DELPHI SYSTEMS CORP.

CORRECTIVE MEASURES PROPOSAL

APPENDIX A

HEALTH AND SAFETY PLAN

HALEY & ALDRICH, INC.
SITE-SPECIFIC HEALTH & SAFETY PLAN

for

Delphi Systems Corp. - Former Anaheim Battery Operation

1201 North Magnolia Ave.
Anaheim, CA 92801-2609

Project/File No. 32486-011

Prepared by: Colleen Canfield Date: 10 Aug 2005

Revised by: Anita Broughton, CIH, REA, EIT Date: 25 August 2005
Second revision by: Anita Broughton, CIH, REA, EIT Date: 6 October 2005
Third revision by: Kelly Hoggan Date: 7 July 2007
Fourth revision by Scott Boston, CIH, CSP Date: 13 July 2007
Fifth revision by Anita Broughton, CIH, REA, EIT Date: 7 August 2007

APPROVALS: The following signatures constitute approval of this Health & Safety Plan

Original signed by Scott Boston
Scott Boston, CIH, CSP - Local H&S Coordinator — 8-8-07 Date

Original signed by Tom Tatnall
Tom Tatnall - Site/Project Manager — 8-8-07 Date

Original signed by Anita Broughton
Anita Broughton, CIH, REA, EIT — 8-8-07 Date

Date printed: 8/10/2007 at 11:52 AM

Note: This HASP is developed for Haley & Aldrich purposes only and not for use by subcontractors. Subcontractors may use this HASP as reference only.

PRE-JOB SAFETY CHECKLIST

The following is a checklist that is designed to help Project Managers prepare for the H&S requirements needed for their projects.

The use of this form should be used during the planning stage of the project and not intended to be used the day before the project. This form is to be attached to the front off the HASP before it goes to the field.

Please initial in each appropriate box and sign on the bottom of the appropriate box that the required materials, equipment, training, etc., has been procured before commencement of work on a site.

#	Project H&S Requirements	Approval by PM or LHSC (initial each box or place NA)	Date Approved
1.0	HASP and supporting documentation is complete and signed by all members		
2.0	Task Safety Analysis performed and attached to the HASP.		
3.0	All staff scheduled for project current with 40 hour or 8 hour refresher training.		
4.0	Is a Hazwoper site supervisor needed, if so, are they trained?		
5.0	Additional Training Requirements met: e.g.- nuclear density gauge, DOT, CSE, Competent Person Training for Excavation, etc		
6.0	We have met the client's additional H&S requirements above and beyond H&A's requirements. Example: facility safety orientations, safety documentation, meetings, PPE requirements		
7.0	H&A subcontractors have met H&A's minimum requirements, including- - Training - Medical surveillance - Written HASP - Insurance - MSDSs		
8.0	All H&A staff involved in project have met their Medical Surveillance examination requirements.		
9.0	Staff that may be required to wear a respirator, medically qualified and fit test card available.		
10.0	MSDSs on site and available for chemicals on site.		
11.0	Safety equipment available, such as: Flashlights, Telephone for communications, Ladders, Cones, Barricade tape, Fire extinguisher, First Aid Kit, PPE, Respiratory Protection, Air Instrumentation and Calibrated, Personal Flotation Device (PFD), 90' life line with ring, Decontamination equipment		

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ISSUANCE AND COMPLIANCE

- This HASP must be signed by all Haley & Aldrich (H&A) staff members who will work on the project, including H&A visitors.
- This HASP or a current signed copy must be retained at the site at all times when H&A staff are present. Senior management does recognize that it is difficult to utilize one HASP when many staff members are involved and there is no stationary location to maintain the HASP.
- Deviations from this HASP are not permitted without prior approval from the above signed. Unauthorized deviations may constitute a violation of H&A company procedures/policies and may result in disciplinary action.
- Revisions to this HASP must be outlined within the contents of the HASP. If immediate or minor changes are necessary, the LHSC and H&A Project Manager may use Appendix A (HASP Amendment Form), located in the back of this HASP. Any revision to the HASP requires employees to be informed of the changes and they understand the requirements of the change.
- This HASP is not for H&A Subcontractor use. Subcontractors must have their own HASP. This HASP will be made available for review by "reference only" to ensure that H&A has properly informed our subcontractors of the hazards associated with the site to the extent we are aware.
- This Site Specific HASP provides only site-specific descriptions and work procedures. General safety and health compliance programs in support of this HASP (e.g., injury reporting, medical surveillance, personal protective equipment (PPE) selection, etc. are described in detail in the H&A Corporate Health and Safety Program Manual and within Standard Operating Procedures (SOPs). Both the manual and SOPs can be located on the Company Intranet. When appropriate, users of this HASP should always refer to these resources and incorporate to the extent possible. The manual and SOPs are available to clients and regulators per request.

SITE SAFETY OFFICER

This project has identified the following person as the site safety officer (SSO). **The highest ranking person on site on this list will be the designated site safety officer.** The H&A Project Manager may designate any person as the primary. (PMs determine who will be on site and in order of highest level of authority when on site.) **A site safety officer must be on site at all times.** When none of the following are present on site, the senior person for H&A on site will default to the SSO.

1. Tom Tatnall
2. Jeff Reardon
3. Glenn Androsko
4. Colleen Canfield
5. Nidal Samara
6. Kelly Hoggan

.

Roles and Responsibilities

The SSO is responsible for field implementation of this HASP and enforcement of safety rules and regulations. SSO functions include:

- Act as H&A's liaison for health and safety issues with client, staff, subcontractors, and agencies.
- Verify that utility clearance has been performed by H&A subcontractors.
- Oversee day-to-day implementation of the HASP by H&A employees on site.
- Interact with subcontractor project personnel on health and safety matters.
- Verify use of required PPE as outlined in the HASP.
- Inspect and maintain H&A safety equipment, including calibration of air monitoring instrumentation used by H&A.
- Perform changes to HASP and document in Appendix A of the HASP as needed and notify appropriate persons of changes.
- Investigate and report on-site accidents and incidents involving H&A and its subcontractors.
- Verify that site personnel are familiar with site safety requirements (e.g., the hospital route and emergency contact numbers).
- Report accidents, injuries, and near misses to the H&A PM and Local Health and Safety Coordinator (LHSC) as needed.

The SSO will conduct initial site safety orientations with site personnel (including subcontractors) and conduct toolbox and safety meetings thereafter with H&A employees and H&A subcontractors at regular intervals and in accordance with H&A policy and contractual obligations. The SSO will track the attendance of site personnel at H&A orientations, toolbox talks, and safety meetings. Subcontractors will document training and provide training rosters to the H&A SSO.

The SSO will report accidents such as injury, overexposure, or property damage to the Local Health and Safety Coordinator, to the Project Manager, and to the safety managers of other on-site consultants and contractors. The SSO will consult with the safety managers of other on-site consultants and subcontractors on specific health and safety issues arising over the course of the project, as needed.

PRE-WORK HEALTH & SAFETY BRIEFING

Note: Only H&A employees sign this page.

I have attended a briefing on this Health & Safety Plan prior to the start of on-site work and declare that I understand and agree to follow the provisions and procedures set forth herein while working on this site.

PRINTED NAME	SIGNATURE	DATE

1. PROJECT INFORMATION

Name of Project: Delphi Systems Corporation, Anaheim Battery Operations Facility	**H&A File No.: 32486-011**
Location: 1201 North Magnolia Ave., Anaheim, CA 92801	
Client/Site Contact: Tim Renner Bill Vierra	**Contact Phone No.: (317) 504-8264; (714) 300-5598**
H&A Project Manager: Tom Tatnall	**PM Phone No.: Office (714) 984-2105 Cell (714) 709-3722**

SCOPE OF WORK:

Task 1. Conduct concrete demolition monitoring. These activities include observation of exposed concrete and soil for evidence of possible chemical releases, field screening with an organic vapor analyzer equipped with a photo ioninzation detector (PID), soil and concrete sampling.

Task 2. Conduct Soil Vapor Extraction (SVE) System well installation. Six wells will be installed and used as a potentially applicable remedial technology for reducing the mass of VOCs present in the unsaturated zone beneath the Warehouse No. 3 Area. The wells will be 7 to 23 feet bgs and will consist of 2-inch Schedule 40 PVC pipe with 0.020-inch slotted screen.

Task 3. Conduct SVE System horizontal well installation by soil trenching. The trench will be 8 feet bgs and 1-foot wide. The well will be constructed using Schedule 40 PVC pipe with 0.020-inch slotted screen.

Task 4: Conduct SVE operation and maintenance. Measurements will be collected and recorded at each vacuum. They will be for vapor flow rate, water production in the vapor-liquid separator, and soil vapor samples.

Task 5. Conduct Soil excavation observation. These activities include observation of exposed soil for evidence of possible chemical releases, field screening with an organic vapor analyzer equipped with a photo ionization detector (PID), soil confirmation sampling, and observing soil excavation activities

Subcontractor(s) to be involved in on-site activities:

Subcontractor Firm Name	Work Activity
Advanced Remedial Services	Concrete demolition
WDC Drilling and Exploration	Well installation
Innovative Construction Solutions	Horizontal well installation
	SVE operation and maintenance
	Soil excavation

Projected Start Date: 19 July 2007

Projected Completion Date: 30 October 2007

Estimated Number of Days to Complete Field Work: Several months

SITE DESCRIPTION

Check one of the following:

Site classification:	☑ Industrial	☐ Commercial	☐ Other Enter description here

General Description

The Site consists of a 26-acre parcel of land occupied by an inactive, one story manufacturing building with a total of 285,568 square feet of floor space, three warehouse buildings and various ancillary buildings. The Site is currently vacant and undergoing demolition activities. Delphi formerly occupied the Site for the manufacture of lead acid storage batteries for the automotive industry.

Site Status Note: Are there current operations at the site? (mark all that apply):

☐ Active	☑ Inactive
☐ Partially active	☑ Other Demolition Phase

Is a **site plan** or sketch available? ☑ Y ☐ N If yes, attach a copy to this plan.

Work Areas

List/identify each specific work area(s) on the job site and indicate its location(s) on the site plan:

1. Paved Entrance Area
2. NE Area south of Storm water detention basin
3. West central area south of above ground waste oil tank
4. Southeast area southeast corner of waste water treatment pit
5. Various locations within the facility boundaries

2. PROJECT TASK BREAKDOWN

List and describe each distinct work task below:

Task No.	Detailed Task Description	Employee(s)	Work Date(s) or Duration
1	Concrete Demolition monitoring	H&A Employees	7/19/07 to 10/30/07
2	Soil Vapor Extraction (SVE) System Well Installation: well	H&A Employees .	7/23/07 to 7/24/07
3	SVE horizontal well installation: soil trenching	H&A Employees .	7/23/07 to 1/30/08
4	SVE Operations and Maintenance	H&A Employees	7/23/07 to 1/30/09
5	Soil excavation observation, Collect and analyze soil confirmation samples		9/11/07 to 1/30/08

Work Site Access Control

Access to client property is dependent upon site-specific conditions under owner permission and will be controlled by the Client Project Manager. It will be the Contractor Project Manager's responsibility to control access to a site by means of temporary barriers such as flagging tape or fencing. The barrier will be inspected daily for integrity and adequacy by the Contractor Site Coordinator.

For sites requiring Level C to Level B PPE (personal protective equipment), the area of field operations will be subdivided into three distinct areas. The extent of these areas is task and location specific. Access to each zone will be controlled with fencing and/or plastic flagging tape. The three areas are defined as:

Exclusion Zone

The exclusion zone is the area where the highest potential for exposure by dermal or inhalation routes exists. Personal protective equipment is required and a daily log will be kept of all personnel entering this zone. The exclusion zone will be marked off with barricades or barrier tape, which will be placed a minimum of 50 feet from the active work area. This 50 foot minimum may be altered in the Task-Specific Health & Safety Requirements depending upon actual site layout. During field operations this boundary may be expanded by the Contractor/Consultant Site Coordinator based upon observations and/or monitoring measurements. Whenever possible, all field work should be performed upwind from potential contaminant sources.

Contamination Reduction Zone

The contamination reduction zone is the area immediately adjacent to the exclusion zone. The probability of dermal and inhalation exposure is lower than in the exclusion zone. Typically, contamination reduction zones include facilities for personnel or equipment decontamination. Personal protective equipment worn in the exclusion zone may not be worn outside the contamination reduction zone except during emergencies.

Support Zone

Support zones cover all areas outside the contamination reduction zone. Typically, the support area includes facilities for a lunch area, office spaces, and clean equipment and material storage. Protective clothing worn in the exclusion zone may not be worn in a support zone except in emergencies.

3. HAZARD ASSESSMENT

Chemical Hazards

Material Safety Data Sheets (MSDS) of hazardous materials used during the execution of work shall be available on site. MSDSs are required for chemicals used to prepare samples, calibration gases, etc.

Note: MSDSs are not required for waste materials.

Does chemical analysis data indicate that the site is contaminated? ☑ Y ☐ N

Potential **physical state** of the hazardous materials at the site (mark all that apply):

- ☑ Gas/Vapor
- ☐ Sludge
- ☑ Liquid
- ☑ Solid/Particulate

Anticipated/actual **class of compounds** (mark all that apply.

- ☐ Asbestos ACM in buildings
- ☑ Inorganics Lead
- ☑ BTEX
- ☐ Pesticides
- ☑ Chlorinated Solvents
- ☑ Petroleum products
- ☑ Heavy Metals
- ☑ Other Plastics-related compounds (SVOCs), PCBs

Impacted environments (indicate the primary media(s) in which contamination is expected):

☑ Air ☑ Groundwater

☑ Soil ☐ Sediment

☐ Surface water ☐ Other Enter description here

Estimated concentrations/medium of major chemicals expected to be encountered by onsite personnel:

Work Activity	Media	Chemical	Anticipated Concentration
Concrete Demolition Monitoring	SO	Pb, As, Sb, PCBs	Soil lead 10,000 mg/kg to background; PCB 1,360 mg/kg to ND Arsenic 170 mg/kg to background, Antimony 623 mg/kg to background;
Install SVE MW's	SO, A	Pb, As, Sb, PCBs, VOCs	Antimony 623 mg/kg to background; Arsenic 670 mg/kg to background; Lead 25,900 mg/kg to background; PCBs 1,360 mg/kg to ND; VOCs soil 11DCE 0.336 mg/kg 11DCA 0.251 mg/kg to ND Soil Gas Max: 111TCA 1,050,000 ug/m3; 11DCE 1,110,000 ug/m3; 11DCA 231,000 ug/m3
Install SVE horizontal wells	SO, A	VOCs, Pb, As, PCBs	Antimony 623 mg/kg to background; Arsenic 670 mg/kg to background; Lead 16,700 mg/kg to background; PCBs low levels; VOCs soil 11DCE 0.336 mg/kg 11DCA 0.251 mg/kg to ND Soil Gas Max: 111TCA 1,050,000 ug/m3; 11DCE 1,110,000 ug/m3; 11DCA 231,000 ug/m3
SVE Operation and Maintenance	A	VOCs	Soil Gas Max: 111TCA 1,050,000 ug/m3; 11DCE 1,110,000

			ug/m3; 11DCA 231,000 ug/m3
Soil Excavation Observation & soil sampling	SO	Pb, As, Sb, PCBs, VOCs, SVOCs,	Antimony 623 mg/kg to background; Arsenic 670 mg/kg to background; Lead 454,000 mg/kg to background; PCBs 1,360 mg/kg to ND; SVOCs moderate levels, VOCs soil 11DCE 0.336 mg/kg 11DCA 0.251 mg/kg to ND

(Media key: A = Air; GW = Groundwater; SW = Surface Water; SO = Soil; SE = Sediment)

Information regarding potential exposure to primary chemicals of concern at the site is presented bellow.

Lead

The State of California, Division of Occupational Safety and Health Administration (Cal/OSHA) has established an “Action Level” for airborne lead of 30 micrograms of lead per cubic meter of air averaged over an eight-hour period, and a “Permissible Exposure Limit” of 50 micrograms of lead per cubic meter of air averaged over an eight-hour period. Lead can affect almost every organ and system in your body. The most sensitive is the central nervous system, particularly in children. Lead also damages kidneys and the immune system. The effects are the same whether it is breathed or swallowed. Exposure to lead is more dangerous for young and unborn children. Unborn children can be exposed to lead through their mothers. Harmful effects include premature births, smaller babies, decreased mental ability in the infant, learning difficulties, and reduced growth in young children. These effects are more common after exposure to high levels of lead. In adults, lead may decrease reaction time, cause weakness in fingers, wrists, or ankles, and possibly affect the memory. Lead may cause anemia, a disorder of the blood. It can cause abortion and damage the male reproductive system. The connection between these effects and exposure to low levels of lead is uncertain.

Arsenic

Cal/OSHA has set a limit (Permissible Exposure Limit [PEL]) of 10 microgram arsenic per cubic meter of workplace air (10 µg/m3) for 8 hour shifts and 40 hour work weeks. Several studies have shown that inorganic arsenic can increase the risk of lung cancer, skin cancer, bladder cancer, liver cancer, kidney cancer, and prostate cancer. The World Health Organization (WHO), the Department of Health and Human Services (DHHS), and the EPA have determined that inorganic arsenic is a human carcinogen.

Breathing high levels of inorganic arsenic can give you a sore throat or irritated lungs. Ingesting high levels of inorganic arsenic can result in death. Lower levels of arsenic can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of "pins and needles" in hands and feet.

1,1-Dichloroethane

Breathing very high levels of 1,1-Dichloroethane can affect your heart and animal studies have seen kidney disease from long-term exposure to high levels in air. 1,1-Dichloroethane has been found in at least 248 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA). 1,1-Dichloroethane is not expected to build up in the body tissues of animals. 1,1-DCE volatilizes easily at room temperature and burns easily. It does not occur naturally in the environment. 1,1-Dichloroethane evaporates from water rapidly into the air. It can also be found in the air as a breakdown product of another chemical, 1,1,1-trichloroethane. 1,1-Dichloroethane does not dissolve easily in water. Small amounts of 1,1-dichloroethane released to soil can evaporate into the air or move into groundwater. The Cal/OSHA PEL for 1,1-dichloroethane is 100 ppm.

1,1-Dichloroethene

1,1-Dichloroethene is a colorless liquid with a mild, sweet, chloroform-like odor. Odor thresholds ranging from 190 to 500 parts per million (ppm) parts of air have been reported. 1,1-Dichloroethene is an eye irritant and can affect the central nervous system, liver, and kidneys in humans. Contact with the eyes can cause conjunctivitis and transient corneal injury [IARC 1986]. Workers exposed to high concentrations (4,000 ppm) of 1,1-dichloroethene have shown central nervous system depression with accompanying signs of intoxication that may progress to unconsciousness [ACGIH 1991]. Repeated exposures to low concentrations are associated with liver and kidney dysfunction [NLM 1992]. IARC concluded that in the absence of adequate epidemiologic data, no evaluation of the carcinogenicity of 1,1-dichloroethene to humans could be made [IARC 1986].. The Cal/OSHA PEL is 1 ppm.

Polychlorinated Biphenyls (PCBs)

Polychlorinated biphenyls (PCBs) are a group of manufactured organic chemicals that contain 209 individual chlorinated chemicals (known as congeners). PCBs are either oily liquids or solids and are colorless to light yellow in color. They have no known smell or taste. There are no known natural sources of PCBs. Some commercial PCB mixtures are known in the United States by their industrial trade name, Aroclor.

PCBs don't burn easily and are good insulating material. They have been used widely as coolants and lubricants in transformers, capacitors, and other electrical equipment. The manufacture of PCBs stopped in the United States in 1977 because of evidence that they build up in the environment and cause harmful effects. Products containing PCBs are old fluorescent lighting fixtures, electrical appliances containing PCB capacitors, old microscope oil, and hydraulic fluids.

The PEL for PCBs on this site is 0.5 mg/m^3 as an 8-hour TWA with a skin notation with indicates that there is a potential significant contribution to the overall exposure by cutaneous route, including mucous membranes and the eyes, by contact with vapors, liquids, and solids.

Toluene

The Cal/OSHA PEL for toluene 50 PPM as an 8-hour TWA, 500 ppm as a ceiling concentration and 150 ppm as an STEL. Toluene affects the brain. Low-to-moderate levels from long-term exposure can cause tiredness, confusion, weakness, drunken-type actions, memory loss, nausea and loss of appetite, and hearing loss. Inhaling a high level of toluene in a short time can make you feel light-headed, dizzy, or sleepy. It can cause unconsciousness, and even death. Repeated exposure to high levels can cause permanent brain and speech damage, vision and hearing problems, loss of muscle control, and poor balance. It can also cause memory loss and decreased mental ability. Toluene also affects the kidneys. Several studies have shown that unborn animals were harmed when high levels of toluene were breathed by their mothers. Babies can have neurological problems and retarded growth and development if their mothers breathe a high level of toluene during pregnancy. We do not know if toluene harms the unborn child if the mother is exposed to low levels of toluene during pregnancy.

Trichloroethylene (TCE)

Trichloroethylene (TCE) is a colorless, nonflammable, non-corrosive liquid has a "sweet" odor characteristic of some chlorinated hydrocarbons.

The compound is incompatible with strong caustics, it reacts with aluminum when acidic, and it is incompatible with active metals - barium, lithium, sodium, magnesium, and titanium. Decomposition of TCE, due to contact with hot metal or ultraviolet radiation, forms products including chlorine gas, hydrogen chloride, and phosgene. Dichloroacetylene may be formed from the reaction of alkali with TCE.

