will be applied for and obtained from AQMD for the specific equipment used on site.

8.5.2.2 Additional Well and Piping Installation

Additional extraction wells will be installed as necessary in the shallow and deep zones to effectively remediate the VOCs. Wells will be installed in general accordance with the specifications included in the Pilot Study Work Plan and Final Design Plan.

8.5.2.3 Carbon Vessels

The carbon vessels from the pilot study will be utilized if appropriately sized for the full-scale system. If alternate vessels are necessary they will be obtained and installed.

8.5.3 System Operation & Maintenance

8.5.3.1 Regular Permit & Performance System Readings

The VES full scale system will be operated under a site specific permit issued by the AQMD. The system will be monitored weekly with a photoionization detector to monitor influent and effluent concentrations. Summa canisters for laboratory analysis will be collected monthly. Field and lab data will be used to monitor removal progress and estimate mass removed and efficiency of carbon.

8.5.3.2 Reporting

O&M reports to monitor the system and progress of the clean up will be submitted to DTSC on monthly basis.

8.6 Groundwater Monitored Natural Attenuation Program

The following sections outline the proposed monitored natural attenuation program for groundwater.

8.6.1 Monitoring Objectives

The objective of the monitored attenuation program is to measure and evaluate physical parameter to evaluate if natural degradation processes are occurring and if they will be sufficient to meet the RAO of reducing concentrations of VOCs in groundwater to concentrations les than the drinking water MCLs.

8.6.2 Additional Investigation Work

To supplement the existing on and offsite groundwater monitoring wells at least two additional monitoring wells will be installed. The two wells will be installed along the Knollwood Circle, south of existing well MW-10 and MW-11 (Figure 33). The wells will be completed as dual-zone wells with two 2-inch diameter PVC casings, one set at approximately 30-35 feet bgs and the deeper casing set at approximately 50-60 feet bgs. The wells will be installed under permits from the City of Anaheim and in accordance with State well construction standards.

If deemed appropriate additional direct-push grab sampling may be performed prior to constructing the wells to further evaluate groundwater quality and select locations for the wells.

8.6.3 Proposed Groundwater Monitoring Program

The groundwater monitoring program will include obtaining depth to water measurements in the existing 12 wells and any new wells that are installed. This data will be used to calculate groundwater elevation contours and estimate gradient and direction of flow.

Wells will be purge in accordance with low-flow sampling methodology and tested for VOCs by EPA Method 8260B. Details of the proposed sampling procedures are included in the Groundwater Monitored Natural Attenuation Monitoring and Sampling Work Plan included in Appendix F.

8.6.4 Schedule for Proposed Groundwater Monitoring Program

The proposed monitoring will be performed semi-annually during October and March of each year for a period of at least three years. If necessary, additional monitoring may be performed. The proposed groundwater monitoring program will be initiated in August or September 2007 and will begin with further offsite investigation and evaluation to select appropriate locations for the two additional offsite wells. Subsequent to installation of the new wells semi-annual sampling should be performed by late September or early October and then again in the Spring during late March or in April of each year.

Reports will be completed within 30-days of receipt of analytical data and submitted to DTSC for review.

The proposed groundwater MNA sampling program is included as Appendix F.

8.7 Site Restoration

Site restoration activities will include backfilling of the excavations using imported fills materials and potentially using onsite sources. Filled areas will be compacted and grading performed as appropriate and to meet any SWPPP requirements. It is expected that Site restoration would consist of grading the excavation areas to match the existing Site grade.

8.7.1 Imported Fill Materials

Prior to importing fill materials the source will be identified and inspected and/or sampled if appropriate to evaluate the material for potential impacts. Sampling and testing will be performed as appropriate to evaluate the backfill materials for any chemicals of concern if it is from a non-commercial source.

If necessary, samples of the off-site borrow source will be collected by the excavation contractor and analyzed by a California certified laboratory for organic and inorganic constituents, in accordance with the DTSC Information Advisory, Clean Imported Fill Material (October 2001) (Appendix G). The analytical report will be provided in the Remedial Action Completion Report.

8.7.2 Backfill and Compaction

In order to obtain a firm sub-grade, the placed fill material will be moisture conditioned, placed in thin, loose lifts and compacted with earth moving equipment. Compaction shall be verified by relative density testing in accordance with ASTM standard methods by a soils technician using a neutron density meter. All density test locations will be mapped and the results recorded. Any areas that fail the minimum density test result requirements will be required to be reworked until subsequent testing verifies that compaction meets requirements. Result of all compaction/density tests will be presented in a final report.

8.8 Schedule for Demolition and Remediation

Provided approval is granted by DTSC and all public concerns have been addressed resumption of demolition and remediation activities are planned for mid-September 2007. Based on existing information regarding site conditions it is anticipated that demolition and concrete and soil removal remediation activities will be completed in January 2008.