The Cal/OSHA PEL for TCE is 25 PPM as an 8-hour TWA; an acceptable ceiling concentration of 300 PPM; and a STEL of 100 PPM. The standard routes of entry in the body are through inhalation, percutaneous absorption, ingestion, skin and eye contact. The points of attack are the respiratory system, heart, liver, kidneys, central nervous system and skin.

Exposure to TCE vapor may cause irritation of the eyes, nose, and throat. The liquid, if splashed in the eyes, may cause burning irritation and damage. Repeated or prolonged shin contact with the liquid may cause dermatitis. Acute exposure to TCE depresses the central nervous system exhibiting such symptoms as headache, dizziness, vertigo, tremors, nausea and vomiting, irregular heart beat, sleepiness, fatigue, blurred vision, and intoxication similar to that of alcohol. Unconsciousness and death have been reported. Alcohol may make the symptoms of TCE overexposure worse. If alcohol has been consumed, the overexposed worker may become flushed. TCE addiction and peripheral neuropathy have been reported.

1,1,1 Trichloroethane

The health effects for 1,1,1 TCA are as follows- Inhalation of vapors will irritate the respiratory tract. Affects the central nervous system. Symptoms include headache, dizziness, weakness, and nausea. Higher levels of exposure (> 5000 PPM) can cause irregular heart beat, kidney and liver damage, fall in blood pressure, unconsciousness and even death. Harmful if swallowed. Symptoms similar to inhalation will occur along with nausea, vomiting. Aspiration of material into the lungs can cause chemical pneumonitis, which can be fatal. If aspirated, may be rapidly absorbed through the lungs and result in injury to other body systems. Causes mild irritation and redness, especially on prolonged contact. Repeated contact may cause drying or flaking of the skin. Liquids and vapors cause irritation. Symptoms include tearing, redness, stinging, and swelling. Prolonged or repeated skin contact may cause dermatitis. Chronic exposure may affect the kidneys and liver. Dioxane is a suspected human carcinogen based on animal data. Personnel with CNS, kidney, liver or heart disease may be more susceptible to the effects of this substance. Use of alcoholic beverages may aggravate symptoms.

The Cal/OSHA permissible exposure limit (PEL) for 1,1,1 TCA is 350 PPM for an 8-hour time weighted average, 800 ppm as a ceiling concentration and 450 ppm as an STEL.

Physical Hazards

Is any site work area(s) to be entered for this project considered a confined space? ☐ N ☑ N

If yes, indicate which area(s) and why:

ALL CONFINED SPACE ENTRY PROJECTS REQUIRE SPECIAL PROCEDURES, PERMITS AND TRAINING AND MUST BE APPROVED BY THE CORPORATE HEALTH & SAFETY MANAGER.

Physical Hazard Checklist

Indicate all hazards that may be present for each task. If any of these potential hazards are checked, it is the project manager's responsibility to determine how to eliminate/minimize the hazard to protect onsite personnel. Note: Task numbers refer to those identified in Section 3.

(copy and paste a checkmark "✓"into appropriate boxes)

Potential Job Hazards	Task 1	Task 2	Task 3	Task 4	Task 5
Underground utilities	✓	✓	✓		✓
Overhead utilities/piping				✓	
Excavations greater than 4' depth			✓		✓
Open excavation fall hazards	✓	✓	✓		✓
Heavy equipment	✓	✓	✓		✓
Drilling hazards		✓	✓		
Noise (above 85 dBA)	✓	✓	✓		✓
Traffic concerns	✓	✓	✓		✓
Extreme weather conditions					
Rough terrain for drilling equipment		✓	✓		
Buried drums					
Heavy lifting (more than 50 lbs)					
High risk fire hazard					
Poisonous insects or plants					
Water hazards					
Use of a boat					
Lockout/Tag out requirements					
Other: electrical shock, mechanical pinching				✓	

Indicate any **unusual features** at the site (e.g., power lines at low heights, variable terrain, excessive insects, etc.) that are **unique to this project** and steps to be taken to minimize risk:

Due to the concurrent onsite demolition activities unusual features may include variable terrain and the presence of heavy equipment whose operations are not under our oversight.

Staff members must take additional care while walking across the Site. Staff members must be especially careful and alert when working with and in proximity to contractors who use heavy equipment, since equipment failure or breakage can lead to accidents and work injury.

POTENTIAL ACTIVITY HAZARDS

1. Abrasions
2. Access
3. Asphyxiation
4. Bacteria
29. Frost bite/cold
30. Fugitive Dust
31. Generated Wastes
32. Guards removed
56. Overloaded Equipment (tipping)
57. Oxygen deficiency
58. Pinch Points

5. Biological Hazards
6. Blood borne Pathogens
7. Cave ins
8. Chemical/Thermal Burns
9. Chemicals
10. Cold Stress
11. Compressed Gases
12. Confined Spaces
13. Congestion
14. Cuts
15. Defective Equipment
16. Dermatitis
17. Dropping Materials/Tools to Lower Levels
18. Drowning or flowing water
19. Electrical Shock
20. Elevated /Visibility of Overhead Work
21. Energized Equipment
22. Ergonomics
23. Explosions
24. Fatigue
25. Fire
26. Flammability
27. Flying debris
28. Foreign Body in Eye
33. Hazardous Materials
34. Heat Stress (cramps, exhaustion, stroke)
35. Heavy Equipment Operation (improper use)
36. Heavy Lifting
37. High crime area (violence)
38. High Winds
39. Hoists, Rigging, Slings, Wire, Rope
40. Impact
41. Improper Rigging
42. Inability to Maintain Communication
43. Inclement Weather
44. Inclines
45. Insects/Reptiles
46. Known/Unknown Visitors
47. Mold
48. Moving Equipment, Conveyors or Vehicles
49. Muddy Site Conditions
50. New Personnel
51. New Rental or Change in Equipment Used
52. Noise
53. Odor/VOC Emissions
54. Overhead Utilities
55. Overhead Work
59. Poisonous Plants
60. Poor Housekeeping
61. Poor illumination
62. Poor Visibility
63. Pressure
64. Pressurized Lines
65. Radiation
66. Repetitive Motion
67. Sharp Objects
68. Silicosis
69. Slips, Trips, and Falls
70. Sprains and Strains
71. Steam
72. Sunburn
73. Surface Water Run-off
74. Toxicity
75. Traffic
76. Underground utilities
77. Uneven terrain
78. Unsafe Atmosphere
79. Vibration
80. Weight
81. Work at Depth
82. Work at Heights
83. Work over Water
84. Working on Ice

HAZARD CONTROLS

Air Monitoring (Specify)
Appropriate Clothing/Monitoring Of Weather
Appropriate Labels/Signage
Barricades/Fencing/Silt Fencing
Buddy System
Confined Space Procedures
Decontamination Procedures
Derived Waste Management Plan
Drinking Water/Fluids
Dust Abatement Measures
Emergency Action Plan Procedures
Equipment Inspection
Equipment Manuals/Training
Exclusion/Work Zones
Exhaust Ventilation Fall Protection - Type
Fire Extinguisher/Fire Watch
Flotation Devices/Lifelines
Ground Fault Interrupter
Ground Hydraulic Attachments
Grounds on Equipment/Tanks
Hand Signal Communication
Hazardous/Flammable Material Storage
Hearing Protection (Specify)
Hoses, Access to Water
Hotwork Procedures
Isolation of Energy Sources(Lockout/Tag out)
Machine/Equipment Guards
Manual Lifting Equipment
Proper Lifting Techniques
Proper Tool for Job
Proper Work Position/Tools
Protective Equipment (Specify)
Radio Communication
Respirator, (Specify Type)
Safety Harness/Lanyard/Scaffold
Sloping, Shoring, Trench Box
Spill Prevention Measures/Spill Kits
Storm water Control Procedures/Methods
Vehicle Inspection
Visitor Escort/Orientation/Security
Window Cleaning/Defrost

Describe any special precautions to be taken with respect to the hazards checked above:

Heat Stress

Heat stress on hazardous waste sites or construction sites usually is a result of protective clothing decreasing natural body ventilation, although it may occur at any time work is being performed at elevated ambient temperatures. Because heat stress is one of the most common and potentially serious illnesses associated with hazardous waste site work, regular monitoring and other preventative measures are vital.

Site workers must learn to recognize and treat the various forms of heat stress.

The best approach is preventative heat stress management. In general:

- Workers should drink 16 ounces of water before beginning work, such as in the morning or after lunch. The water should be maintained at 50 to 60°F. Workers should drink 1 to 2 4-ounce cups of water every 30-60 minutes. A cool area for rest breaks should be designated, preferably air-conditioned. The use of alcohol during non-working hours and the intake of caffeine during working hours can lead to an increase in susceptibility to heat stress. Monitor for signs of heat stress.

- Workers should acclimate to site work conditions by slowly increasing workloads, i.e., do not begin site work activities with extremely demanding activities. This acclimation process may require up to two weeks for completion.

- Cooling devices should be used to aid natural body ventilation. These devices, however, add weight, and their use should be balanced against worker efficiency. An example of a cooling aid is long cotton underwear, which acts as a wick to help absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing.

- Installed mobile showers and/or hose-down facilities should be used to reduce body temperature and cool protective clothing in serious heat stress situations.

- In hot weather, field activities should be conducted in the early morning or evening.

- Adequate shelter should be available to protect personnel from heat, as well as cold, rain, snow, etc., which can decrease physical efficiency and increase the probability of both heat and cold stress. Set up a command post in the shade or erect temporary shade at the workstation if practical.

- In hot weather, rotate shifts of workers with potential heat stress exposure.

- Good hygienic standards must be maintained by frequent changes of clothing and showering. Clothing should be permitted to dry during rest periods. Persons who develop skin problems should immediately consult medical personnel.

Effects of Heat Stress

If the body's physiological process fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur ranging from mild (such as fatigue, irritability, anxiety, and decreased concentration, dexterity, or movement) to fatal.

Heat-related problems are:

HEAT STROKE: An acute and dangerous reaction to heat exposure caused by failure of heat regulating mechanisms of the body; the individual's temperature control system that causes sweating stops working correctly. Body temperature rises so high that brain damage and death will result if the person is not cooled quickly.

Symptoms: Red, hot, dry skin, although person may have been sweating earlier; nausea; dizziness; confusion; extremely high body temperature; rapid respiratory and pulse rate; unconsciousness or coma.

Treatment: Cool the victim quickly and obtain immediate medical assistance. If the body temperature is not brought down fast, permanent brain damage or death may result. Soak the victim in cool but not cold water, sponge the body with rubbing alcohol or cool water, or pour water on the body to reduce the temperature to a safe level (102°F). Observe the victim and obtain medical help. Do not give coffee, tea or alcoholic beverages.

HEAT EXHAUSTION: A state of definite weakness or exhaustion caused by the loss of fluids from the body. This condition is much less dangerous than heat stroke, but it nonetheless must be treated.

Symptoms: Pale, clammy, moist skin, profuse perspiration and extreme weakness. Body temperature is normal, pulse is weak and rapid, and breathing is shallow. The person may have a headache, may vomit, and may be dizzy.

Treatment: Remove the person to a cool place, loosen clothing, and place in a head-low position. Provide bed rest. Consult physician, especially in severe cases. The normal thirst mechanism is not sensitive enough to ensure body fluid replacement. Have patient drink 1 to 2 cups water immediately and every 20 minutes thereafter until symptoms subside. Total water consumption should be 1 to 2 gallons per day.

HEAT CRAMPS: Caused by perspiration that is not balanced by adequate fluid intake. Heat cramps are often the first sign of a condition that can lead to heat stroke.

Symptoms: Acute painful spasms of voluntary muscles (e.g., abdomen and extremities).

Treatment: Remove the victim to a cool area and loosen clothing. Have the patient drink 1 to 2 cups water immediately, and every 20 minutes thereafter until symptoms subside. Total water consumption should be 1 to gallons per day.

HEAT RASH: Caused by continuous exposure to heat and humid air and aggravated by chaffing clothes. Decreases ability to tolerate heat.

Symptoms: Mild red rash, especially in areas of the body on contract with protective gear.

Treatment: Decrease amount of time in protective gear, and provide powder to help absorb moisture and decrease chaffing.

Utility Locators and Underground Hazards

Prior to drilling, Haley & Aldrich staff members will ensure that permission has been gained from the property owner to access the property. Before marking any proposed exploration or drilling location, it is critical that all readily available information on underground utilities and structures be obtained. The estimated location of utility installations, such as sewer, telephone, fuel, electric, water, or any other underground installation that may be expected to be encountered during drilling work, will be identified with the appropriate authority. Appropriate authorities include client representatives, utility companies, nonprofit organizations (e.g., "Dig-Safe), and others.

Completion of the utility stake out is not a guarantee that the underground facilities will not be encountered in the boreholes; very few, if any, guarantee their work nor do they accept the liability for damage or losses if one may occur. Accordingly, Haley & Aldrich field staff are expected to use extreme caution in the upper 4-5 feet in the event the clearance has failed to identify an existing facility. This may necessitate hand-excavation or probing to confirm the presence of shallow utilities.

When utility companies or owners cannot respond to a request to locate underground utility installations within 24 hours (unless a longer period is required by state or local law), or cannot establish the exact location of these installations, geophysical techniques, such as ground penetrating radar and/or magnetometery can be utilized to locate the potential underground hazards. Using any information that can be obtained, the site should be viewed in detail for physical evidence of buried lines or structures. Evidence of surface elements of buried utilities should be documented, such as manholes, gas or water valves, catch basins, etc.

No subsurface drilling activities will be allowed until "all" utilities have been properly located and marked.

The public and private utility entities generally only mark the locations of their respective underground facilities within public rights-of-way. Determination of the locations on private property will most likely be the responsibility of Haley & Aldrich or the contractor. In some cases, it may be necessary to put the ultimate responsibility back on the owner, to assist in the location of the utilities. It is incumbent on Haley & Aldrich and the Contractor to exercise caution and use good judgment when faced with uncertainty.

Rig Inspection

Each day, prior to the start of work, the driller will inspect the drill rig and associated equipment. The following checks will be made:

- Vehicle condition: Check proper operation of brakes, lights, steering mechanism, and horn.
- Equipment storage: All equipment such as auger flights, split spoon samplers, hammers, hand tools, etc. will be properly stored in an appropriate location and will be secured before moving the rig.
- Wire rope, Cat Line: All wire rope, cable and Cat Line will be inspected for signs of wear such as broken wires, a reduction in rope diameter, abrasion, or signs of rust. Worn, frayed, or otherwise damaged wire, rope or cable will be replaced.
- Safety equipment: Each rig will have at least one fire extinguisher (Type B/C) and one First Aid Kit.

Rig Set-Up

Each drill rig will be properly blocked and leveled prior to raising the derrick. The rig will be moved only after the derrick has been lowered. The leveling jacks will not be raised until the derrick has been lowered.

Blocking provides a more stable drilling structure by evenly distributing the weight of the rig. Proper blocking ensures that a differential settling of the rig does not occur. Wooden blocks, at least 12 by 12 inches and four to eight inches thick, are recommended and should be placed between the jack swivels and the ground. The emergency brake will be engaged and the wheels that are on the ground chocked.

Site drilling will comply with the following rules:

- Before drilling, the Contractor/Consultant Site Coordinator will ensure an adequate safety zone around the drill rig and associated operations.

- Before drilling, the existence of underground utilities in the work area will be determined and conspicuously marked.

- If drilling is conducted in the vicinity of overhead power lines, proper distance will be maintained between the drill rig and the lines as per Cal/OSHA regulations contained in 8 CCR 2946 through 2949. Equipment will not operate under or within 30 feet of any overhead energized lines.

Working around Heavy Equipment

Staff Members must be especially careful and alert when working with contractors who use heavy equipment, since equipment failure or breakage can lead to accidents and worker injury. Cranes and equipment for drilling, pile driving, test pitting and coring is of special concern. Should these devices fail during operation the likelihood of worker injury is high. Equipment of this nature should be visually inspected and checked for proper working order prior to the commencement of field work. Those that operate heavy equipment must meet all of the requirements to operate heavy equipment. Haley & Aldrich, Inc. staff members that supervise projects or are associated with such high risk projects that involve digging should use due diligence when working with a construction firm.

Excavations

Staff Members must be especially careful and alert when working with contractors who use heavy equipment, since equipment failure or breakage can lead to accidents and serious worker injury. Equipment with a fast or wide swing radius should be of special concern. Should these devices fail during operation the likelihood of worker injury is high. Those that operate heavy equipment must meet all of the requirements to operate heavy equipment. Haley & Aldrich, Inc. staff members that supervise projects or are associated with such high risk projects that involve digging should use due diligence when working with a construction firm.

- Excavations greater than 5’ in depth are not to be entered unless properly sloped, shored, or benched. Heavy equipment operators are responsible for the safety of the excavation. Operators must be deemed a competent person per Cal/OSHA regulations and shall ensure that the excavation is safe to enter if any H&A staff member is to enter the hole. H&A staff members are to consult with the competent person prior to entering any excavation. This means that the hole must be sloped, shored or benched in accordance to Cal/OSHA’s Construction Standard for excavations.

- No H&A staff member is to enter the excavation unless they have determined that there is no potential for injury such as cave ins.

- It is the contractors responsibility to safe guard all effected workers from falling into any excavation by the use of barrier's and warning signs.

- No excavation is to be left open, unattended when there is a possibility for workers to fall into the excavation. Barricades must be placed around the hole at night when the depth is greater than 4'. This is responsibility of the contractor.

- Keep all equipment at a minimum of 10' away from energized electrical lines.

- H&A staff members will be required to wear an orange safety vest while in the immediate area where heavy equipment is being used.

Excavation Cave-In Hazards

- The following conditions increase the likelihood of cave-in: Soil materials composed of unconsolidated, uncompacted, and/or rounded particles (See 8 CCR 1539 through 1541.1-Excavation Standard). Special care must be used when trenching in areas that have previously been excavated and backfilled.

- Soils, which have a high water, content, or have been subjected to freeze-thaw or frost-heaving.

- Loading of trench walls by adjacent equipment, supplies, structures, "back-dirt" piles, etc.

- Vibration due to equipment operating near excavations.

- Trench walls that are steeper than the angle of repose of the material composing the walls.

- Deep trenches (i.e., high trench walls).

  The following precautions should be used to prevent cave-ins in all trenches in excess of 4 ft. deep. These precautions should also be used in trenches less than 4 ft. deep whenever those site conditions just listed indicate the likelihood of a cave-in:

  - Sloping: Trench walls should be sloped to the correct angle of repose.

  - Shoring: Vertical trench walls (unless composed of solid rock) must be shored and braced, or restrained with movable trench boxes, to prevent cave-in. A registered professional engineer must design shoring systems and meet accepted engineering requirements.

Excavation and Trenching Safety

The following is a list of minimum requirements for trenching and excavating. Each excavation/trench/shoring project is different, therefore the Contractor/Consultant Project Manager is responsible for evaluating site specific conditions and making appropriate provisions

in the task-specific health and safety requirements in conformance with 8 CCR 1539 – 1941.1 - Excavations.

- Contact the proper utilities to obtain clearance. Prior to work, review the utilities in the area and be sure they have been staked properly. Before work begins, a Safe Work Permit must be obtained from the Client/Site manager of Operations Safety Representative.

- Be aware that trenches and excavations deeper than four feet are considered confined spaces and require additional safety precautions, such as shoring. If an excavation exceeds four feet in depth, contact the Client or H&A Safety Representative to review the original Safe Work Permit and ensure that it is adequate.

- The walls and faces of all excavations and trenches more than four feet deep, in which an staff member is exposed to danger from moving ground, will be guarded by a shoring system, sloping of the ground, or some other equivalent means. The design of shoring systems must be done by a registered Professional Engineer as per 8 CCR 1541.1.

- For excavations or trenches in which a staff member may be required to enter, excavated or other material will be effectively stored and retained at least two feet or more from the edge of the excavation or trench.

- The Contractor/Consultant Site Coordinator will make daily inspections of excavations. If evidence of possible cave-ins or slides is apparent, all work in the excavation will cease until the necessary precautions have been taken to safeguard staff members.

- Trenches more than four feet deep will have ladders or steps located so as to require no more than 25 feet of lateral travel.

- Hard hats and other personal protective equipment will be worn at all times during any type of excavating or trenching operation.

- Determine soil composition (e.g., through soil sampling, soil maps, etc.) and other relevant site conditions, with special emphasis on conditions conducive to cave-ins.

- Monitor the atmosphere in and around trenches on a regular basis to check for explosive, toxic or otherwise dangerous gases and vapors.

- The Contractor/Consultant Project Manager will insure that all staff members involved in the excavation activity have appropriate training in safe trenching practices, with emphasis on factors such as:
    - utility line identification
    - cave-in prevention measures
    - recognition of conditions which may cause cave-ins
    - means of egress from trench

- Water will not be allowed to accumulate in any excavation. Utilize ditches, dikes, pumps, or other means to keep surface water out of trenches.

- All open excavations must be well marked and barricaded.

Noise Reduction

Site activities in proximity to heavy equipment often expose workers to excessive noise. It is anticipated that situations may arise when noise levels may exceed the Cal/OSHA Action Level of 85 dBA in an 8-hour time-weighted average (TWA). An example of this possibility is working in close proximity to the subcontractor during drilling activities onsite. If excessive noise levels occur, efforts will be made to control this by issuance of earplugs to all personnel and by implementing a system of hand signals understood by all .

Daily Safe Work Practices

- Unauthorized personnel are not allowed onsite, particularly in the Exclusion Zone (EZ).
- Work groups inside exclusion zones will always consist of at least two (2) team members.
- Wind-flags will be positioned onsite so that work can be performed upwind as much as possible.
- A high standard of personal hygiene will be observed. Smoking, eating, drinking, chewing gum or tobacco, taking medication, and applying cosmetics will not be permitted within any restricted or exclusion zone.
- Wearing of contact lenses in contaminated atmospheres is prohibited.
- Open flames are not allowed anywhere onsite without a hot-work permit.
- Personnel under the obvious influence of alcohol or controlled substances are not allowed onsite; those taking medications must notify the SHSO.
- Personnel will avoid skin contact with contaminated or potentially contaminated media. If such contact occurs, the affected areas should be washed thoroughly with soap and water.
- Personnel will discard and replace any damaged or heavily soiled protective clothing. Discarded PPE will be drummed at the end of each day.
- Personnel should notify the SHSO of any defective monitoring, emergency, or other protective/safety equipment.
- A supply of potable water, electrolyte replacement solutions, shaded break area, and sufficient lighting will be maintained onsite; sanitary facilities will be accessible to personnel.
- Owners/operators of heavy equipment will ensure that they are in good working order by performing daily inspections and routine maintenance. Deficiencies affecting health and safety shall be corrected prior to equipment use.
- All unsafe conditions shall be made safe immediately. All unsafe conditions not in the scope of the project shall be reported to the PM and the condition corrected.
- All site personnel will familiarize themselves with these and the emergency procedures during daily tailgate and pre-work safety meetings.
- Following safe work practices reduces the likelihood of an accident, illness, or injury during field activities.
- Loose-fitting clothing or loose long hair are prohibited near moving machinery.

- Workers who are passengers or drivers of vehicles (both offsite and onsite) will wear their seat belts any time the vehicle is in motion.
- All internal combustion engines must have spark arrestors that meet the requirements for hazardous atmospheres if they are to be used in such areas.
- Do not fuel engines while vehicle is running.
- Where portable electric tools and appliances can be used (where there is no potential for flammable or explosive conditions), they will be equipped only with 3-wire grounded power and extension cords to prevent electrical shock.
- Store tools in clean, secure areas so they will not be damaged, lost, or stolen.

4. PROTECTIVE MEASURES

Personal Protective Equipment Requirements

(copy and paste a checkmark "✓"into appropriate boxes)

Required PPE	Task 1	Task 2	Task 3	Task 4	Task 5
Hard hat	✓	✓	✓	✓	✓
Safety glasses w/side shields	✓	✓	✓	✓	✓
Steel-toe footwear	✓	✓	✓	✓	✓
Hearing protection (plugs, muffs)	✓	✓	✓		✓
Tyvek ™ coveralls					
PE-coated Tyvek™ coveralls					
Boots, chemical resistant					
Boot covers, disposable					
Leather work gloves					
Inner gloves – Nitrile	✓	✓	✓	✓	✓
Outer gloves – Nitrile					
Tape all wrist/ankle interfaces					
Half-face respirator	#	#	#	#	#
Full-face respirator					
Organic vapor cartridges	#	#	#	#	#
Acid gas cartridges					
Other cartridges:					
P-100 (HEPA) filters	#	#	#	#	#
Face shield					
Personal Flotation Device (PFD)					
High-Visibility Safety Vest	✓	✓	✓	✓	✓
Other:					
Level of protection required [C or D]:	D	D	D	D	D

The PPE checked in any box above must be on site during the task being performed. Work shall not commence unless the PPE is present.

 # Have available for possible upgrade of PPE.

In the event of respirator use, H&A staff that may be required to wear a respirator must be:

- Medically qualified
- Fit tested
- Fresh shaven with no facial hair that will interfere with the seal. This includes one day hair growth or more, beards, excessive long side burns, and goatees.

Respirator Use and Maintenance Overview

Staff Member exposures to airborne contaminants should always be reduced as much as possible through engineering controls, substitution and/or work practices. If exposure can not be controlled through the above methods, respiratory protection will be used to ensure Staff Members exposures are maintained below regulatory levels.

Medical Evaluations:

Before a Staff Member is issued a respirator they will be enrolled in and approved through their employer's medical monitoring program.

Fit-Testing Procedures:

All Staff Members that are issued a respirator will be fit tested annually. Staff Members with beards, long side burns or other forms of facial hair which make contact with the sealing surface of the respirator are not fit tested and cannot wear respirators. Staff Members who have significant weight change, major dental surgery or facial surgery are required to notify the appropriate health and safety personnel in their organization so they can be re –fitted.

Respirator Procedures:

Respirator inspection, maintenance, storage and use are the responsibility of the individual to whom the respirator was issued. Respirators should be inspected for cracks, tears or loss of integrity, shape and general condition, condition of exhalation and inhalation valves, and head adjustment straps, and cartridge installation.

Respirator Maintenance and Repair:

Respirators should be maintained according to manufacturer specifications and any worn or damaged parts should be replaced with appropriate replacement parts. Damaged respirators that cannot be repaired should be discarded.

Storage:

Respirators should be stored in their original shipping container or other container that protects the article from damage or contamination. The storage container should be labeled with the appropriate Staff Members name. Respirators should be cleaned with a mild soap and water solution, disinfectant and thoroughly inspected prior to storage.

Cartridge Selection and Change-out:

Only NIOSH approved cartridges will be used. The cartridges will be selected based upon the types of contaminants and expected exposure levels.

Because of variability in the field and environmental exposures including temperature, humidity and contaminant level, and the lack of useful indicators of effective coverage, the following change-out schedule will be used:

Organic Vapors	8 hours, project completion or odor
Acid Gas	8 hours, project completion or odor
Particulate Only	24 hours of use, increased breathing resistance or project completion

At the completion of all projects requiring respiratory protection, the cartridges will be discarded, the respirator will be disinfected and stored properly.

Training:

Cal/OSHA-required training as it relates to respiratory protection is provided during the 40 hour HAZWOPER and 8-hour HAZWOPER refresher courses. Additional training may be necessary for specific project demands to ensure Staff Members are aware of a specific site condition.

Personal Hygiene Safeguards

Describe any additional safeguards other than basic decontamination procedures for personal hygiene. The following safeguards, at a minimum, shall be adhered to:

1. No Smoking or tobacco product on any Hazwoper project
2. No eating or dinking in the exclusion (hot) zone; and
3. It is especially important to wash your hands before eating, smoking, taking medication, chewing gum/tobacco, using the restroom, or applying cosmetics and before you leave the site for the day. It is recommended that personnel present on site shower or bathe at home at the end of each day of working on the site.

Site Safety Equipment

Check all items that are required to be on site:

☐ Fire Extinguisher	☑ First Aid Kit	☐ Flashlight
☐ Air horn/signaling device	☑ Cellular Phone	☐ Duct tape
☐ Ladder	☑ Barricade tape	☐ Drum dolly
☐ Two-way radio	☑ Safety cones	☐ Harness/Lanyard
☐ Other Specify		

The equipment checked in any box above must be on site during the task being performed. Work shall not commence unless the equipment is present.

Site Security & Work Area Controls

Access to each contaminated work area will be controlled during on-site activities as follows: Consider protection of both project and non-project personnel (e.g., general public, facility personnel).

The site is a private facility.

Can **site access** be controlled by a perimeter fence or similar means? ☑ Y ☐ N

If not, how will the site/work area be controlled during non-work hours to prevent access by unauthorized persons?

An exclusion area will be set up around equipment in the event of overnight set up.

Training Requirements

4.1.1 Health and Safety Training

Personnel will not be permitted to supervise or participate in field activities until they have been trained to a level required by their job function and responsibility. H&A staff members, contractors, subcontractors, and consultants who have the potential to be exposed to contaminated materials or physical hazards must complete the training described in the following sections.

The H&A Project Manager/LHSC will be responsible for maintaining and providing to the client/site manager documentation of H&A staff members' compliance with required training as requested. Records shall be maintained per Cal/OSHA requirements.

4.1.2 40-Hour Health and Safety Training

The 40-Hour Health and Safety Training course provides instruction on the nature of hazardous waste work, protective measures, proper use of personal protective equipment, recognition of signs and symptoms which might indicate exposure to hazardous substances, and decontamination procedures. It is required for all personnel working on-site, such as equipment operators, general laborers, and supervisors, who may be potentially exposed to hazardous substances, health hazards, or safety hazards consistent with 8 CCR 5192.

4.1.3 8-hour Annual Refresher Training

Personnel who complete the 40-hour health and safety training are subsequently required to attend an annual 8-hour refresher course to remain current in their training. When required, site personnel must be able to show proof of completion (i.e., certification) at an 8-hr refresher training course within the past 12 months.

4.1.4 8-Hour Supervisor Training

On-site managers and supervisors directly responsible for, or who supervise staff members engaged in hazardous waste operations, should have eight additional hours of Supervisor training in accordance with 8 CCR 5192. Supervisor Training includes, but is not limited to, accident reporting/investigation, regulatory compliance, work practice observations, auditing, and emergency response procedures.

4.1.5 Additional Training for Specific Projects

H&A personnel will ensure their personnel have received additional training on specific instrumentation, equipment, confined space entry, construction hazards, etc., as necessary to perform their duties. This specialized training will be provided to personnel before engaging in the specific work activities. Any staff member engaging in the following activities will be required to have additional training:

- Client specific training or orientation
- Competent person excavations
- Confined space entry (entrant, supervisor, and attendant)
- Heavy equipment including aerial lifts and forklifts
- First aid/ CPR
- Diving
- Use of fall protection
- Commercial Drivers License
- Use of Nuclear Density Gauges
- Asbestos

5. MONITORING PLAN AND EQUIPMENT

Is air/**exposure monitoring** required at this work site for personal protection? ☑ Y ☐ N

The groundwater monitoring wells are being installed in areas which are paved with concrete. Therefore, it is unlikely that dust will be an issue.

Is **perimeter monitoring** required for community protection? ☐ Y ☑ N

See above

Monitoring/Screening Equipment

required to be on site:

☐ HNu analyzer (PID) ☐ 10.2eV ☐ 11.7eV

☐ Organic vapor monitor (FID)

☑ Photovac Micro Tip, 10.6eV

☐ Photovac GC

☑ Other Specify Particulate sampling for lead

☑ Combustible Gas Indicator (CGI) (LEL)

☐ Multiple Gas Detector-LEL/O_2/H_2S/CO

☑ Dust Monitors (RAMs) Real time and 15-minute time-weighted averages

☑ Colorimetric tubes Specify: **For 1,1-dichloroethene (DCE)**. When collecting soil samples or conducting demolition monitoring or excavation observation activities in areas with suspected elevated 1,1-DCE concentrations.

Standard Action Levels And Required Responses

For readings obtained with a multiple gas detector or an individual monitoring instrument are listed in Table 2. Specific Ionization potentials and exposure limits are listed in Table 1.

Description of Monitoring Requirements (include frequency and location by Task):

Monitoring Plan for Task Number(s):	1	Frequency	n/a	times per	n/a

When sampling soils: PID and Miniram dust monitor

Monitoring Plan for Task Number(s):	2	Frequency	1	times per	15 min

When conducting soil gas survey: PID

Monitoring Plan for Task Number(s):	3	Frequency	1	times per	15 min

When conducting demolition monitoring: PID and Miniram dust monitor

Monitoring Plan for Task Number(s):	4	Frequency	1	times per	15 min

Note: Miniram dust monitor action levels will be verified by personal air sampling results (at a minimum to be conducted the first two days of demolition monitoring in an area outside of the elevated lead area in proximity to the former railway loading area). Excavation in the above-noted elevated lead area will not be conducted until the personal air sampling is conducted to confirm the protectiveness of the identified action level for this area (Table 2).

Air Sample Locations

1. Personal Monitoring

   Personal monitoring will take place at times in the task-specific health & safety requirements. In scheduling personal monitoring, consideration will be given to collecting samples at times of maximum potential exposure. Samples will be collected in the staff members' breathing zone (9 inch radius hemisphere centered at the nose and forward of the shoulders) utilizing direct reading instruments.

   Personal monitoring will be conducted for the first two days of Task 5 activities in an area outside of the elevated lead area in proximity to the former railway loading area. Each personal sample will be collected using a calibrated personal air sampling pump (e.g., Gilian GilAir Sampling Pump or equivalent) equipped with clean tubing, a filter holder, and a laboratory-provided clean filter with a 0.8 micron cellulose ester membrane following either NIOSH method 7105 or 7082. The personal air sampling pump shall be calibrated by the rental firm (e.g., Ashtead Rentals in Irvine) to 3 Liters/minute. Documentation certifying the pump calibration must be obtained and maintained as part of the project file. The sampling pump shall be clipped to the person being monitored and the filter holder shall remain in the breathing zone of the person during the 8-hour work day. The pump shall remain in the above-noted position, operating during the 8-hour sampling period. The pump shall not be turned off or the filter moved during break periods or other non-work activities. The filter will be removed, labeled, placed in a sealed plastic bag, and transported under chain-of-custody to the laboratory (LA Testing in Los Alamitos – 714.828.4999) for 24-hour turn around time for total particulate and lead analysis.

2. Work Area Monitoring

   Real-time air monitoring for volatile organic compounds and total particulates will be conducted on a regular basis within and immediately downwind of the work area (exclusion zone or work area perimeter) as described in the field monitoring section. The action levels for PID, Miniram dust monitor, and colorimetric tube measurements are listed in Table 2. Table 2 also includes the required actions should the action levels be exceeded.

Action Levels (Summary)

Project action levels will be determined by the Haley & Aldrich Site Safety Officer based upon site conditions and information and will be presented in the task-specific health & safety requirements. The levels defined in Tables 1 and 2 of this HASP will serve as guidelines for project action levels.

Calibration and use of Equipment

Calibrate all monitoring equipment in accordance with manufacturers requirements and site specific requirements (e.g., at the beginning and end of each work day). Calibration of equipment shall be documented in the field notes or Daily Field Report (DFR).

Calibration data will be recorded in a bound field notebook or in the field notes. Documentation should include:

- Date/time
- Zero reading before calibration
- Concentration of calibration gas
- Reading obtained with calibration gas before adjusting span
- Final reading obtained with calibration gas after adjusting span

Air monitoring for exposure should be based on the frequency established above. Record time, location and results of monitoring and actions taken based upon the readings.

Use the H&A established SOPs for equipment calibration in the H&A SOP's located on the Intranet.

Records of all air monitoring results will be maintained in project files and communicated in writing by the Project Manager to all affected employees in compliance with applicable state and federal notification and recordkeeping requirements.

6. DECONTAMINATION

Personnel Decontamination

Are **decontamination procedures** required for personnel working on site? ☑ Y ☐ N
If yes, describe steps:

Task 1:

1. Gloves will be discarded into trash bags and disposed of in proper trash receptacles.

2. Hands, arms, and other exposed areas will be washed with soapy water and rinsed in a three step decontamination station.

Tasks 2 and 3:

Step 1 - Equipment Drop

- Deposit equipment used on site (tools, sampling devices, monitoring equipment, radios, etc.) on plastic drop cloths.
- Decontaminate or dispose of items before removal from the exclusion zone.

Step 2 - Outer Boot/Glove Wash and Rinse

- Scrub outer boots/gloves with decontamination solution.
- Rinse using water.

Step 3 - Outer Boot/Glove Removal

- Remove outer boots/gloves.

- If outer boots/gloves are disposable, deposit in container with plastic liner.
- If outer boots/gloves are non-disposable, store in a clean, dry location.

Step 4 - Outer Garment Removal

- If using self-contained breathing apparatus (SCBA), remove SCBA backpack and keep the face piece on until garments are removed. Remove chemical protective outer garments and deposit in appropriate container.

Step 5 - Respiratory Protection Removal

- Remove hard hat and face piece, and place them on a clean surface.
- Wash and rinse face piece.
- Wipe off and store face piece in a clean, dry location.

Step 6 - Inner Glove Removal

- Remove inner gloves.
- Deposit in container for disposal.

Step 7 - Field Wash

- Thoroughly wash hands and face with soap and water.
- Shower as soon as possible.

Location of decontamination station: Near drill rig and at stations on site

Disposal of PPE: PPE will be contained in trash bags and disposed of in a proper trash receptacle.

Tools & Equipment Decontamination

All decon should be conducted at the site and not at the office or lab.

- All drilling equipment (i.e. augers, rods, bits, sampling tubes, etc.) will be steam cleaned with pressurized steam prior to the onset of drilling activities, between boring locations, and before leaving the site.

- Steam cleaning will be conducted in a designated area on site, which will be determined by the onsite H&A representative at the site.

- All vapor well materials (casings, screens, caps, plugs, and protective casings) will be cleaned with a low-temperature, pressurized water rinse prior to installation.

- Water generated from cleaning new monitor well materials or from initial steam cleaning of pre-cleaned drilling equipment prior to its first use on the site will not be maintained.

- Sample collection equipment (split-spoon samplers, hand augers, bailers, collection utensils, etc.) will be decontaminated before initial use, between samples, and before leaving the site with a non-phosphate detergent wash and/or high-pressure steam, tap water rinse, and final triplicate deionized water rinse.

- After decontamination, sample collection equipment will not be transported to the sampling location on unclean surfaces (e.g., transport in or on new plastic).

- Contractors are responsible to decontaminate their own equipment.

Check all **equipment and materials needed for decontamination** of tools and other equipment:

☐ Acetone	☑ Distilled water	☑ Poly sheeting
☑ Alconox soap	☑ Drums for water	☑ Steam cleaner
☑ Brushes	☐ Hexane	☑ Tap water
☑ Disposal bags	☐ Methanol	☑ Washtubs
☐ Other Specify		

Disposal methods for contaminated decontamination materials (e.g., wash water, rags, brushes, poly sheeting) will consist of:

Decon water and soil cuttings will be placed in 55-gallon drums. These will be stored on-site pending laboratory analysis, and subsequently disposed of properly.

Contaminated Soil Sent to Geotechnical Lab

Assignments that include geotechnical lab testing on contaminated samples must be accompanied with written data that will provide information on the type and extent of contamination. Project Managers **must communicate** any anticipated or known chemical hazards to the lab when assigning geotechnical tests. Preferably, **a copy of this HASP** should be forwarded to the laboratory for their review. If the contamination is not known, the PM must contact the laboratory and discuss the potential source of the sample to help identify any hazards that may be associated with the sample.

7. CONTINGENCY PLANNING

How H&A responds to an emergency depends on whether we are at an active facility or another other location. **Many active facilities have very stringent requirements for the mitigation of emergencies.** Therefore, the PM is responsible for identifying any specific requirements from the client contact.

As a rule of thumb, the following are H&A's basic responses to handling Emergencies. Typically, H&A does not mitigate emergencies. When Clients request or require specific functions such as First Aid/CPR trained personnel on site, we typically conform. Before any Project Manager or LHSC agrees to something more stringent, many issues should be considered such as training, safety, feasibility of an adequate response, insurance requirements, and much more.

Fire

- Major Fires - Major fires will be mitigated by the local fire departments or by client's on-site fire/emergency response departments.
- Incipient Stage Fires -Incipient stage fires will be extinguished by on-site personnel using fire extinguishers. Only those who have received annual training may use an extinguisher.

Medical

All H&A employee injuries and illnesses will be documented using the Supervisor's Accident / Injury / Near Miss Report (SAIR). This form is available on the Intranet.

- First Aid - First aid will be addressed using the on-site first aid kit. H&A employees are not required or expected to administer first aid/CPR to any H&A, Contractor, or Civilian personnel at any time and it is H&A's position that those who do are doing it on their behalf and not as a function of their job.
- Trauma - Based upon the nature of the injury, the injured party may be transported to the nearest hospital or emergency clinic by on-site personnel or by ambulance. First response to a trauma incident is to call 911 or facility security. H&A staff members are expected to assist in ancillary roles only such as directing ambulances to the scene. It is the discretion of the staff member on site whether an ambulance should be procured in remote locations where ambulance services will not be effective.

Hazardous Materials Spill

- Small incidental spills (e.g.- pint of motor oil) caused by H&A employees and/or by the contractor will be mitigated by the H&A staff member and/or the contractor.
- Large spills (e.g.- large leak from heavy equipment fuel tank) The contractor is responsible for cleanup. In the event that it posses a serious human or environmental threat, the local Fire Department and/or client emergency response department will be contacted. Once emergency has been mitigated typically clean up will be provided by a vendor.

Rescue

H&A employees will not enter any confined spaces for rescue purposes.

Emergency Alarming and Communication

In the event of an emergency, on site H&A personnel and Subcontractors shall assemble in a designated area. Role shall be completed by the SSO or senior-most H&A person present. No personnel shall leave the assembly area unless directed to do so by Project management, the SSO, or recognized emergency response agency (e.g., police, fire department).

Evacuation alarms and/or emergency information will be communicated among personnel on site by the following means: Verbal communication.

If communication will be by other means, describe:

Emergency services will be summoned: Via on-site cell phone.

The **site evacuation plan** will be decided each day during the tailgate meeting.

Reporting Incidents

Detailed reporting procedures for work-related accidents and incidents involving H&A staff members consist of the following sequential steps:

1. **Initial notification** - The staff member who is injured or otherwise directly involved in a work-related incident is responsible for immediately notifying his/her supervisor (staff manager) of the event. Obviously, any other staff member present at the site may make the notification if the injury is serious and/or debilitating.

2. **Secondary notifications** - The staff manager shall notify his/her Local H&S Coordinator (LHSC) of the accident/incident as soon as possible after the initial response is completed. If a serious work-related injury occurs, the staff manager shall also directly notify the Corporate H&S Manager. The LHSC shall notify the Corporate H&S Manager in all minor cases. The Corporate H&S Manager will, in turn, be responsible for notifying senior H&A management, via email and/or phone, as necessary.