Completion of the remedial action implementation report documenting site clean up activities should be completed and submitted to DTSC in February 2008.

8.9 Land Use Restrictions

The preferred corrective measure also consists of recording a Land Use Covenant or Deed Restriction to restrict use of the property to commercial/ industrial use and potentially limit other Site developments. In this case, this covenant would be an agreement by the property owner to limit future land use at the site to commercial/industrial uses. The documents may also outline necessary short and long-term monitoring requirements. The covenant will be signed by DTSC and the property owner and would be recorded with the Office of the County Recorder. The document would “transfer with the ownership of the land,” limiting future owners and operators of the site to commercial/industrial uses and continuing any ongoing monitoring programs. DTSC has the authority to enforce the covenant under state law. Based on the future property use, zoning, and site cleanup levels, a land use covenant to restrict the site to commercial/industrial land use will be filed with Orange County upon completion of the project.

9. REFERENCES

1. Haley & Aldrich, Inc., "Facility Investigation Report, Delphi Corporation – Former Anaheim Battery Operations Facility, 1201 North Magnolia Avenue, Anaheim, CA, March, 2007.

2. U.S. Environmental Protection Agency, "Corrective Action for Releases from Solid Waste Management Units at Hazardous waste Management Facilities", advance notice of proposed rulemaking, Federal Register Vol. 61, No. 85, 19432, May 1, 1996.

3. U.S. Environmental Protection Agency, Solid Waste and Emergency Response, "Handbook of Groundwater Protection and Cleanup Policies for RCRA Corrective Action", EPA/530/R-04/030, April 2004.

4. U.S. Environmental Protection Agency, Office of Waste Programs Enforcement, Office of Solid Waste, "RCRA Corrective Action Plan (Final)", OSWER Directive 9902.3-2A, May 1994.

5. U.S. Environmental Protection Agency, Office of Solid Waste, Solid Waste and Emergency Response, "RCRA Cleanup Reforms", EPA 530-F-01-001, January 2001.

6. U.S. Environmental Protection Agency, Federal Register Notice, "Announcement of Schedule for RCRA Corrective Action Guidance Documents and Request for Feedback on RCRA Cleanup Reforms", FRL-6564-4, March 24, 2000.

7. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, "Institutional Controls: A Site Manager's Guide to Identifying, Evaluating and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups", OSWER 9355.0-74FS-P, EPA 540-F-00-005, September 2000.

8. U.S. Environmental Protection Agency, Office of Compliance, Office of Enforcement and Compliance Assurance, "EPA Office of Compliance Sector Notebook Project – Profile of the Motor Vehicle Assembly Industry", EPA.310-R-95-009, September 1995.

9. U.S. Environmental Protection Agency, Region 5 - Waste, Pesticides and Toxics Division, "Use of Institutional Controls in the RCRA Corrective Action Program", March 2000.

10. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, "Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites", OSWER Directive 9200.4-17P, April 1999.

11. U.S. Environmental Protection Agency, Office of Research and Development, "Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water", EPA/600/R-98/128, September 1998.

12. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, "Implementing Presumptive Remedies", EPA 540-R-97-029, October 1997.

13. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, "Presumptive Remedies: Site Characterization and Technology Selection for CERCLA Sites with Volatile Organic Compounds in Soils", OSWER Directive 9355.0-48FS, EPA 540-F-93-048, September 1993.

14. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, "Presumptive Remedy: Supplemental Bulletin – Multi-Phase Extraction (MPE) Technology for VOCs in Soil and Groundwater", OSWER Directive No. 9355.0-68FS, EPA 540-F-97-004, April 1997.

15. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, "Revised Interim Soil Lead Guidance for CERCLA and RCRA Corrective Action Facilities", OSWER Directive 9355.4-12, July 1994.

16. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, "Clarification to the 1994 Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities", OSWER Directive 9200.4-27, EPA/540/F-98/030, August 1998.

17. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, "Presumptive Remedy for Metals-In-Soil Sites", OSWER 9355.0-72FS, EPA 540-F-98-054, September 1999.

18. U.S. Environmental Protection Agency, Office of Research and Development, "Contaminants and Remedial Options at Selected Metals Contaminated Sites – A Technical Resource Document", EPA/540/R-95-512, July 1995.

19. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Office of Research and Development, "Engineering Bulletin: Technology Alternatives for the Remediation of Soils Contaminated with As, Cd, Cr, Hg, and Pb", EPA/540/S-97/500, August 1997.

20. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, "Guidance on Remedial Actions for Superfund Sites with PCB Contamination", EPA/540/G-90/007, August 1990.

21.

G:\CLIENTS & PROJECTS\Delphi-32486\Anaheim-32486\Reports\CMP-Corrective Measure Proposal\CMP Text Items\2007-0810-HAI-Delphi-Anaheim-CMP_F.doc