   All work-related injuries, illnesses, and near misses shall be reported to the LHSC, regardless of severity. Thus, at a minimum, all first aid cases must be reported. It

is not the responsibility of the staff manager or project manager to determine what shall be reported to the LHSC. The LHSC will work closely with the CHSM to determine reportability and recordability of an injury/illness on each case.

3. **Accident report** - After the initial response (medical attention, etc.) is completed, the accountable staff manager is responsible for initiating an investigation into the cause of the accident/incident and for completing the H&A accident/incident report form. The H&A "Supervisor Accident/Injury/Near Miss Report" (SAIR) form is posted on the H&A H&S Intranet: go to "Health & Safety"- "Forms"). In the case of large projects, the field supervisor may initiate this.

   The staff manager is responsible for submitting the completed report to the LHSC by the close of business on the day following the event (24 hours). Again, if a serious work-related injury/incident occurs, the staff manager shall fax the report directly to the Corporate H&S Manager.

4. **Report distribution** – Copies of the report shall immediately be forwarded to the Corporate HR Representative via fax and CHSM for placement in the respective incident/injury case and workers' compensation files. This is the responsibility of the LHSC. In the event that the LHSC is not available, the staff manager will be delegated the responsibility.

   Corporate HR will ensure a "First Report of Injury or Illness" report is filed with our insurance carrier, currently Liberty Mutual. This will fulfill our obligation to meet Cal/OSHA recordkeeping requirements and begin the process to ensure medical bills are properly processed through our workers compensation carrier.

   The LHSC will contact the Corporate H&S Manager to discuss recording the injury on the OSHA 300 log and summary of occupational injuries and illnesses.

5. **Corrective actions** - The staff manager and LHSC (with input from the injured staff member and other staff members involved in the incident) are responsible for determining a course of action to ensure that the accident/incident does not occur again. Responses to serious work-related accidents or incidents may require the approval of the Corporate H&S Manager and senior management.

It is important that all H&A staff members understand these reporting procedures and the significance of the role of the staff member's staff manager in the process of responding to and reporting on-the-job injuries, illnesses and near misses.

Seeking Medical Attention-

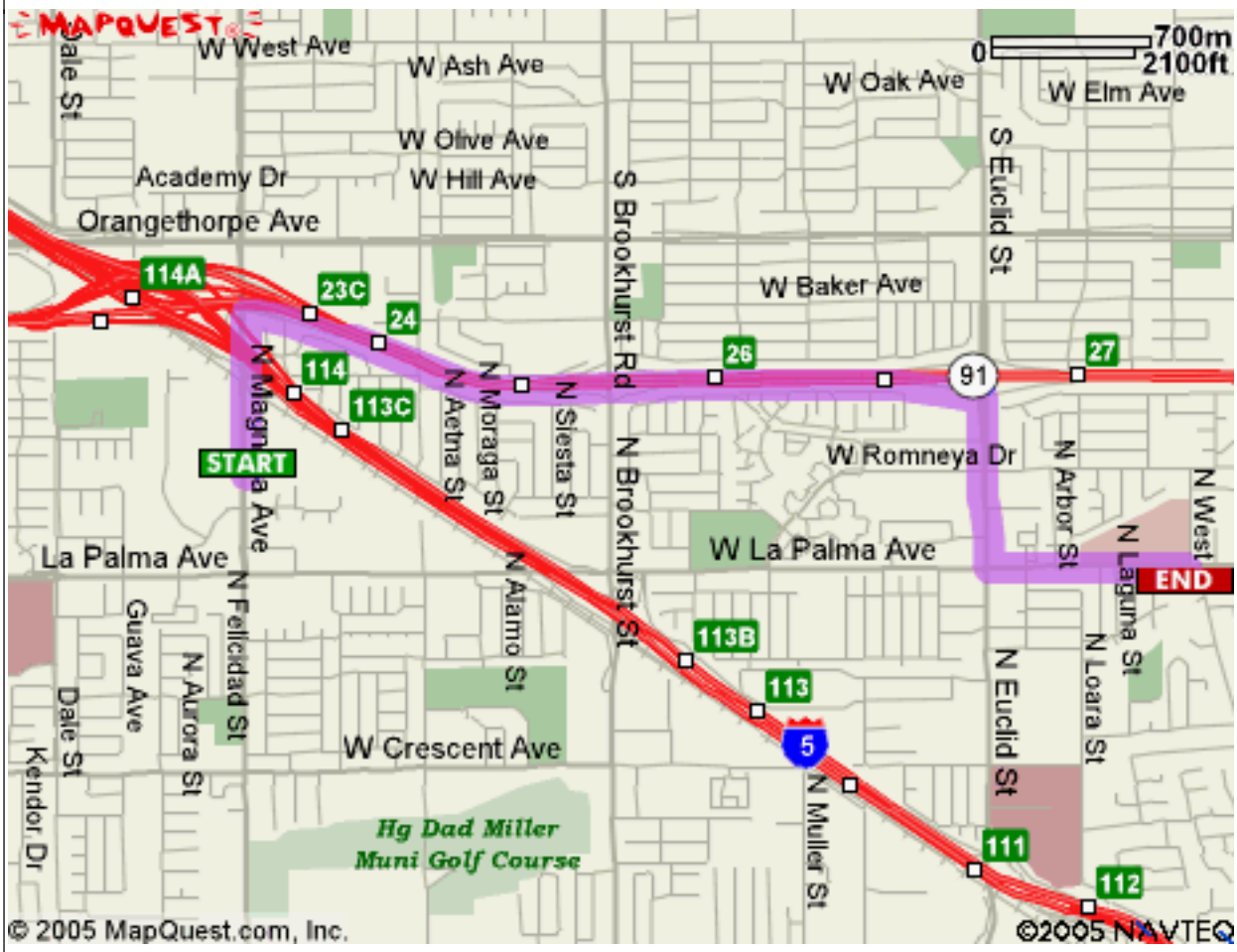
The staff member should seek emergency medical services from an institution that is convenient for the services needed, such as a clinic, hospital, etc. If the injury is not an emergency, but medical treatment is required, refer the staff member to the listed Workers' Compensation Health Care Provider closest to the office. A list of providers is available from HR in Boston. The staff member may seek medical services from their own physician, but only if a signed notification form is on file with the Company stating that they prefer to be examined by their own physician in the event of a work-related injury. A list of Company-designated

providers and local claim offices is available upon request. (Concentra Medical Clinic at 2121 Towne Center Place, Suite 100, Anaheim CA)

EMERGENCY RESPONSE RESOURCES

Nearest Hospital: (see attached map) Address: Phone Number:	**Anaheim Memorial Hospital** **1111 W. La Palma** **Anaheim, CA 92801** **714-774-1450**
Emergency Response Number:	**911**
Local Emergency Response Number (if not on 911 system):	NA
Other Ambulance, Fire, Police, or Environmental Emergency Resources:	**Buena Park Police Dept.** **6650 Beach Blvd.** **Buena Park, CA** **714-562-3901**
H&A Project Manager: Phone Number: Emergency Phone Number: Client Contact/Project Manager: Phone Number: Emergency Phone Number:	**Tom Tatnall** **Office (714) 984-2105; Cell (714) 709-3722** **Brea Reception 714-985-2100** Tim Renner 317-504-8265 317-504-8265
Other Entity: Address: Phone Number:	NA

Start out going NORTH on N MAGNOLIA AVE toward BUCKINGHAM ST.
Turn RIGHT onto BUCKINGHAM ST.
Merge onto CA-91 E.
Take the EUCLID ST exit.
Turn RIGHT onto N EUCLID ST.
Turn LEFT onto W LA PALMA AVE.
End at **Anaheim Memorial Hospital**
1111 W La Palma Ave, Anaheim, CA 92801



APPENDIX A
HASP Amendment Form

This Appendix is to be used whenever there is an immediate change in the project scope that would require an amendment to the HASP. For project scope changes associated with "add-on" tasks, the changes must be made in the body of the HASP. Before changes can be made, a review of the potential hazards must be initiated by the H&A Project Manager.

Amendment No.	
Site Name:	
Work Assignment No.:	
Date:	
Type of Amendment:	
Reason for Amendment:	
Alternate Safeguard Procedures:	
Required Changes in PPE:	

Project Manager Signature: _____ Date: _____

Local Health and Safety Coordinator : _____ Date: _____

This original form must remain on site with the original HASP. If additional HASPs are in the field, it is the PMs responsibility to forward a signed copy of this amendment to those who have copies.

TABLE 1
HAZARD MONITORING

CONTAMINANTS OF CONCERN	ROUTES OF EXPOSURE	IDLH	PEL	TLV	PID (IP eV)	FID	ODOR THRES-HOLD	IRRITATION THRESHOLD	ODOR DESCRIPTION	MAXIMUM ON-SITE CONCENTRATION IN UPPER 10 FEET OF SOIL (MG/KG)	PARTICULATE EQUIVALENT CONCENTRATION (MG/KG)
1,1-Dichloroethane	R,I,C	3000	100	100	--	80	200	--	Distinct		
1,1-Dichloroethylene (Vinylidene chloride, 1,1-DCE	R,I	Ca	--	5 Cv 20	*	40	190	--	--		
Naphthalene	R,A,I,C	250	10	10	8.14	--	0.3	E 15	Mothball-like		
Tetrachloroethylene (Perchloroethylene)	R,I,C	Ca	100	25	9.32	70	4.68	N.T513-690	Ether, chloroform-like		
Trichloroethylene	R,I,C	Ca (1000)	100	50	9.47	70	21.4	--	Solventy, chloroform-like		
Vinyl Chloride	R	Ca	1	2	9.995	--	3000	--	Ethereal		
DUSTS, MISTS AND MISCELLANEOUS COMPOUNDS											
PAHs (as benzo(a)pyrene)	I,C	Ca	0.2 mg/m^3	0.1 mg/m^3	--	--	--	--	--	24.1 mg/m^3	8,300 mg/m^3
PCBs-42% Chlorine	R,A,I,C	Ca	1 mg/m^3 Sk	1 mg/m^3 Sk	--	--	--	--	Mild, hydrocarbon	27,800 mg/m^3	17.9 mg/m^3
PCBs-54% Chlorine	R,A,I,C	Ca	0.5 mg/m^3 Sk	0.5 mg/m^3 Sk	--	--	--	--	Mild, hydrocarbon	27,800 mg/m^3	17.9 mg/m^3
Arsenic- inorganic	R,A,I,C	Ca	0.01 mg/m^3	0.2 mg/m^3	--	--	--	--	--	2,220 mg/m^3	4.5 mg/m^3
Lead - arsenate	R,I,C	Ca	0.05 mg/m^3	0.15 mg/m^3	--	--	--	--	--	643,900 mg/m^3	0.047 mg/m^3 (When rail road loading area (AOI 48) is uncovered and remediation of that area is not yet complete) 0.41 mg/m^3 (during times other than above)
- inorg. dust & fume	R,I,C	--	0.03 mg/m^3	0.15 mg/m^3	--	--	--	--	--		
- chromate	R,I,C	--	--	0.05 mg/m^3	--	--	--	--	--		
Nuisance Dust			5mg/m^3(Resp) 15mg/m^3(total)								
Portland cement	R,I,C	--	15 mg/m^3	10 mg/m^3	--	--	--	--	--		

Notes: All units in ppm unless otherwise noted.

R = Respiratory (Inhalation) I = Ingestion A = Skin Absorption C = Skin and/or Eye Contact
Cv = Ceiling value Ca = Carcinogen Sk = Skin
** = Use 11.7 eV lamp

Particulate equivalent concentration (mg soil/ m3) = PEL or PEL action level (mg/m3) / max soil concentration (mg/kg) x 10^6 mg/kg

TABLE 2
Last Revised August 2007

MONITORING METHOD, ACTION LEVELS AND PROTECTIVE MEASURES

INSTRUMENT	HAZARD	ACTION LEVEL	ACTION RESPONSE
Respirable Dust Monitor	Total Particulates (as lead)	> 0.047 mg/m^3 (when rail road loading area (AOI 48) is uncovered and remediation of that area is not yet complete) >0.41 mg/m^3 (during times other than above) Sustained for >5 minutes in the breathing zone.	Upgrade to Level C Protection
Personal Monitoring for Lead	Lead in Total Particulates	>0.03 mg/kg 8-hour TWA (Personal monitoring for lead will be used to confirm respirable dust monitoring action levels)	Upgrade to Level C Protection
OVA, HNU(2), Photovac Microtip	Total Organic Vapors	Background 10 ppm > background or lowest OSHA permissible exposure limit, whichever is lower, or as modified for this task. Sustained for >5 minutes in the breathing zone. 50 ppm over background, unless lower values required due to respirator protection factors	Level D Protection Upgrade to Level C - site evacuation may be necessary for specific compounds Cease work; upgrade to Level B(3) may be required
Drager Tubes	Vapors/Gases	Species Dependent > 1 ppm 1,1-DCE	Consult Table 1 or other resources for concentration toxicity/detection data. Upgrade to Level C if concentration of compounds exceed thresholds shown at left; May need to cease work if other levels exceeded - site specific

Notes:
1. Monitor breathing zone.
2. Can also be used to monitor some inorganic species.
3. Positive pressure demand self contained breathing apparatus
4. Lower explosive limit (LEL) scale is 0-100%. LEL for most gasses is 15%.
5. Normal atmospheric oxygen concentration at sea level is 20%
6. Background gamma radiation is ~0.01-0.02 millirems/hour.
7. Contact H&A Health and Safety staff immediately.

DELPHI SYSTEMS CORP.

CORRECTIVE MEASURES PROPOSAL

APPENDIX B

DUST MONITORING PLAN

DUST MONITORING PLAN
SOIL AND CONCRETE EXCAVATION AND MATERIALS MANAGEMENT ACTIVITIES
FORMER DELPHI FACILITY
ANAHEIM, CALIFORNIA

by

Haley & Aldrich, Inc.
Brea, California

for

Delphi Corporation
Troy, Michigan

File No. 32486-011
August 2007

HALEY&
ALDRICH

TABLE OF CONTENTS

1. INTRODUCTION

This Dust Monitoring Plan (DMP) describes air monitoring for particulate matter (fugitive dust) during implementation of the Corrective Measures Proposal for impacted soil and concrete excavation activities at the Former Delphi Battery Operation Facility (Site) in Anaheim, California (Figure 1 of the CMP). Dust monitoring will be conducted during excavation of soil and concrete containing non-volatile chemicals of potential concern (COPCs) at concentrations greater than the Site-specific remediation criteria. The dust monitoring activities will be conducted to:

- Comply with the South Coast Air Quality Management District (SCAQMD) Rule 403 as amended 3 June 2005; and
- Protect worker and community health.

This DMP has been developed as an integrated part of the Corrective Measures Proposal (CMP) prepared for the Site. Specifically, this DMP includes descriptions of:

- The Site and the proposed soil and concrete excavation and materials management activities
- Implementation of SCAQMD Rule 403 monitoring
- SCAQMD Rule 403 dust mitigation actions
- SCAQMD Rule 403 recordkeeping requirements
- Action levels for worker and community health
- Dust monitoring procedures to protect worker and community health dust monitoring
- Worker and community health dust mitigation actions
- Other worker and community health recordkeeping activities

A copy of SCAQMD Rule 403 is presented in Appendix A.

2. BACKGROUND INFORMATION

The following sections describe the Site, the soil remediation areas, the proposed soil and concrete excavation and materials management activities, and a description of adjacent properties.

2.1 Site Description and Location

The Site is located at 1201 North Magnolia Avenue in the city of Anaheim, Orange County, California (Figures 1 and 2 of the CMP). The Site occupies approximately 22 acres in an area that is primarily commercial/industrial. The Site is bounded by Magnolia Avenue on the east, with commercial and office buildings further east. Directly to the north are two baseball fields used by the local Little League baseball organization. Highway 91 and Interstate 5 are located further north. On the west, the Site is bounded by industrial/commercial buildings and to the south by commercial and office buildings.

The Site is generally flat with a gentle slope to the west and north, although slopes vary locally across the Site. A chain link fence extends around the perimeter of the Site.

2.2 Site History and Background

A review of historical aerial photographs and topographic maps indicates that prior to construction of the battery manufacturing facility, the Site was used for agricultural purposes and appeared to contain an orange grove. 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 relatively major on-Site construction activities also occurred in 1963, 1974, and 1977, and included the construction of a warehouse and production line buildings.

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). Under DTSC oversight, the results of environmental investigations have been used to delineate the extent of impacts from former activities on-Site. In addition, a health risk assessment has been performed to establish Site-specific remediation criteria that are protective of human health and the environment and that will enable the Site to be redeveloped for commercial/industrial uses.

The CACA addresses assessment and remediation of chemical impacts found in some of the thirteen solid waste management units (SWMUs) and 53 Areas of Concern (AOIs) identified during investigations performed for Phase I Environmental Site Assessment (ESA), Current Conditions Report (CCR), and Facility Investigation (FI) performed by Haley and Aldrich and others at the Site. As the required by the CACA issued by DTSC, Delphi is submitting a Corrective Measures Proposal (CMP) to DTSC to describe proposed Site remediation activities. This air monitoring plan is a component of the proposed remediation activities (also referred to as corrective measures) outlined in the Site-specific CMP.

2.3 Chemicals of Potential Concern

The COPCs for which remediation criteria have been developed for the Site include:

- Lead
- Arsenic
- Antimony
- Chromium IV
- Polychlorinated Biphenyls (PCBs)
- Volatile Organic Compounds (VOCs) including: 1,1- dichloroethane, 1,1-dichloroethene, 1,2-dichloropropane, tetrachloroethene, vinyl chloride, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and naphthalene
- Semi-Volatile Organic Compounds (SVOCs) including the following polynuclear aromatic hydrocarbons (PAHs): benzo(a)anthracene, benzo(a) pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene

Areas impacted by COPCs and proposed for excavation are shown on figures in the CMP. The impacted media include concrete, soil, soil gas, and groundwater. A majority of the impacted areas identified are located in former storage areas along the west-central part of the Site. Impacted areas to be remediated are shown on Figure 10 of the CMP for concrete removal areas and Figure 11 of the CMP for soil excavation areas.

2.4 Excavation Areas

COC-impacted soil was identified during the Facility Investigation activities conducted in 2005 and 2006. A summary of these activities is presented in the document entitled *Facility Investigation Report* (Haley & Aldrich, 2006). A Site-specific human health risk assessment (HHRA) is presented in Appendix G of the FI Report. The recommended HHRA-based soil and concrete remediation criteria are listed in Table 1 of the CMP. Based on the sample results, the area containing COC concentrations greater than the remediation criteria are shown on Figure 11 of the CMP for soil and Figure 10 for concrete. This soil and concrete will be excavated and removed from the Site as described in the CMP.

2.5 Soil Excavation and Management

It is proposed that heavy excavation equipment such as scrapers and backhoes will be used during the remedial excavation operations. Excavated soils will be temporarily stockpiled in an on-Site staging area and will be transferred to trucks under manifest for transport to an appropriately regulated facility. Additional details regarding the proposed soil and concrete excavation and materials management activities are presented in the CMP.

3. SCAQMD RULE 403 MONITORING

The purpose of Rule 403 is to reduce the amount of particulate matter entrained in the ambient air as a result of anthropogenic fugitive dust sources by requiring actions to prevent, reduce, or mitigate fugitive dust emissions. Rule 403 applies to the soil remediation activities since excavating and backfilling can generate fugitive dust. For the purposes of complying with Rule 403, the proposed activities at the Site are not considered to be "large operations", defined under this Rule as any active operations on a property which contains 50 or more acres of disturbed surface area; or any earth-moving operation with a daily earth-moving or throughput volume of 3,850 cubic meters (5,000 cubic yards) or more three times during the most recent 365-day period. Thus, as outlined in Rule 403, the proposed on-Site activities shall comply with follow Table 1 of Rule 403.

Pursuant to Table 1 of Rule 403, the following measures will be implemented:

- Conduct observations for visible dust
- Prevent dust from remaining visible in the atmosphere beyond the fence line of the Site
- Minimize dust generation by using best available control measures
- Mitigate visible fugitive dust, if detected.

The SCAQMD Rule 403 (d) (3) states that no person shall cause or allow PM_{10} (particulate mater less than 10 microns in diameter) levels to exceed 50 micrograms per cubic meter ($\mu g/m^3$) when measured over a 5-hour period. The PM_{10} levels are determined by evaluating the difference between upwind and downwind samples measured over a 5-hour period. At its discretion, SCAQMD may conduct particulate sampling at any site where fugitive dust emissions are suspected.

3.1 Observations

In general, the approach to Rule 403 monitoring will be to implement routine dust control measures identified as best available control measures in Table 1 of Rule 403. The excavation contractor will be responsible for implementing dust control measures on a daily basis. Haley & Aldrich will be present to observe the soil and concrete excavation and materials management activities, and conduct air monitoring and recordkeeping activities, and will immediately notify the excavation contractor if visible dust emissions exceed 100 feet in length in any direction.

3.2 Dust Control Measures

As described in Table 1 of the Rule 403 Handbook, the following best available control measures will be conducted during the excavation activities:

- Pre-apply water to depth of proposed cuts.
- Re-apply water as necessary to maintain soils in a damp condition to ensure that visible emissions do not exceed 100 feet in any direction. An odor suppressant may also be used that act as an additional control agent for fugitive dust generation.

If visible dust is observed, the excavation contractor will implement dust control mitigation measures as summarized in Table 1 of Rule 403; which includes increasing dust control measures until no visible dust is observed. If additional watering is conducted and is ineffective or cannot be implemented satisfactorily (e.g., with no runoff or discharge from the Site), then these operations will be discontinued and alternative dust suppression measures will be implemented.

3.3 Recordkeeping

The SCAQMD does not require record keeping on sites that do not contain large operations defined by Rule 403. However, Haley & Aldrich personnel will take field notes to document the observed field activities.

4. SITE-SPECIFIC WORKER AND COMMUNITY HEALTH AIR QUALITY MONITORING

During soil and concrete excavation and materials management activities, ambient air monitoring will be implemented to:

- Monitor potential on-site impacts to ambient air from the excavation and materials management activities
- Monitor potential off-site (community) impacts
- Assess whether mitigation measures are necessary to protect worker and/or community health

4.1 Action Levels

COPCs may be bound to dust particles emitted from the Site during excavation and materials management activities. Dust action levels have been derived to be protective of on-Site workers and the adjacent community. The derivation of these action levels is provided below. The associated calculations are presented in Appendix B.

4.1.1 Site Perimeters

The perimeter action level for nuisance dust monitoring specified in Rule 403 is 0.05 mg/m^3 (equivalent to 50 $\mu g/m^3$) greater than the measured upwind background level based on a 5-hour time weighted average. To ensure that measured fugitive dust concentrations are considered protective for the community during on-Site soil and concrete excavation and materials management activities, estimated maximum fugitive dust concentrations were compared to separate COPC-specific perimeter action levels developed for Site-specific COPCs being remediated. These COPC-specific perimeter action levels are dust equivalent concentrations derived using Office of Environmental Health Hazard Assessment (OEHHA) Acute Reference Exposure Levels (RELs) and the maximum measured COPC concentrations in on-Site soil and concrete. These calculations are presented in Appendix B. A COPC-specific perimeter action level was derived for arsenic. There are no acute RELs for the other COPCs, so COPC-specific perimeter action levels were not developed for the other COPCs. Arsenic was considered to be an indicator COPC for evaluating Site perimeter dust monitoring action levels.

The derived arsenic Site perimeter action level (Appendix B) is 0.086 mg/m^3 (86 $\mu g/m^3$). This level is greater than the above-identified Rule 403 dust action level of 0.05 mg/m^3. Therefore, the Rule 403 action level is considered to provide adequate protection during Site remediation activities.

In addition, an evaluation was conducted to assess whether inhalation of fugitive dust and VOCs in ambient may pose a significant health risk to children playing in the adjacent ball fields or to adjacent commercial/industrial workers during the onsite remediation/construction activities, and thus whether the Rule 403 dust action level of 50 $\mu g/m^3$ would be protective for these potential receptors. For the child playing on the adjacent ball fields, it was assumed that a child (15 kg bodyweight) would play on

the ball fields 3 hours each day for 3 days each week for 6 months during the year that Site remediation/construction activities were occurring, the inhalation rate for the child would be for a moderate level of activity. For the adjacent commercial/industrial worker, it was assumed that the adult (70 kg bodyweight) would be outside of the adjacent commercial/industrial building 4 hours each workday over a 1 year period, and the inhalation rate for the adult would be consistent with the DTSC default value of 14 m^3/8-hour workday. The human health risk assessment (HHRA) calculations for these receptors are attached in Appendix C. A review of the results indicates that the total hazard index (HI) and cumulative incremental lifetime cancer risk (ILCR) results for both receptors are less than 1.0 and $1x10^{-6}$, respectively, and therefore the Rule 403 action level is considered to be protective for these receptors.

4.1.2 Areas Occupied by Workers

The Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL) for respirable dust is 5 mg/m^3. PELs are time weighted average concentrations that must not be exceeded during any 8-hour work shift of a 40-hour workweek.

To ensure that the respirable dust PEL is protective enough for fugitive dust generated from COPC-impacted soil and concrete excavation and materials management activities at the Site, the estimated maximum fugitive dust concentrations were compared to a separate COPC-specific worker action levels developed for Site-specific COPCs being remediated. These COPC-specific worker action levels are dust equivalent concentrations derived using PELs and the maximum measured COPC concentrations in on-Site soil and concrete. These calculations are presented in Appendix B. A COPC-specific worker action level was derived for lead, arsenic, antimony, PAHs as benzo(a)pyrene, and PCBs. These COPCs were considered indicator chemicals for worker monitoring activities.

The derived COPC-specific action levels are as follows:

- Lead 0.047 mg/m^3 (when rail road loading areas (AOI 48 is uncovered and remediation of that area is not yet complete)
- Lead 0.41 mg/m^3 (during times other than above)
- Arsenic 4.5 mg/m^3
- Antimony 5.6 mg/m^3
- Benzo(a)pyrene 8,300 mg/m^3
- PCBs 17.9 mg/m^3

The lowest of the above-listed COPC-specific action levels was compared to the PEL for respirable nuisance dust of 5 mg/m^3. Since, this COPC-specific action level for lead is lower than that for respirable nuisance dust, it was selected as the worker action level for the proposed excavation and materials management activities at the Site.

To meet these requirements, the HASP (Haley & Aldrich, 2006d) indicates that for areas occupied by workers if ambient dust measurements exceed 0.047 mg/m^3 for

more than 5 minutes, dust suppression measures must be implemented. If dust suppression does not reduce ambient dust concentrations below 0.047 mg/m^3, activities must be ceased or respirators shall be donned. These action levels are measured as the difference from upwind background levels sustained for more than 5 minutes.

4.2 Equipment

A MIE Personal DataRAM (or equivalent) will be used for monitoring total dust to be used to assess the Site perimeter and worker action levels. The DataRAM is a portable real time particulate monitor with a concentration measurement range of 0.001 milligrams per meter (mg/m^3) to 400 mg/m^3 at an accuracy of $\pm$ 5%. This instrument has a particulate size range of maximum response of 0.1 to 10 microns. The calibration performed by the DataRAM manufacturer will be verified using a certified calibration bag at the beginning of each workday in accordance with the procedures specified by the manufacturer. Calibration logs will be maintained for each day.

A Noavalynx Model 110-WS-16 modular weather station (or equivalent) will be used to record wind speed, wind direction, temperature, relative humidity, and barometric pressure. The weather station can record wind speeds from 0 to 99.9 mph with an accuracy of $\pm$ 3%. The weather station will be set up in a location near the remedial excavation and materials management areas where interference from structures or trees will be minimal.

4.3 Measurement Frequency and Locations

Measurements will be taken throughout the workday as described in the following sections, when the subject remedial excavation and materials management activities are being conducted.

4.3.1 Site Perimeter

Dust level measurement frequency for Site perimeters will be every 15 minutes during the subject work activities. The 5-hour time weighted average (TWA_5) dust concentration will be recorded by the DataRAMs.

Measurement locations at Site perimeters will be based on prevailing wind direction with monitoring points established within 5 to 15 degrees of the measured upwind/downwind direction. Monitoring locations may be moved throughout the day based on wind direction. Perimeter monitoring locations include:

- One upwind location just inside the property boundary (fence line) at the further upwind direction, and
- One downwind location just inside the property boundary (fence line) at the further downwind direction.

4.3.2 Areas Occupied By Workers

Dust level measurement frequency for areas occupied by workers will be conducted at a frequency of every 15 minutes. When an ambient dust concentration of 0.047 mg/m^3 is detected in the work area when the rail road loading area (AOI 48) is

uncovered and remediation of that area is not yet complete,, readings will be monitored for a 5-minute period to determine if the measurement above the action level is sustained. When an ambient dust concentration of 0.41 mg/m^3 is detected in the work area when the rail road loading area (AOI 48) is covered and/or remediation of that area is complete, readings will be monitored for a 5-minute period to determine if the measurement above the action level is sustained.

Miniram dust monitor action levels will be verified by personal air sampling results (at a minimum to be conducted the first day of the subject activities in an area outside of the apparently most elevated lead impact area in proximity to the former railway loading area. Excavation in the above-noted elevated lead area will not be conducted until the personal air sampling is conducted to confirm the protectiveness of the identified action level. In scheduling personal monitoring, consideration will be given to collecting samples at times of maximum potential exposure. Samples will be collected in the staff members' breathing zone (9-inch radius hemisphere centered at the nose and forward of the shoulders).

Each personal sample will be collected using a calibrated personal air sampling pump (e.g., Gilian GilAir Sampling Pump or equivalent) equipped with clean tubing, a filter holder, and a laboratory-provided clean filter with a 0.8 micron cellulose ester membrane following either NIOSH method 7105 or 7082. The personal air sampling pump shall be calibrated by the rental firm (e.g., Ashtead Rentals in Irvine) to 3 Liters/minute. Documentation certifying the pump calibration must be obtained and maintained as part of the project file. The sampling pump shall be clipped to the person being monitored and the filter holder shall remain in the breathing zone of the person during the 8-hour work day. The pump shall remain in the above-noted position, operating during the 8-hour sampling period. The pump shall not be turned off or the filter moved during break periods or other non-work activities. The filter will be removed, labeled, placed in a sealed plastic bag, and transported under chain-of-custody to the laboratory (LA Testing in Los Alamitos – 714.828.4999) for 24-hour turn around time for total particulate and lead analysis. The results of the initial exposure assessment will be compared to the Cal/OSHA Action Level (AL) of 30 µg/m^3 and the PEL of 50 µg/m^3. These results will also be compared to measured fugitive dust concentrations to further evaluate the protectiveness of the lead-specific worker action level derived for fugitive dust.

4.4 Mitigation Measures

If Site fugitive dust action levels are reached, the mitigation measures described below will be implemented.

4.4.1 Site Perimeter

If the difference in the TWA_5 total dust readings between the upwind and downwind fence line locations is greater than the 50 µg/m^3 action level, excavation activities will be stopped and dust suppression activities will be conducted until the TWA_5 fugitive dust readings are less than the action level.

4.4.2 Areas Occupied by Workers

If the fugitive dust readings in the work areas are greater than 0.047 mg/m^3 when the rail road area (AOI 48) is uncovered and remediation of that area is not yet complete, and sustained for more than 5 minutes, dust suppression activities will be conducted. Alternatively, if the fugitives dust readings in the work area are greater than 0.41 mg/m^3 when the rail road loading area (AOI 48) is covered and/or remediation of that area is complete, and sustained for more than 5 minutes, dust suppression activities will be conducted. If dust suppression activities do not successfully reduce fugitive dust concentrations in the work area to less than the worker action levels , the excavation activities will be stopped and workers will leave the work area (exclusion zone defined by the HASP), or workers shall don full-face air-purifying respirators supplied with HEPA cartridges, until dust levels are reduced. Specific personal protective equipment (PPE) is identified in the HASP.

4.5 Recordkeeping

The instruments will be calibrated at the beginning of each workday and the time and name of field personnel will be recorded. In addition, weather conditions at the Site will be recorded each day. Measurements will be documented for each reading at each designated monitoring location.

The following information will be recorded for each instrument reading:

- Date and time of reading
- Reading location (e.g., upwind, downwind)
- Reading zone (e.g., upwind, downwind)
- Concentration reading

APPENDIX A

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
RULE 402 and 403

(Adopted May 7, 1976)

RULE 402. NUISANCE

A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

The provisions of this rule shall not apply to odors emanating from agricultural operations necessary for the growing of crops or the raising of fowl or animals.

(Adopted May 7, 1976) (Amended November 6, 1992)
(Amended July 9, 1993) (Amended February 14, 1997)
(Amended December 11, 1998)(Amended April 2, 2004)
(Amended June 3, 2005)

RULE 403. FUGITIVE DUST

(a) Purpose

The purpose of this Rule is to reduce the amount of particulate matter entrained in the ambient air as a result of anthropogenic (man-made) fugitive dust sources by requiring actions to prevent, reduce or mitigate fugitive dust emissions.

(b) Applicability

The provisions of this Rule shall apply to any activity or man-made condition capable of generating fugitive dust.

(c) Definitions

(1) ACTIVE OPERATIONS means any source capable of generating fugitive dust, including, but not limited to, earth-moving activities, construction/demolition activities, disturbed surface area, or heavy- and light-duty vehicular movement.

(2) AGGREGATE-RELATED PLANTS are defined as facilities that produce and / or mix sand and gravel and crushed stone.

(3) AGRICULTURAL HANDBOOK means the region-specific guidance document that has been approved by the Governing Board or hereafter approved by the Executive Officer and the U.S. EPA. For the South Coast Air Basin, the Board-approved region-specific guidance document is the Rule 403 Agricultural Handbook dated December 1998. For the Coachella Valley, the Board-approved region-specific guidance document is the Rule 403 Coachella Valley Agricultural Handbook dated April 2, 2004.

(4) ANEMOMETERS are devices used to measure wind speed and direction in accordance with the performance standards, and maintenance and calibration criteria as contained in the most recent Rule 403 Implementation Handbook.

(5) BEST AVAILABLE CONTROL MEASURES means fugitive dust control actions that are set forth in Table 1 of this Rule.

(6) BULK MATERIAL is sand, gravel, soil, aggregate material less than two inches in length or diameter, and other organic or inorganic particulate matter.

(7) CEMENT MANUFACTURING FACILITY is any facility that has a cement kiln at the facility.

(8) CHEMICAL STABILIZERS are any non-toxic chemical dust suppressant which must not be used if prohibited for use by the Regional Water Quality Control Boards, the California Air Resources Board, the U.S. Environmental Protection Agency (U.S. EPA), or any applicable law, rule or regulation. The chemical stabilizers shall meet any specifications, criteria, or tests required by any federal, state, or local water agency. Unless otherwise indicated, the use of a non-toxic chemical stabilizer shall be of sufficient concentration and application frequency to maintain a stabilized surface.

(9) COMMERCIAL POULTRY RANCH means any building, structure, enclosure, or premises where more than 100 fowl are kept or maintained for the primary purpose of producing eggs or meat for sale or other distribution.

(10) CONFINED ANIMAL FACILITY means a source or group of sources of air pollution at an agricultural source for the raising of 3,360 or more fowl or 50 or more animals, including but not limited to, any structure, building, installation, farm, corral, coop, feed storage area, milking parlor, or system for the collection, storage, or distribution of solid and liquid manure; if domesticated animals, including horses, sheep, goats, swine, beef cattle, rabbits, chickens, turkeys, or ducks are corralled, penned, or otherwise caused to remain in restricted areas for commercial agricultural purposes and feeding is by means other than grazing.

(11) CONSTRUCTION/DEMOLITION ACTIVITIES means any on-site mechanical activities conducted in preparation of, or related to, the building, alteration, rehabilitation, demolition or improvement of property, including, but not limited to the following activities: grading, excavation, loading, crushing, cutting, planing, shaping or ground breaking.

(12) CONTRACTOR means any person who has a contractual arrangement to conduct an active operation for another person.

(13) DAIRY FARM is an operation on a property, or set of properties that are contiguous or separated only by a public right-of-way, that raises cows or

produces milk from cows for the purpose of making a profit or for a livelihood. Heifer and calf farms are dairy farms.

(14) DISTURBED SURFACE AREA means a portion of the earth's surface which has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural soil condition, thereby increasing the potential for emission of fugitive dust. This definition excludes those areas which have:

(A) been restored to a natural state, such that the vegetative ground cover and soil characteristics are similar to adjacent or nearby natural conditions;

(B) been paved or otherwise covered by a permanent structure; or

(C) sustained a vegetative ground cover of at least 70 percent of the native cover for a particular area for at least 30 days.

(15) DUST SUPPRESSANTS are water, hygroscopic materials, or non-toxic chemical stabilizers used as a treatment material to reduce fugitive dust emissions.

(16) EARTH-MOVING ACTIVITIES means the use of any equipment for any activity where soil is being moved or uncovered, and shall include, but not be limited to the following: grading, earth cutting and filling operations, loading or unloading of dirt or bulk materials, adding to or removing from open storage piles of bulk materials, landfill operations, weed abatement through disking, and soil mulching.

(17) DUST CONTROL SUPERVISOR means a person with the authority to expeditiously employ sufficient dust mitigation measures to ensure compliance with all Rule 403 requirements at an active operation.

(18) FUGITIVE DUST means any solid particulate matter that becomes airborne, other than that emitted from an exhaust stack, directly or indirectly as a result of the activities of any person.

(19) HIGH WIND CONDITIONS means that instantaneous wind speeds exceed 25 miles per hour.

(20) INACTIVE DISTURBED SURFACE AREA means any disturbed surface area upon which active operations have not occurred or are not expected to occur for a period of 20 consecutive days.

(21) LARGE OPERATIONS means any active operations on property which contains 50 or more acres of disturbed surface area; or any earth-moving operation with a daily earth-moving or throughput volume of 3,850 cubic

meters (5,000 cubic yards) or more three times during the most recent 365-day period.

(22) OPEN STORAGE PILE is any accumulation of bulk material, which is not fully enclosed, covered or chemically stabilized, and which attains a height of three feet or more and a total surface area of 150 or more square feet.

(23) PARTICULATE MATTER means any material, except uncombined water, which exists in a finely divided form as a liquid or solid at standard conditions.

(24) PAVED ROAD means a public or private improved street, highway, alley, public way, or easement that is covered by typical roadway materials, but excluding access roadways that connect a facility with a public paved roadway and are not open to through traffic. Public paved roads are those open to public access and that are owned by any federal, state, county, municipal or any other governmental or quasi-governmental agencies. Private paved roads are any paved roads not defined as public.

(25) PM_{10} means particulate matter with an aerodynamic diameter smaller than or equal to 10 microns as measured by the applicable State and Federal reference test methods.

(26) PROPERTY LINE means the boundaries of an area in which either a person causing the emission or a person allowing the emission has the legal use or possession of the property. Where such property is divided into one or more sub-tenancies, the property line(s) shall refer to the boundaries dividing the areas of all sub-tenancies.

(27) RULE 403 IMPLEMENTATION HANDBOOK means a guidance document that has been approved by the Governing Board on April 2, 2004 or hereafter approved by the Executive Officer and the U.S. EPA.

(28) SERVICE ROADS are paved or unpaved roads that are used by one or more public agencies for inspection or maintenance of infrastructure and which are not typically used for construction-related activity.

(29) SIMULTANEOUS SAMPLING means the operation of two PM_{10} samplers in such a manner that one sampler is started within five minutes of the other, and each sampler is operated for a consecutive period which must be not less than 290 minutes and not more than 310 minutes.

(30) SOUTH COAST AIR BASIN means the non-desert portions of Los Angeles, Riverside, and San Bernardino counties and all of Orange

County as defined in California Code of Regulations, Title 17, Section 60104. The area is bounded on the west by the Pacific Ocean, on the north and east by the San Gabriel, San Bernardino, and San Jacinto Mountains, and on the south by the San Diego county line.

(31) STABILIZED SURFACE means any previously disturbed surface area or open storage pile which, through the application of dust suppressants, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust and is demonstrated to be stabilized. Stabilization can be demonstrated by one or more of the applicable test methods contained in the Rule 403 Implementation Handbook.

(32) TRACK-OUT means any bulk material that adheres to and agglomerates on the exterior surface of motor vehicles, haul trucks, and equipment (including tires) that have been released onto a paved road and can be removed by a vacuum sweeper or a broom sweeper under normal operating conditions.

(33) TYPICAL ROADWAY MATERIALS means concrete, asphaltic concrete, recycled asphalt, asphalt, or any other material of equivalent performance as determined by the Executive Officer, and the U.S. EPA.

(34) UNPAVED ROADS means any unsealed or unpaved roads, equipment paths, or travel ways that are not covered by typical roadway materials. Public unpaved roads are any unpaved roadway owned by federal, state, county, municipal or other governmental or quasi-governmental agencies. Private unpaved roads are all other unpaved roadways not defined as public.

(35) VISIBLE ROADWAY DUST means any sand, soil, dirt, or other solid particulate matter which is visible upon paved road surfaces and which can be removed by a vacuum sweeper or a broom sweeper under normal operating conditions.

(36) WIND-DRIVEN FUGITIVE DUST means visible emissions from any disturbed surface area which is generated by wind action alone.

(37) WIND GUST is the maximum instantaneous wind speed as measured by an anemometer.

(d) Requirements

(1) No person shall cause or allow the emissions of fugitive dust from any active operation, open storage pile, or disturbed surface area such that:

(A) the dust remains visible in the atmosphere beyond the property line of the emission source; or

(B) the dust emission exceeds 20 percent opacity (as determined by the appropriate test method included in the Rule 403 Implementation Handbook), if the dust emission is the result of movement of a motorized vehicle.

(2) No person shall conduct active operations without utilizing the applicable best available control measures included in Table 1 of this Rule to minimize fugitive dust emissions from each fugitive dust source type within the active operation.

(3) No person shall cause or allow PM_{10} levels to exceed 50 micrograms per cubic meter when determined, by simultaneous sampling, as the difference between upwind and downwind samples collected on high-volume particulate matter samplers or other U.S. EPA-approved equivalent method for PM_{10} monitoring. If sampling is conducted, samplers shall be:

(A) Operated, maintained, and calibrated in accordance with 40 Code of Federal Regulations (CFR), Part 50, Appendix J, or appropriate U.S. EPA-published documents for U.S. EPA-approved equivalent method(s) for PM_{10}.

(B) Reasonably placed upwind and downwind of key activity areas and as close to the property line as feasible, such that other sources of fugitive dust between the sampler and the property line are minimized.

(4) No person shall allow track-out to extend 25 feet or more in cumulative length from the point of origin from an active operation. Notwithstanding the preceding, all track-out from an active operation shall be removed at the conclusion of each workday or evening shift.

(5) No person shall conduct an active operation with a disturbed surface area of five or more acres, or with a daily import or export of 100 cubic yards or more of bulk material without utilizing at least one of the measures listed in subparagraphs (d)(5)(A) through (d)(5)(E) at each vehicle egress from the site to a paved public road.

(A) Install a pad consisting of washed gravel (minimum-size: one inch) maintained in a clean condition to a depth of at least six inches and extending at least 30 feet wide and at least 50 feet long.

(B) Pave the surface extending at least 100 feet and at least 20 feet wide.

(C) Utilize a wheel shaker/wheel spreading device consisting of raised dividers (rails, pipe, or grates) at least 24 feet long and 10 feet wide to remove bulk material from tires and vehicle undercarriages before vehicles exit the site.

(D) Install and utilize a wheel washing system to remove bulk material from tires and vehicle undercarriages before vehicles exit the site.

(E) Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the actions specified in subparagraphs (d)(5)(A) through (d)(5)(D).

(6) Beginning January 1, 2006, any person who operates or authorizes the operation of a confined animal facility subject to this Rule shall implement the applicable conservation management practices specified in Table 4 of this Rule.

(e) Additional Requirements for Large Operations

(1) Any person who conducts or authorizes the conducting of a large operation subject to this Rule shall implement the applicable actions specified in Table 2 of this Rule at all times and shall implement the applicable actions specified in Table 3 of this Rule when the applicable performance standards can not be met through use of Table 2 actions; and shall:

(A) submit a fully executed Large Operation Notification (Form 403 N) to the Executive Officer within 7 days of qualifying as a large operation;

(B) include, as part of the notification, the name(s), address(es), and phone number(s) of the person(s) responsible for the submittal, and a description of the operation(s), including a map depicting the location of the site;

(C) maintain daily records to document the specific dust control actions taken, maintain such records for a period of not less than three years; and make such records available to the Executive Officer upon request;

(D) install and maintain project signage with project contact signage that meets the minimum standards of the Rule 403 Implementation Handbook, prior to initiating any earthmoving activities;

(E) identify a dust control supervisor that:

(i) is employed by or contracted with the property owner or developer;

(ii) is on the site or available on-site within 30 minutes during working hours;

(iii) has the authority to expeditiously employ sufficient dust mitigation measures to ensure compliance with all Rule requirements;

(iv) has completed the AQMD Fugitive Dust Control Class and has been issued a valid Certificate of Completion for the class; and

(F) notify the Executive Officer in writing within 30 days after the site no longer qualifies as a large operation as defined by paragraph (c)(18).

(2) Any Large Operation Notification submitted to the Executive Officer or AQMD-approved dust control plan shall be valid for a period of one year from the date of written acceptance by the Executive Officer. Any Large Operation Notification accepted pursuant to paragraph (e)(1), excluding those submitted by aggregate-related plants and cement manufacturing facilities must be resubmitted annually by the person who conducts or authorizes the conducting of a large operation, at least 30 days prior to the expiration date, or the submittal shall no longer be valid as of the expiration date. If all fugitive dust sources and corresponding control measures or special circumstances remain identical to those identified in the previously accepted submittal or in an AQMD-approved dust control plan, the resubmittal may be a simple statement of no-change (Form 403NC).

(f) Compliance Schedule

The newly amended provisions of this Rule shall become effective upon adoption. Pursuant to subdivision (e), any existing site that qualifies as a large operation will have 60 days from the date of Rule adoption to comply with the notification and recordkeeping requirements for large operations. Any Large Operation

Notification or AQMD-approved dust control plan which has been accepted prior to the date of adoption of these amendments shall remain in effect and the Large Operation Notification or AQMD-approved dust control plan annual resubmittal date shall be one year from adoption of this Rule amendment.

(g) Exemptions

(1) The provisions of this Rule shall not apply to:

(A) Dairy farms.

(B) Confined animal facilities provided that the combined disturbed surface area within one continuous property line is one acre or less.

(C) Agricultural vegetative crop operations provided that the combined disturbed surface area within one continuous property line and not separated by a paved public road is 10 acres or less.

(D) Agricultural vegetative crop operations within the South Coast Air Basin, whose combined disturbed surface area includes more than 10 acres provided that the person responsible for such operations:

(i) voluntarily implements the conservation management practices contained in the Rule 403 Agricultural Handbook;

(ii) completes and maintains the self-monitoring form documenting sufficient conservation management practices, as described in the Rule 403 Agricultural Handbook; and

(iii) makes the completed self-monitoring form available to the Executive Officer upon request.

(E) Agricultural vegetative crop operations outside the South Coast Air Basin whose combined disturbed surface area includes more than 10 acres provided that the person responsible for such operations:

(i) voluntarily implements the conservation management practices contained in the Rule 403 Coachella Valley Agricultural Handbook; and

(ii) completes and maintains the self-monitoring form documenting sufficient conservation management practices, as described in the Rule 403 Coachella Valley Agricultural Handbook; and

(iii) makes the completed self-monitoring form available to the Executive Officer upon request.

(F) Active operations conducted during emergency life-threatening situations, or in conjunction with any officially declared disaster or state of emergency.

(G) Active operations conducted by essential service utilities to provide electricity, natural gas, telephone, water and sewer during periods of service outages and emergency disruptions.

(H) Any contractor subsequent to the time the contract ends, provided that such contractor implemented the required control measures during the contractual period.

(I) Any grading contractor, for a phase of active operations, subsequent to the contractual completion of that phase of earth-moving activities, provided that the required control measures have been implemented during the entire phase of earth-moving activities, through and including five days after the final grading inspection.

(J) Weed abatement operations ordered by a county agricultural commissioner or any state, county, or municipal fire department, provided that:

(i) mowing, cutting or other similar process is used which maintains weed stubble at least three inches above the soil; and

(ii) any discing or similar operation which cuts into and disturbs the soil, where watering is used prior to initiation of these activities, and a determination is made by the agency issuing the weed abatement order that, due to fire hazard conditions, rocks, or other physical obstructions, it is not practical to meet the conditions specified in clause (g)(1)(H)(i). The provisions this clause shall not exempt the owner of any property from stabilizing, in accordance with paragraph (d)(2), disturbed surface areas which have been created as a result of the weed abatement actions.

(K) sandblasting operations.

(2) The provisions of paragraphs (d)(1) and (d)(3) shall not apply:

(A) When wind gusts exceed 25 miles per hour, provided that:

(i) The required Table 3 contingency measures in this Rule are implemented for each applicable fugitive dust source type, and;

(ii) records are maintained in accordance with subparagraph (e)(1)(C).

(B) To unpaved roads, provided such roads:

(i) are used solely for the maintenance of wind-generating equipment; or

(ii) are unpaved public alleys as defined in Rule 1186; or

(iii) are service roads that meet all of the following criteria:

(a) are less than 50 feet in width at all points along the road;

(b) are within 25 feet of the property line; and

(c) have a traffic volume less than 20 vehicle-trips per day.

(C) To any active operation, open storage pile, or disturbed surface area for which necessary fugitive dust preventive or mitigative actions are in conflict with the federal Endangered Species Act, as determined in writing by the State or federal agency responsible for making such determinations.

(3) The provisions of (d)(2) shall not apply to any aggregate-related plant or cement manufacturing facility that implements the applicable actions specified in Table 2 of this Rule at all times and shall implement the applicable actions specified in Table 3 of this Rule when the applicable performance standards of paragraphs (d)(1) and (d)(3) can not be met through use of Table 2 actions.

(4) The provisions of paragraphs (d)(1), (d)(2), and (d)(3) shall not apply to:

(A) Blasting operations which have been permitted by the California Division of Industrial Safety; and

(B) Motion picture, television, and video production activities when dust emissions are required for visual effects. In order to obtain this exemption, the Executive Officer must receive notification in writing at least 72 hours in advance of any such activity and no nuisance results from such activity.

(5) The provisions of paragraph (d)(3) shall not apply if the dust control actions, as specified in Table 2, are implemented on a routine basis for

each applicable fugitive dust source type. To qualify for this exemption, a person must maintain records in accordance with subparagraph (e)(1)(C).

(6) The provisions of paragraph (d)(4) shall not apply to earth coverings of public paved roadways where such coverings are approved by a local government agency for the protection of the roadway, and where such coverings are used as roadway crossings for haul vehicles provided that such roadway is closed to through traffic and visible roadway dust is removed within one day following the cessation of activities.

(7) The provisions of subdivision (e) shall not apply to:

(A) officially-designated public parks and recreational areas, including national parks, national monuments, national forests, state parks, state recreational areas, and county regional parks.

(B) any large operation which is required to submit a dust control plan to any city or county government which has adopted a District-approved dust control ordinance.

(C) any large operation subject to Rule 1158, which has an approved dust control plan pursuant to Rule 1158, provided that all sources of fugitive dust are included in the Rule 1158 plan.

(8) The provisions of subparagraph (e)(1)(A) through (e)(1)(C) shall not apply to any large operation with an AQMD-approved fugitive dust control plan provided that there is no change to the sources and controls as identified in the AQMD-approved fugitive dust control plan.

(h) Fees

Any person conducting active operations for which the Executive Officer conducts upwind/downwind monitoring for PM_{10} pursuant to paragraph (d)(3) shall be assessed applicable Ambient Air Analysis Fees pursuant to Rule 304.1. Applicable fees shall be waived for any facility which is exempted from paragraph (d)(3) or meets the requirements of paragraph (d)(3).

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Backfilling	01-1 Stabilize backfill material when not actively handling; and 01-2 Stabilize backfill material during handling; and 01-3 Stabilize soil at completion of activity.	✓ Mix backfill soil with water prior to moving ✓ Dedicate water truck or high capacity hose to backfilling equipment ✓ Empty loader bucket slowly so that no dust plumes are generated ✓ Minimize drop height from loader bucket
Clearing and grubbing	02-1 Maintain stability of soil through pre-watering of site prior to clearing and grubbing; and 02-2 Stabilize soil during clearing and grubbing activities; and 02-3 Stabilize soil immediately after clearing and grubbing activities.	✓ Maintain live perennial vegetation where possible ✓ Apply water in sufficient quantity to prevent generation of dust plumes
Clearing forms	03-1 Use water spray to clear forms; or 03-2 Use sweeping and water spray to clear forms; or 03-3 Use vacuum system to clear forms.	✓ Use of high pressure air to clear forms may cause exceedance of Rule requirements
Crushing	04-1 Stabilize surface soils prior to operation of support equipment; and 04-2 Stabilize material after crushing.	✓ Follow permit conditions for crushing equipment ✓ Pre-water material prior to loading into crusher ✓ Monitor crusher emissions opacity ✓ Apply water to crushed material to prevent dust plumes

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Cut and fill	05-1 Pre-water soils prior to cut and fill activities; and 05-2 Stabilize soil during and after cut and fill activities.	✓ For large sites, pre-water with sprinklers or water trucks and allow time for penetration ✓ Use water trucks/pulls to water soils to depth of cut prior to subsequent cuts
Demolition – mechanical/manual	06-1 Stabilize wind erodible surfaces to reduce dust; and 06-2 Stabilize surface soil where support equipment and vehicles will operate; and 06-3 Stabilize loose soil and demolition debris; and 06-4 Comply with AQMD Rule 1403.	✓ Apply water in sufficient quantities to prevent the generation of visible dust plumes
Disturbed soil	07-1 Stabilize disturbed soil throughout the construction site; and 07-2 Stabilize disturbed soil between structures	✓ Limit vehicular traffic and disturbances on soils where possible ✓ If interior block walls are planned, install as early as possible ✓ Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes
Earth-moving activities	08-1 Pre-apply water to depth of proposed cuts; and 08-2 Re-apply water as necessary to maintain soils in a damp condition and to ensure that visible emissions do not exceed 100 feet in any direction; and 08-3 Stabilize soils once earth-moving activities are complete.	✓ Grade each project phase separately, timed to coincide with construction phase ✓ Upwind fencing can prevent material movement on site ✓ Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Importing/exporting of bulk materials	09-1 Stabilize material while loading to reduce fugitive dust emissions; and 09-2 Maintain at least six inches of freeboard on haul vehicles; and 09-3 Stabilize material while transporting to reduce fugitive dust emissions; and 09-4 Stabilize material while unloading to reduce fugitive dust emissions; and 09-5 Comply with Vehicle Code Section 23114.	✓ Use tarps or other suitable enclosures on haul trucks ✓ Check belly-dump truck seals regularly and remove any trapped rocks to prevent spillage ✓ Comply with track-out prevention/mitigation requirements ✓ Provide water while loading and unloading to reduce visible dust plumes
Landscaping	10-1 Stabilize soils, materials, slopes	✓ Apply water to materials to stabilize ✓ Maintain materials in a crusted condition ✓ Maintain effective cover over materials ✓ Stabilize sloping surfaces using soil binders until vegetation or ground cover can effectively stabilize the slopes ✓ Hydroseed prior to rain season
Road shoulder maintenance	11-1 Apply water to unpaved shoulders prior to clearing; and 11-2 Apply chemical dust suppressants and/or washed gravel to maintain a stabilized surface after completing road shoulder maintenance.	✓ Installation of curbing and/or paving of road shoulders can reduce recurring maintenance costs ✓ Use of chemical dust suppressants can inhibit vegetation growth and reduce future road shoulder maintenance costs

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Screening	12-1 Pre-water material prior to screening; and 12-2 Limit fugitive dust emissions to opacity and plume length standards; and 12-3 Stabilize material immediately after screening.	✓ Dedicate water truck or high capacity hose to screening operation ✓ Drop material through the screen slowly and minimize drop height ✓ Install wind barrier with a porosity of no more than 50% upwind of screen to the height of the drop point
Staging areas	13-1 Stabilize staging areas during use; and 13-2 Stabilize staging area soils at project completion.	✓ Limit size of staging area ✓ Limit vehicle speeds to 15 miles per hour ✓ Limit number and size of staging area entrances/exists
Stockpiles/ Bulk Material Handling	14-1 Stabilize stockpiled materials. 14-2 Stockpiles within 100 yards of off-site occupied buildings must not be greater than eight feet in height; or must have a road bladed to the top to allow water truck access or must have an operational water irrigation system that is capable of complete stockpile coverage.	✓ Add or remove material from the downwind portion of the storage pile ✓ Maintain storage piles to avoid steep sides or faces

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Traffic areas for construction activities	15-1 Stabilize all off-road traffic and parking areas; and 15-2 Stabilize all haul routes; and 15-3 Direct construction traffic over established haul routes.	✓ Apply gravel/paving to all haul routes as soon as possible to all future roadway areas ✓ Barriers can be used to ensure vehicles are only used on established parking areas/haul routes
Trenching	16-1 Stabilize surface soils where trencher or excavator and support equipment will operate; and 16-2 Stabilize soils at the completion of trenching activities.	✓ Pre-watering of soils prior to trenching is an effective preventive measure. For deep trenching activities, pre-trench to 18 inches soak soils via the pre-trench and resuming trenching ✓ Washing mud and soils from equipment at the conclusion of trenching activities can prevent crusting and drying of soil on equipment
Truck loading	17-1 Pre-water material prior to loading; and 17-2 Ensure that freeboard exceeds six inches (CVC 23114)	✓ Empty loader bucket such that no visible dust plumes are created ✓ Ensure that the loader bucket is close to the truck to minimize drop height while loading
Turf Overseeding	18-1 Apply sufficient water immediately prior to conducting turf vacuuming activities to meet opacity and plume length standards; and 18-2 Cover haul vehicles prior to exiting the site.	✓ Haul waste material immediately off-site

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure		Guidance
Unpaved roads/parking lots	19-1	Stabilize soils to meet the applicable performance standards; and	✓ Restricting vehicular access to established unpaved travel paths and parking lots can reduce stabilization requirements
	19-2	Limit vehicular travel to established unpaved roads (haul routes) and unpaved parking lots.	
Vacant land	20-1	In instances where vacant lots are 0.10 acre or larger and have a cumulative area of 500 square feet or more that are driven over and/or used by motor vehicles and/or off-road vehicles, prevent motor vehicle and/or off-road vehicle trespassing, parking and/or access by installing barriers, curbs, fences, gates, posts, signs, shrubs, trees or other effective control measures.	

Table 2
DUST CONTROL MEASURES FOR LARGE OPERATIONS

FUGITIVE DUST SOURCE CATEGORY		CONTROL ACTIONS
Earth-moving (except construction cutting and filling areas, and mining operations)	(1a)	Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations each subsequent four-hour period of active operations; OR
	(1a-1)	For any earth-moving which is more than 100 feet from all property lines, conduct watering as necessary to prevent visible dust emissions from exceeding 100 feet in length in any direction.
Earth-moving: Construction fill areas:	(1b)	Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. For areas which have an optimum moisture content for compaction of less than 12 percent, as determined by ASTM Method 1557 or other equivalent method approved by the Executive Officer and the California Air Resources Board and the U.S. EPA, complete the compaction process as expeditiously as possible after achieving at least 70 percent of the optimum soil moisture content. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations during each subsequent four-hour period of active operations.

Table 2 (Continued)

FUGITIVE DUST SOURCE CATEGORY	CONTROL ACTIONS	
Earth-moving: Construction cut areas and mining operations:	(1c)	Conduct watering as necessary to prevent visible emissions from extending more than 100 feet beyond the active cut or mining area unless the area is inaccessible to watering vehicles due to slope conditions or other safety factors.
Disturbed surface areas (except completed grading areas)	(2a/b)	Apply dust suppression in sufficient quantity and frequency to maintain a stabilized surface. Any areas which cannot be stabilized, as evidenced by wind driven fugitive dust must have an application of water at least twice per day to at least 80 percent of the unstabilized area.
Disturbed surface areas: Completed grading areas	(2c)	Apply chemical stabilizers within five working days of grading completion; OR
	(2d)	Take actions (3a) or (3c) specified for inactive disturbed surface areas.
Inactive disturbed surface areas	(3a)	Apply water to at least 80 percent of all inactive disturbed surface areas on a daily basis when there is evidence of wind driven fugitive dust, excluding any areas which are inaccessible to watering vehicles due to excessive slope or other safety conditions; OR
	(3b)	Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; OR
	(3c)	Establish a vegetative ground cover within 21 days after active operations have ceased. Ground cover must be of sufficient density to expose less than 30 percent of unstabilized ground within 90 days of planting, and at all times thereafter; OR
	(3d)	Utilize any combination of control actions (3a), (3b), and (3c) such that, in total, these actions apply to all inactive disturbed surface areas.

Table 2 (Continued)

FUGITIVE DUST SOURCE CATEGORY	CONTROL ACTIONS	
Unpaved Roads	(4a)	Water all roads used for any vehicular traffic at least once per every two hours of active operations [3 times per normal 8 hour work day]; OR
	(4b)	Water all roads used for any vehicular traffic once daily and restrict vehicle speeds to 15 miles per hour; OR
	(4c)	Apply a chemical stabilizer to all unpaved road surfaces in sufficient quantity and frequency to maintain a stabilized surface.
Open storage piles	(5a)	Apply chemical stabilizers; OR
	(5b)	Apply water to at least 80 percent of the surface area of all open storage piles on a daily basis when there is evidence of wind driven fugitive dust; OR
	(5c)	Install temporary coverings; OR
	(5d)	Install a three-sided enclosure with walls with no more than 50 percent porosity which extend, at a minimum, to the top of the pile. This option may only be used at aggregate-related plants or at cement manufacturing facilities.
All Categories	(6a)	Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 2 may be used.

TABLE 3
CONTINGENCY CONTROL MEASURES FOR LARGE OPERATIONS

FUGITIVE DUST SOURCE CATEGORY	CONTROL MEASURES
Earth-moving	(1A) Cease all active operations; OR (2A) Apply water to soil not more than 15 minutes prior to moving such soil.
Disturbed surface areas	(0B) On the last day of active operations prior to a weekend, holiday, or any other period when active operations will not occur for not more than four consecutive days: apply water with a mixture of chemical stabilizer diluted to not less than 1/20 of the concentration required to maintain a stabilized surface for a period of six months; OR (1B) Apply chemical stabilizers prior to wind event; OR (2B) Apply water to all unstabilized disturbed areas 3 times per day. If there is any evidence of wind driven fugitive dust, watering frequency is increased to a minimum of four times per day; OR (3B) Take the actions specified in Table 2, Item (3c); OR (4B) Utilize any combination of control actions (1B), (2B), and (3B) such that, in total, these actions apply to all disturbed surface areas.
Unpaved roads	(1C) Apply chemical stabilizers prior to wind event; OR (2C) Apply water twice per hour during active operation; OR (3C) Stop all vehicular traffic.
Open storage piles	(1D) Apply water twice per hour; OR (2D) Install temporary coverings.
Paved road track-out	(1E) Cover all haul vehicles; OR (2E) Comply with the vehicle freeboard requirements of Section 23114 of the California Vehicle Code for both public and private roads.
All Categories	(1F) Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 3 may be used.

Table 4
(Conservation Management Practices for Confined Animal Facilities)

SOURCE CATEGORY	CONSERVATION MANAGEMENT PRACTICES
Manure Handling **(Only applicable to Commercial Poultry Ranches)**	(1a) Cover manure prior to removing material off-site; AND (1b) Spread the manure before 11:00 AM and when wind conditions are less than 25 miles per hour; AND (1c) Utilize coning and drying manure management by removing manure at laying hen houses at least twice per year and maintain a base of no less than 6 inches of dry manure after clean out; or in lieu of complying with conservation management practice (1c), comply with conservation management practice (1d). (1d) Utilize frequent manure removal by removing the manure from laying hen houses at least every seven days and immediately thin bed dry the material.
Feedstock Handling	(2a) Utilize a sock or boot on the feed truck auger when filling feed storage bins.
Disturbed Surfaces	(3a) Maintain at least 70 percent vegetative cover on vacant portions of the facility; OR (3b) Utilize conservation tillage practices to manage the amount, orientation and distribution of crop and other plant residues on the soil surface year-round, while growing crops (if applicable) in narrow slots or tilled strips; OR (3c) Apply dust suppressants in sufficient concentrations and frequencies to maintain a stabilized surface.
Unpaved Roads	(4a) Restrict access to private unpaved roads either through signage or physical access restrictions and control vehicular speeds to no more than 15 miles per hour through worker notifications, signage, or any other necessary means; OR (4b) Cover frequently traveled unpaved roads with low silt content material (i.e., asphalt, concrete, recycled road base, or gravel to a minimum depth of four inches); OR (4c) Treat unpaved roads with water, mulch, chemical dust suppressants or other cover to maintain a stabilized surface.
Equipment Parking Areas	(5a) Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; OR (5b) Apply material with low silt content (i.e., asphalt, concrete, recycled road base, or gravel to a depth of four inches).

APPENDIX B

ACTION LEVEL CALCULATIONS

APPENDIX B

Action Level Calculations for Site Workers

Calculations of Site-specific dust equivalent Permissible Exposure Limits (PELs) for COCs:

Site-specific Dust equivalent (mg/m^3) = (OSHA PEL (mg/m^3) / Max. Site Concentration (mg/kg)) * Conversion Factor (10^6 mg/kg)

Lead

OSHA PEL Action Level = 0.03 mg/m^3

Highest reported on-Site lead concentration in the upper 10 feet of soil in AOI 48 (rail road loading area) = 643,900 mg/kg

$$= \frac{0.03\ mg}{m^3} \times \frac{kg}{643{,}900\ mg} \times \frac{10^6\ mg}{kg} = 0.047\ mg/m^3\ (47\ ug/m^3)$$

OSHA PEL Action Level = 0.03 mg/m^3

Highest reported on-Site lead concentration in the upper 10 feet of soil in areas outside of AOI 48 (rail road loading area) = 72,900 mg/kg

$$= \frac{0.03\ mg}{m^3} \times \frac{kg}{72{,}900\ mg} \times \frac{10^6\ mg}{kg} = 0.41\ mg/m^3\ (401\ ug/m^3)$$

Arsenic

OSHA PEL = 0.01 mg/m^3

Highest reported On-site arsenic concentration in the upper 10 feet of soil = 2,220 mg/kg

$$= \frac{0.01\ mg}{m^3} \times \frac{kg}{2{,}220\ mg} \times \frac{10^6\ mg}{kg} = 4.5\ mg/m^3\ (4{,}500\ ug/m^3)$$

Antimony

OSHA PEL = 0.05 mg/m^3

Highest reported on-Site antimony concentration in upper 10 feet of soil = 8,900 mg/kg

$$= \frac{0.05\ mg}{m^3} \times \frac{kg}{8{,}900\ mg} \times \frac{10^6\ mg}{kg} = 5.6\ mg/m^3\ (5{,}600\ ug/m^3)$$

PAHs (as Benzo(a)pyrene)

OSHA PEL = 0.2 mg/m^3

Highest reported on-Site total benzo(a)pyrene concentration in upper 10 feet of soil = 24.1 mg/kg

$$= \frac{0.2\ mg}{m^3} \times \frac{kg}{24.1\ mg} \times \frac{10^6\ mg}{kg} = 8{,}300\ mg/m^3$$

PCBs (total)

OSHA PEL = 0.5 mg/m^3

Highest reported on-Site total PCB concentration in upper 10 feet of soil = 27,800 mg/kg

$$= \frac{0.5\ mg}{m^3} \times \frac{kg}{27{,}800\ mg} \times \frac{10^6\ mg}{kg} = 17.9\ mg/m^3\ (17{,}900\ ug/m^3)$$

Action Level Calculations for Site Perimeter

Calculations of Site-specific dust equivalent perimeter action levels using Acute Reference Exposure Limits (RELs):

Site-specific Dust equivalent (mg/m^3) = (OEHHA REL (mg/m^3) / Max. or Avg. Site Concentration (mg/kg)) * Conversion Factor (10^6 mg/kg)

Arsenic

OEHHA Acute Inhalation Reference Exposure Level (REL) = 0.19 ug/m^3 = 1.9×10^{-4} mg/m^3

Highest reported On-site arsenic concentration in the upper 10 feet of soil = 2,220 mg/kg

$$= \frac{1.9 \times 10^{-4}\ mg}{m^3} \times \frac{kg}{2{,}220\ mg} \times \frac{10^6\ mg}{kg} = 0.086\ mg/m^3\ (86\ ug/m^3)$$

APPENDIX C

Human Health Risk Calculations for Off-Site Receptors During Site Remediation/Construction Activities

SITE-SPECIFIC LIFETIME CANCER RISK (OFF-SITE LITTLE LEAGUER) CALCULATIONS – ENTIRE SITE DURING REMEDIATION/CONSTRUCTION ACTIVITIES
USING REASONABLE MAXIMUM EXPOSURE CONCENTRATIONS
FORMER DELPHI BATTERY PLANT, 1201 MAGNOLIA AVE.
ANAHEIM, CALIFORNIA
32486-001

General Exposure Factors		
Exposure Duration	(yrs)	1
Body Weight	(kg)	15
Averaging Time	(days)	25,500
Dermal exposure factors		
Skin Surface Area	(cm^2/day)	2,900
Soil to Skin Adherence Factor	(mg/cm^2)	0.2
Dermal Absorption Factor	(unitless)	Chemical-specific
Exposure Frequency	(days/yr)	78
Ingestion Exposure Factors		
Soil Ingestion Rate	(mg/day)	200
Absorption Rate	(unitless)	1
Exposure Frequency	(days/yr)	78
Inhalation Exposure Factors		
Inhalation Rate	(m^3/day)	5.22
Exposure Frequency	(days/yr)	78

Exposure Pathway: Inhalation of Particulates (for non-volatiles)

Chemical	Cs (mg/kg)	*	5.00E-08 (kg/m^3) (Note #1)	*	0.0011 (kg/µg)	*	SFi $(mg/kg\text{-}day)^{-1}$	=	Cancer Risk
Antimony	531	*	5.00E-08	*	0.0011	*	na	=	na
Arsenic	75	*	5.00E-08	*	0.0011	*	1.2E+01	=	4.8E-08
Cadmium	0.92	*	5.00E-08	*	0.0011	*	1.5E+01	=	7.3E-10
Chromium (III)	122	*	5.00E-08	*	0.0011	*	na	=	na
Chromium (VI)	5.45	*	5.00E-08	*	0.0011	*	5.1E+02	=	1.5E-07
Zinc	106	*	5.00E-08	*	0.0011	*	na	=	na
PCBs (total)	892	*	5.00E-08	*	0.0011	*	2.0E+00	=	9.5E-08
2,4-Dimethylphenol	4.3	*	5.00E-08	*	0.0011	*	na	=	na
2-Methylnaphthalene (as Pyrene)	8.25	*	5.00E-08	*	0.0011	*	na	=	na
2-Methylphenol (2-Cresol)	0.3	*	5.00E-08	*	0.0011	*	na	=	na
4-Methylphenol	11.2	*	5.00E-08	*	0.0011	*	na	=	na
Acenaphthene	13	*	5.00E-08	*	0.0011	*	na	=	na
Acenaphthylene	3.78	*	5.00E-08	*	0.0011	*	na	=	na
Anthracene	24.3	*	5.00E-08	*	0.0011	*	na	=	na
Benzo(a)anthracene	1.4	*	5.00E-08	*	0.0011	*	3.9E-01	=	2.9E-11
Benzo(a)pyrene	1.5	*	5.00E-08	*	0.0011	*	3.9E+00	=	3.1E-10
Benzo(b)fluoranthene	2.03	*	5.00E-08	*	0.0011	*	3.9E-01	=	4.2E-11
Benzo(g,h,i)perylene	36.6	*	5.00E-08	*	0.0011	*	na	=	na
Benzo(k)fluoranthene	1.02	*	5.00E-08	*	0.0011	*	3.9E-01	=	2.1E-11
Benzoic Acid	2.56	*	5.00E-08	*	0.0011	*	na	=	na
Bis(2-ethylhexyl) phthalate	19.8	*	5.00E-08	*	0.0011	*	8.4E-03	=	8.9E-12
Chrysene	2.92	*	5.00E-08	*	0.0011	*	3.9E-02	=	6.1E-12
Dibenzofuran	3.25	*	5.00E-08	*	0.0011	*	na	=	na
Di-n-butyl phthalate	0.625	*	5.00E-08	*	0.0011	*	na	=	na
Di-n-octyl phthalate (Dioctyl ester) (as Di-n-butyl phthalate)	20.6	*	5.00E-08	*	0.0011	*	na	=	na
Fluoranthene	151	*	5.00E-08	*	0.0011	*	na	=	na
Fluorene	12.6	*	5.00E-08	*	0.0011	*	na	=	na
Indeno(1,2,3-cd)pyrene	1.57	*	5.00E-08	*	0.0011	*	3.9E-01	=	3.3E-11
Naphthalene	6.97	*	5.00E-08	*	0.0011	*	1.2E-01	=	4.5E-11
Pentachlorophenol	4.09	*	5.00E-08	*	0.0011	*	1.8E-02	=	3.9E-12
Phenanthrene	128	*	5.00E-08	*	0.0011	*	na	=	na
Phenol	5.16	*	5.00E-08	*	0.0011	*	na	=	na
Pyrene	95.1	*	5.00E-08	*	0.0011	*	na	=	na
									3E-07

Exposure Pathway: Inhalation of volatiles

Chemical	Ca (mg/m3)	*	0.0011 (m^3/kg-day) (Note #2)	*	SFi $(mg/kg\text{-}day)^{-1}$	=	Cancer Risk	Soil Conc. mg/kg
1,1,1-Trichloroethane	6.07E-02	*	0.0011	*	na	=	na	3.13
1,1,2-Trichloroethane	1.75E-04	*	0.0011	*	5.70E-02	=	1.1E-08	0.0269
1,1-Dichloroethane	5.88E-03	*	0.0011	*	5.70E-03	=	3.6E-08	0.336
1,1-Dichloroethene	7.60E-03	*	0.0011	*	na	=	na	0.251
1,2,3-Trichlorobenzene	1.86E-05	*	0.0011	*	na	=	na	0.0188
1,2,4-Trichlorobenzene	6.15E-05	*	0.0011	*	na	=	na	0.0622
1,2,4-Trimethylbenzene	5.39E-03	*	0.0011	*	na	=	na	2.480
1,2-Dichloroethane	1.99E-04	*	0.0011	*	7.20E-02	=	1.5E-08	0.0187
1,3,5-Trimethylbenzene	7.23E-03	*	0.0011	*	na	=	na	1.360
2-Butanone (MEK)	1.72E-04	*	0.0011	*	na	=	na	0.0811
Acetone	4.35E-03	*	0.0011	*	na	=	na	1.34
Benzene	1.31E-04	*	0.0011	*	1.00E-01	=	1.4E-08	0.0084
Dibromomethane (as EBD; 1,2, Dibromoethane)	1.22E-04	*	0.0011	*	na	=	na	0.0308
Ethylbenzene	4.00E-04	*	0.0011	*	na	=	na	0.0506
Isopropylbenzene	1.01E-03	*	0.0011	*	na	=	na	0.0848
Naphthalene	6.88E-03	*	0.0011	*	1.20E-01	=	8.8E-07	6.970
n-Propylbenzene	9.79E-04	*	0.0011	*	na	=	na	0.26
p-Isopropyltoluene (or Cymene, as Isopropyl-benzene)	8.93E-03	*	0.0011	*	na	=	na	0.75
sec-Butylbenzene	2.54E-03	*	0.0011	*	na	=	na	0.493
tert-Butylbenzene	1.28E-04	*	0.0011	*	na	=	na	0.0302
Tetrachloroethene	4.47E-03	*	0.0011	*	2.10E-02	=	1.0E-07	0.266
Toluene (Methyl benzene)	9.90E-04	*	0.0011	*	na	=	na	0.0924
Xylenes (total)	2.43E-03	*	0.0011	*	na	=	na	0.347
			Total Cancer Risk Inhalation of Volatiles				**1E-06**	

Cumulative Cancer Risk: 1E-06

Proposed Cumulative Risk Based Remedial Goals are highlighted in yellow
Note #1: SCAWMD Rule 403 threshold of 50 ug/m^3 (1/50 ug/m^3 = 5 x 10^{-8} kg/m^3)
Note #2: ((Inhalation Rate) x (Exposure Frequency) x (Exposure Duration)) / ((Body Weight) x (Averaging Time))

SITE-SPECIFIC HAZARD INDEX (OFF-SITE LITTLE LEAGUER) CALCULATIONS – ENTIRE SITE DURING REMEDIATION/CONSTRUCTION ACTIVITIES
USING REASONABLE MAXIMUM EXPOSURE CONCENTRATIONS
FORMER DELPHI BATTERY PLANT, 1201 MAGNOLIA AVE.
ANAHEIM, CALIFORNIA
32486-001

General Exposure Factors		
Exposure Duration	(yrs)	1
Body Weight	(kg)	15
Averaging Time	(days)	365
Dermal exposure factors		
Skin Surface Area	(cm^2/day)	2,900
Soil to Skin Adherence Factor	(mg/cm^2)	0.2
Dermal Absorption Factor	(unitless)	Chemical-specific
Exposure Frequency	(days/yr)	78
Ingestion Exposure Factors		
Soil Ingestion Rate	(mg/day)	200
Absorption Rate	(unitless)	1
Exposure Frequency	(days/yr)	78
Inhalation Exposure Factors		
Inhalation Rate	(m^3/day)	5.22
Exposure Frequency	(days/yr)	78

Exposure Pathway: Inhalation of Particulates

Chemical	(Cs (mg/kg)	*	5.00E-08 (kg/m^3)	/	RfD (mg/kg-day)	*	0.074 (m^3/kg-day) (Note #2)	=	Hazard Index
Antimony	531	*	5.00E-08	/	5.71E-05	*	0.074	=	0.035
Arsenic	75	*	5.00E-08	/	8.57E-06	*	0.074	=	0.033
Cadmium	0.92	*	5.00E-08	/	5.71E-06	*	0.074	=	0.00060
Chromium (III)	122	*	5.00E-08	/	na	*	0.074	=	na
Chromium (VI)	5.45	*	5.00E-08	/	5.71E-05	*	0.074	=	0.0030
Zinc	106	*	5.00E-08	/	1.00E-02	*	0.074	=	0.00034
PCBs (total)	892	*	5.00E-08	/	3.43E-04	*	0.074	=	0.0097
2,4-Dimethylphenol	4.3	*	5.00E-08	/	2.00E-02	*	0.074	=	0.0000069
2-Methylnaphthalene (as Pyrene)	8.25	*	5.00E-08	/	3.00E-02	*	0.074	=	0.0000088
2-Methylphenol (2-Cresol)	0.3	*	5.00E-08	/	5.00E-02	*	0.074	=	0.00000019
4-Methylphenol	11.2	*	5.00E-08	/	5.00E-03	*	0.074	=	0.000072
Acenaphthene	13	*	5.00E-08	/	6.00E-02	*	0.074	=	0.0000069
Acenaphthylene	3.78	*	5.00E-08	/	3.00E-02	*	0.074	=	0.0000040
Anthracene	24.3	*	5.00E-08	/	3.00E-01	*	0.074	=	0.0000026
Benzo(a)anthracene	1.4	*	5.00E-08	/	na	*	0.074	=	na
Benzo(a)pyrene	1.5	*	5.00E-08	/	na	*	0.074	=	na
Benzo(b)fluoranthene	2.03	*	5.00E-08	/	na	*	0.074	=	na
Benzo(g,h,i)perylene	36.6	*	5.00E-08	/	3.00E-02	*	0.074	=	0.0000045
Benzo(k)fluoranthene	1.02	*	5.00E-08	/	na	*	0.074	=	na
Benzoic Acid	2.56	*	5.00E-08	/	4.00E+00	*	0.074	=	0.0000000024
Bis(2-ethylhexyl) phthalate	19.8	*	5.00E-08	/	2.00E-02	*	0.074	=	0.0000037
Chrysene	2.92	*	5.00E-08	/	na	*	0.074	=	na
Dibenzofuran	3.25	*	5.00E-08	/	2.00E-03	*	0.074	=	0.0000060
Di-n-butyl phthalate	0.625	*	5.00E-08	/	1.00E-01	*	0.074	=	0.000000023
Di-n-octyl phthalate (Dioctyl ester) (as Di-n-butyl phthalate)	20.6	*	5.00E-08	/	4.00E-02	*	0.074	=	0.0000019
Fluoranthene	151	*	5.00E-08	/	4.00E-02	*	0.074	=	0.000014
Fluorene	12.6	*	5.00E-08	/	4.00E-02	*	0.074	=	0.0000012
Indeno(1,2,3-cd)pyrene	1.57	*	5.00E-08	/	na	*	0.074	=	na
Naphthalene	6.97	*	5.00E-08	/	2.57E-03	*	0.074	=	0.000087
Pentachlorophenol	4.09	*	5.00E-08	/	5.71E-05	*	0.074	=	0.0023
Phenanthrenev (as Pyrene)	128	*	5.00E-08	/	3.00E-02	*	0.074	=	0.00014
Phenol	5.16	*	5.00E-08	/	5.71E-02	*	0.074	=	0.0000029
Pyrene	95.1	*	5.00E-08	/	3.00E-02	*	0.074	=	0.00010

Total Hazard Index for Inhalation of Particulates: 0.083

Exposure Pathway: Inhalation of volatiles

Chemical	Ca (mg/m3)	/	RfD (mg/kg-day)	*	0.074 (m^3/kg-day) (Note #2)	=	Hazard Index	Soil Conc. mg/kg
1,1,1-Trichloroethane	6.07E-02	/	2.86E-01	*	0.074	=	0.016	3.13
1,1,2-Trichloroethane	1.75E-04	/	4.00E-03	*	0.074	=	0.0033	0.0269
1,1-Dichloroethane	5.88E-03	/	1.43E-01	*	0.074	=	0.0031	0.336
1,1-Dichloroethene	7.60E-03	/	2.00E-02	*	0.074	=	0.028	0.251
1,2,3-Trichlorobenzene	1.86E-05	/	1.00E-03	*	0.074	=	0.0014	0.0188
1,2,4-Trichlorobenzene	6.15E-05	/	1.00E-03	*	0.074	=	0.0046	0.0622
1,2,4-Trimethylbenzene	5.39E-03	/	1.70E-03	*	0.074	=	0.24	2.480
1,2-Dichloroethane	1.99E-04	/	1.14E-01	*	0.074	=	0.00013	0.0187
1,3,5-Trimethylbenzene	7.23E-03	/	1.70E-03	*	0.074	=	0.32	1.360
2-Butanone (MEK)	1.72E-04	/	2.86E-01	*	0.074	=	0.000045	0.0811
Acetone	4.35E-03	/	9.00E-01	*	0.074	=	0.00036	1.34
Benzene	1.31E-04	/	1.71E-02	*	0.074	=	0.00057	0.0084
Dibromomethane (as EBD; 1,2, Dibromoethane)	1.22E-04	/	1.00E-02	*	0.074	=	0.00090	0.0308
Ethylbenzene	4.00E-04	/	5.71E-01	*	0.074	=	0.000052	0.0506
Isopropylbenzene	1.01E-03	/	1.10E-01	*	0.074	=	0.00068	0.0848
Naphthalene	6.88E-03	/	2.57E-03	*	0.074	=	0.20	6.970
n-Propylbenzene	9.79E-04	/	4.00E-02	*	0.074	=	0.0018	0.26
p-Isopropyltoluene (or Cymene, as Isopropyl-benzene)	8.93E-03	/	1.10E-01	*	0.074	=	0.0060	0.75
sec-Butylbenzene	2.54E-03	/	4.00E-02	*	0.074	=	0.0047	0.493
tert-Butylbenzene	1.28E-04	/	4.00E-02	*	0.074	=	0.00024	0.0302
Tetrachloroethene	4.47E-03	/	1.00E-02	*	0.074	=	0.033	0.266
Toluene (Methyl benzene)	9.90E-04	/	8.57E-02	*	0.074	=	0.00086	0.0924
Xylenes (total)	2.43E-03	/	2.00E-01	*	0.074	=	0.00090	0.347

Total Inhalations of volatiles Hazard Index: 0.86

Cumulative Hazard Index 0.94

Proposed Cumulative Risk Based Remedial Goals are highlighted in yellow
Note #1: SCAWMD Rule 403 threshold of 50 ug/m^3 (1/50 ug/m^3 = 5 x 10^{-8} kg/m^3)
Note #2: ((Inhalation Rate) x (Exposure Frequency) x (Exposure Duration)) / ((Body Weight) x (Averaging Time))

VOLATILIZATION FACTOR CALCULATION

COLUMN	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CAS_No	Chemical	MW	H	H'	Di	Dw	Koc	Kd	S	DA-PRG	VF-PRG	SAT-PRG	DA-SS	VF-SS	SAT-SS
		(g/mol)	(atm-m3/mol)	(dimensionless)	(cm^2/s)	(cm^2/s)	(cm^3/g)	(cm^2/s)	(mg/L-water)	(cm2/s)	(m^3/kg)	(mg/kg)	(cm2/s)	(m^3/kg)	(mg/kg)
630-20-6	1,1,1,2-Tetrachloroethane	1.7E+02	3.5E-04	1.4E-02	7.1E-02	7.9E-06	9.3E+01	5.6E-01	3.0E+03	7.9E-05	1.4E+04	2.0E+03	5.17E-05	3.33E+02	2.00E+03
71-55-6	1,1,1-Trichloroethane	1.3E+02	1.7E-02	7.1E-01	7.8E-02	8.8E-06	1.1E+02	6.6E-01	1.3E+03	3.2E-03	2.2E+03	1.2E+03	2.15E-03	5.16E+01	1.18E+03
79-34-5	1,1,2,2-Tetrachloroethane	1.7E+02	3.5E-04	1.4E-02	7.1E-02	7.9E-06	9.3E+01	5.6E-01	3.0E+03	7.9E-05	1.4E+04	2.0E+03	5.17E-05	3.33E+02	2.00E+03
79-00-5	1,1,2-Trichloroethane	1.3E+02	9.1E-04	3.7E-02	7.8E-02	8.8E-06	5.0E+01	3.0E-01	4.4E+03	3.7E-04	6.5E+03	1.8E+03	2.42E-04	1.54E+02	1.85E+03
598-77-6	1,1,2-Trichloropropane	1.5E+02	3.4E-04	1.4E-02	7.1E-02	7.9E-06	5.1E+01	3.1E-01	2.7E+03	1.3E-04	1.1E+04	1.1E+03	8.21E-05	2.64E+02	1.13E+03
92-52-4	1,1-Biphenyl	1.5E+02	3.0E-04	1.2E-02	4.0E-02	8.2E-06	7.8E+03	4.7E+01	7.5E+00	5.5E-07	1.7E+05	3.5E+02	3.70E-07	3.93E+03	3.50E+02
75-34-3	1,1-Dichloroethane	9.9E+01	5.6E-03	2.3E-01	7.4E-02	1.1E-05	3.2E+01	1.9E-01	5.1E+03	2.7E-03	2.4E+03	1.7E+03	1.75E-03	5.72E+01	1.71E+03
75-35-4	1,1-Dichloroethylene	9.7E+01	2.6E-02	1.1E+00	9.0E-02	1.0E-05	5.9E+01	3.5E-01	2.3E+03	7.7E-03	1.4E+03	1.5E+03	5.24E-03	3.30E+01	1.43E+03
563-58-6	1,1-Dichloropropene (Surr=1,3-Dichloropropene)	1.1E+02	1.8E-02	7.3E-01	6.3E-02	1.0E-05	4.6E+01	2.7E-01	2.8E+03	4.6E-03	1.8E+03	1.4E+03	3.13E-03	4.27E+01	1.40E+03
87-61-6	1,2,3-Trichlorobenzene (surr=1,2,4trichlrobenzene)	1.8E+02	1.4E-03	5.8E-02	3.0E-02	8.2E-06	1.8E+03	1.1E+01	3.0E+02	8.4E-06	4.3E+04	3.2E+03	5.60E-06	1.01E+03	3.24E+03
96-18-4	1,2,3-Trichloropropane	1.5E+02	3.4E-04	1.4E-02	7.1E-02	7.9E-06	5.1E+01	3.1E-01	2.7E+03	1.3E-04	1.1E+04	1.1E+03	8.21E-05	2.64E+02	1.13E+03
96-19-5	1,2,3-Trichloropropene (Surr=1,2,3-Trichloropropane)	2.0E+02	3.4E-04	1.4E-02	7.1E-02	7.9E-06	5.1E+01	3.1E-01	2.7E+03	1.3E-04	1.1E+04	1.1E+03	8.21E-05	2.64E+02	1.13E+03
120-82-1	1,2,4-Trichlorobenzene	1.8E+02	1.4E-03	5.8E-02	3.0E-02	8.2E-06	1.8E+03	1.1E+01	3.0E+02	8.4E-06	4.3E+04	3.2E+03	5.60E-06	1.01E+03	3.24E+03
95-63-6	1,2,4-Trimethylbenzene	1.2E+02	5.7E-03	2.3E-01	7.5E-02	7.1E-06	3.7E+03	2.2E+01	5.7E+01	4.1E-05	2.0E+04	1.3E+03	2.70E-05	4.61E+02	1.28E+03
96-12-8	1,2-Dibromo-3-chloropropane	2.4E+02	1.5E-04	6.0E-03	2.1E-02	7.0E-06	1.3E+02	7.8E-01	1.2E+03	7.6E-06	4.6E+04	1.1E+03	5.03E-06	1.07E+03	1.07E+03
106-93-4	1,2-Dibromoethane	1.9E+02	3.2E-04	1.3E-02	7.3E-02	8.1E-06	4.4E+01	2.6E-01	3.4E+03	1.8E-04	1.1E+04	1.2E+03	8.92E-05	2.53E+02	1.27E+03
95-50-1	1,2-Dichlorobenzene	1.5E+02	1.9E-03	7.8E-02	6.9E-02	7.9E-06	6.2E+02	3.7E+00	1.6E+02	7.3E-05	1.5E+04	6.0E+02	4.86E-05	3.43E+02	5.97E+02
107-06-2	1,2-Dichloroethane	9.9E+01	9.8E-04	4.0E-02	1.0E-01	9.9E-06	1.7E+01	1.0E-01	8.5E+03	1.0E-03	3.9E+03	1.8E+03	6.50E-04	9.39E+01	1.89E+03
156-59-2	1,2-Dichloroethylene (cis)	9.7E+01	4.1E-03	1.7E-01	7.4E-02	1.1E-05	3.6E+01	2.1E-01	3.5E+03	1.9E-03	2.9E+03	1.2E+03	1.21E-03	6.87E+01	1.23E+03
156-60-5	1,2-Dichloroethylene (trans)	9.7E+01	9.4E-03	3.8E-01	7.1E-02	1.2E-05	5.3E+01	3.2E-01	6.3E+03	2.9E-03	2.3E+03	3.1E+03	1.93E-03	5.45E+01	3.07E+03
78-87-5	1,2-Dichloropropane	1.1E+02	2.8E-03	1.1E-01	7.8E-02	8.7E-06	4.4E+01	2.6E-01	2.8E+03	1.2E-03	3.6E+03	1.1E+03	7.92E-04	8.50E+01	1.10E+03
108-67-8	1,3,5-Trimethylbenzene	1.2E+02	7.7E-03	3.2E-01	7.5E-02	7.1E-06	8.2E+02	4.9E+00	4.8E+01	2.4E-04	8.0E+03	2.4E+02	1.62E-04	1.88E+02	2.45E+02
106-99-0	1,3-Butadiene	5.4E+01	1.8E-01	7.3E+00	9.8E-02	1.1E-05	1.2E+02	7.2E-01	7.4E+02	1.7E-02	9.6E+02	1.6E+03	1.24E-02	2.15E+01	1.47E+03
541-73-1	1,3-Dichlorobenzene	1.5E+02	1.9E-03	7.8E-02	6.9E-02	7.9E-06	6.2E+02	3.7E+00	1.6E+02	7.3E-05	1.5E+04	6.0E+02	4.86E-05	3.43E+02	5.97E+02
542-75-6	1,3-Dichloropropene	1.1E+02	1.8E-02	7.3E-01	6.3E-02	1.0E-05	4.6E+01	2.7E-01	2.8E+03	4.6E-03	1.8E+03	1.4E+03	3.13E-03	4.27E+01	1.40E+03
764-41-0	1,4-Dichloro-2-butene	1.3E+02	2.6E-04	1.1E-02	7.3E-02	8.1E-06	4.8E+01	2.9E-01	2.8E+03	1.0E-04	1.2E+04	1.1E+03	6.66E-05	2.93E+02	1.12E+03
106-46-7	1,4-Dichlorobenzene	1.5E+02	2.4E-03	1.0E-01	6.9E-02	7.9E-06	6.2E+02	3.7E+00	7.4E+01	9.4E-05	1.3E+04	2.8E+02	6.21E-05	3.04E+02	2.83E+02
75-68-3	1-Chloro-1,1-difluoroethane (surr=dichlorodifluoromethane)	1.2E+02	1.0E-01	4.1E+00	8.0E-02	1.1E-05	5.8E+01	3.5E-01	2.8E+02	1.4E-02	1.1E+03	3.4E+02	1.02E-02	2.37E+01	3.12E+02
109-69-3	1-Chlorobutane (surr=2-Chloro-1,3-butadiene)	8.8E+01	3.2E-02	1.3E+00	1.1E-01	1.1E-05	5.0E+01	3.0E-01	7.4E+02	1.2E-02	1.2E+03	4.8E+02	8.04E-03	2.67E+01	4.59E+02
126-99-8	2-Chloro-1,3-butadiene	8.8E+01	3.2E-02	1.3E+00	1.1E-01	1.1E-05	5.0E+01	3.0E-01	7.4E+02	1.2E-02	1.2E+03	4.8E+02	8.04E-03	2.67E+01	4.59E+02
532-27-4	2-Chloroacetophenone (surr=chlorobenzene)	1.1E+02	3.7E-03	1.5E-01	7.3E-02	8.7E-06	2.2E+02	1.3E+00	4.7E+02	4.0E-04	6.3E+03	6.8E+02	2.64E-04	1.47E+02	6.84E+02
95-57-8	2-Chlorophenol	1.3E+02	3.9E-04	1.6E-02	5.0E-01	9.5E-06	4.0E+02	2.4E+00	2.2E+04	1.7E-04	9.7E+03	5.5E+04	1.11E-04	2.27E+02	5.50E+04
75-29-6	2-Chloropropane (surr=1,2-dichloropropane)	1.1E+02	2.8E-03	1.1E-01	7.8E-02	8.7E-06	4.4E+01	2.6E-01	2.8E+03	1.2E-03	3.6E+03	1.1E+03	7.92E-04	8.50E+01	1.10E+03
75-07-0	Acetaldehyde	4.4E+01	7.9E-05	3.2E-03	1.2E-01	1.4E-05	1.8E+01	1.1E-01	1.0E+06	1.0E-04	1.3E+04	2.1E+05	6.36E-05	3.00E+02	2.21E+05
67-64-1	Acetone	5.8E+01	3.9E-05	1.6E-03	1.2E-01	1.1E-05	5.8E-01	3.5E-03	1.0E+06	1.0E-04	1.3E+04	1.0E+05	6.02E-05	3.08E+02	1.15E+05
75-05-8	Acetonitrile	4.1E+01	2.0E-05	8.2E-04	1.3E-01	1.7E-05	1.6E+01	9.4E-02	1.0E+06	2.9E-05	2.3E+04	1.9E+05	1.85E-05	5.55E+02	2.05E+05
107-02-8	Acrolein	5.6E+01	1.2E-04	4.9E-03	1.1E-01	1.2E-05	2.1E+01	1.3E-01	2.1E+05	1.2E-04	1.2E+04	4.8E+04	7.51E-05	2.76E+02	5.03E+04
107-13-1	Acrylonitrile	5.3E+01	8.8E-05	3.6E-03	1.1E-01	1.3E-05	8.5E-01	5.1E-03	7.9E+04	1.9E-04	9.0E+03	8.4E+03	1.17E-04	2.21E+02	9.27E+03
71-43-2	Benzene	7.8E+01	5.6E-03	2.3E-01	8.8E-02	9.8E-06	5.9E+01	3.5E-01	1.8E+03	2.1E-03	2.7E+03	8.7E+02	1.38E-03	6.44E+01	8.77E+02
100-44-7	Benzyl chloride	1.3E+02	5.1E-05	2.1E-03	6.7E-02	7.8E-06	5.0E+01	3.0E-01	3.3E+03	1.8E-05	2.9E+04	1.3E+03	1.18E-05	6.96E+02	1.36E+03
91-58-7	beta-Chloronaphthalene	1.6E+02	3.1E-04	1.3E-02	3.5E-02	8.8E-06	1.6E+03	9.3E+00	1.2E+01	2.4E-06	8.0E+04	1.1E+02	1.63E-06	1.87E+03	1.13E+02
111-44-4	Bis(2-chloroethyl)ether	1.4E+02	1.8E-05	7.4E-04	6.9E-02	7.5E-06	7.6E+01	4.6E-01	1.7E+04	4.9E-06	5.7E+04	9.6E+03	3.25E-06	1.33E+03	9.76E+03
108-60-1	Bis(2-chloroisopropyl)ether	1.7E+02	1.1E-04	4.6E-03	6.3E-02	6.4E-06	6.1E+01	3.7E-01	1.7E+03	3.3E-05	2.2E+04	7.9E+02	2.13E-05	5.19E+02	8.13E+02
542-88-1	Bis(chloromethyl)ether	1.2E+02	2.0E-04	8.2E-03	8.9E-02	9.4E-06	1.2E+00	7.2E-03	2.2E+04	3.5E-04	6.7E+03	2.4E+03	2.10E-04	1.65E+02	2.64E+03
108-86-1	Bromobenzene (surr=chlorobenzene)	1.1E+02	3.7E-03	1.5E-01	7.3E-02	8.7E-06	2.2E+02	1.3E+00	4.7E+02	4.0E-04	6.3E+03	6.8E+02	2.64E-04	1.47E+02	6.84E+02
74-97-5	Chlorobromomethane (surr=methylene chloride)	8.5E+01	2.2E-03	9.0E-02	1.0E-01	1.2E-05	1.2E+01	7.0E-02	1.3E+04	2.5E-03	2.5E+03	2.5E+03	1.60E-03	5.98E+01	2.59E+03
75-27-4	Bromodichloromethane	1.6E+02	1.6E-03	6.6E-02	3.0E-02	1.1E-05	5.5E+01	3.3E-01	6.7E+03	2.3E-04	8.3E+03	3.0E+03	1.50E-04	1.95E+02	3.05E+03
74-83-9	Bromomethane	9.5E+01	6.2E-03	2.6E-01	7.3E-02	1.2E-05	9.0E+00	5.4E-02	1.5E+04	4.8E-03	1.8E+03	3.1E+03	3.12E-03	4.28E+01	3.14E+03
75-15-0	Carbon disulfide	7.6E+01	3.0E-02	1.2E+00	1.0E-01	1.0E-05	4.6E+01	2.7E-01	1.2E+03	1.1E-02	1.2E+03	7.2E+02	7.65E-03	2.73E+01	6.95E+02
56-23-5	Carbon tetrachloride	1.5E+02	3.0E-02	1.2E+00	7.8E-02	8.8E-06	1.7E+02	1.0E+00	7.9E+02	3.7E-03	2.1E+03	1.1E+03	2.48E-03	4.80E+01	1.07E+03
108-90-7	Chlorobenzene	1.1E+02	3.7E-03	1.5E-01	7.3E-02	8.7E-06	2.2E+02	1.3E+00	4.7E+02	4.0E-04	6.3E+03	6.8E+02	2.64E-04	1.47E+02	6.84E+02
75-45-6	Chlorodifluoromethane (surr=dichlorodifluoromethane)	1.2E+02	1.0E-01	4.1E+00	8.0E-02	1.1E-05	5.8E+01	3.5E-01	2.8E+02	1.4E-02	1.1E+03	3.4E+02	1.02E-02	2.37E+01	3.12E+02
75-00-3	Chloroethane	6.5E+01	1.1E-02	4.5E-01	1.0E-01	1.2E-05	1.5E+01	8.8E-02	5.7E+03	9.0E-03	1.3E+03	1.6E+03	5.98E-03	3.09E+01	1.55E+03
67-66-3	Chloroform	1.2E+02	3.7E-03	1.5E-01	1.0E-01	1.0E-05	4.0E+01	2.4E-01	7.9E+03	2.2E-03	2.7E+03	2.9E+03	1.45E-03	6.29E+01	2.97E+03
74-87-3	Chloromethane	5.1E+01	2.4E-02	9.8E-01	1.1E-01	6.5E-06	3.5E+01	2.1E-01	8.2E+03	1.1E-02	1.2E+03	4.0E+03	7.75E-03	2.72E+01	3.92E+03
218-01-9	Chrysene	2.3E+02	9.5E-05	3.9E-03	2.5E-02	6.2E-06	4.0E+05	2.4E+03	1.6E-03	2.1E-09	2.7E+06	3.8E+00	1.42E-09	6.35E+04	3.82E+00
4170-30-3	Crotonaldehyde (surr=methyl methacrylate)	1.0E+02	3.4E-04	1.4E-02	7.7E-02	8.6E-06	1.3E+01	7.9E-02	1.5E+04	3.1E-04	7.1E+03	2.7E+03	1.93E-04	1.72E+02	2.89E+03
98-82-8	Cumene (isopropylbenzene)	1.2E+02	1.2E-02	4.7E-01	7.5E-02	7.1E-06	2.2E+02	1.3E+00	6.1E+01	1.2E-03	3.6E+03	9.2E+01	8.12E-04	8.40E+01	9.19E+01
460-19-5	Cyanogen	5.2E+01	5.0E-03	2.1E-01	9.6E-02	1.0E-05	2.6E+01	1.6E-01	8.5E+03	3.5E-03	2.1E+03	2.5E+03	2.27E-03	5.02E+01	2.55E+03
506-68-3	Cyanogen bromide	5.2E+01	5.0E-03	2.1E-01	9.6E-02	1.0E-05	2.6E+01	1.6E-01	8.5E+03	3.5E-03	2.1E+03	2.5E+03	2.27E-03	5.02E+01	2.55E+03
506-77-4	Cyanogen chloride	5.2E+01	5.0E-03	2.1E-01	9.6E-02	1.0E-05	2.6E+01	1.6E-01	8.5E+03	3.5E-03	2.1E+03	2.5E+03	2.27E-03	5.02E+01	2.55E+03
110-82-7	Cyclohexane	8.4E+01	2.0E-01	8.2E+00	8.0E-02	9.0E-06	1.6E+02	9.6E-01	5.5E+01	1.3E-02	1.1E+03	1.4E+02	9.54E-03	2.45E+01	1.31E+02
99-87-6	Cymene (surr=isopropylbenzene)	1.2E+02	1.2E-02	4.7E-01	7.5E-02	7.1E-06	2.2E+02	1.3E+00	6.1E+01	1.2E-03	3.6E+03	9.2E+01	8.12E-04	8.40E+01	9.19E+01
124-48-1	Dibromochloromethane	2.1E+02	8.5E-04	3.5E-02	9.6E-02	1.0E-05	4.7E+02	2.8E+00	4.4E+03	6.0E-05	1.6E+04	1.3E+04	3.96E-05	3.80E+02	1.29E+04
75-71-8	Dichlorodifluoromethane	1.2E+02	1.0E-01	4.1E+00	8.0E-02	1.1E-05	5.8E+01	3.5E-01	2.8E+02	1.4E-02	1.1E+03	3.4E+02	1.02E-02	2.37E+01	3.12E+02
77-73-6	Dicyclopentadiene	1.3E+02	1.1E-02	4.4E-01	6.7E-02	1.0E-05	5.7E+02	3.4E+00	1.8E+03	4.2E-04	6.1E+03	6.5E+03	2.81E-04	1.43E+02	6.48E+03
108-20-3	Diisopropyl ether (surr=MTBE)	8.5E+01	5.9E-04	2.4E-02	8.0E-02	1.0E-05	6.0E+00	3.6E-02	1.5E+05	7.1E-04	4.7E+03	2.1E+04	4.40E-04	1.14E+02	2.27E+04
124-40-3	Dimethylamine	4.5E+01	9.0E-05	3.7E-03	1.2E-01	1.3E-05	2.2E+00	1.3E-02	1.0E+06	2.0E-04	8.8E+03	1.1E+05	1.22E-04	2.16E+02	1.25E+05
106-89-8	Epichlorohydrin	9.30E+01	3.20E-05	1.30E-03	8.80E-02	9.80E-06	3.50E+00	2.1E-04	6.00E+04	5.00E-05	1.80E+04	7.30E+03	3.62E-05	3.97E+02	6.72E+03
141-78-6	Ethyl acetate	8.8E+01	1.4E-04	5.7E-03	7.3E-02	9.7E-06	5.9E+01	3.6E-01	8.0E+04	4.8E-05	1.8E+04	3.7E+04	3.12E-05	4.28E+02	3.75E+04
140-88-5	Ethyl acrylate (surr=methyl methacrylate)	2.0E+02	2.4E-01	9.8E+00	9.1E-02	8.6E-06	8.4E+02	5.0E+00	2.0E+01	6.7E-03	1.5E+03	1.4E+02	4.63E-03	3.52E+01	1.34E+02
75-00-3	Ethyl chloride	6.5E+01	1.1E-02	4.5E-01	1.0E-01	1.2E-05	1.5E+01	8.8E-02	5.7E+03	9.0E-03	1.3E+03	1.6E+03	5.98E-03	3.09E+01	1.55E+03
60-29-7	Ethyl ether (surr=Bis(2-chloroethyl)ether)	1.4E+02	1.8E-05	7.4E-04	6.9E-02	7.5E-06	7.6E+01	4.6E-01	1.7E+04	4.9E-06	5.7E+04	9.6E+03	3.25E-06	1.33E+03	9.76E+03
97-63-2	Ethyl methacrylate (surr=methyl methacrylate)	2.0E+02	2.4E-01	1.0E+01	9.1E-02	8.6E-06	8.4E+02	5.0E+00	2.0E+01	6.8E-03	1.5E+03	1.4E+02	4.67E-03	3.50E+01	1.35E+02
100-41-4	Ethylbenzene	1.1E+02	7.9E-03	3.2E-01	7.5E-02	7.8E-06	3.6E+02	2.2E+00	1.7E+02	5.4E-04	5.4E+03	4.0E+02	3.58E-04	1.26E+02	3.96E+02
75-21-8	Ethylene oxide	4.4E+01	7.6E-05	3.1E-03	1.3E-01	1.5E-05	2.2E+00	1.3E-02	1.0E+06	1.8E-04	9.4E+03	1.1E+05	1.08E-04	2.30E+02	1.25E+05
76-13-1	Freon 113	1.9E+02	5.2E-01	2.1E+01	2.9E-02	8.1E-06	1.6E+02	9.6E-01	1.1E+03	6.3E-03	1.6E+03	5.6E+03	4.75E-03	3.47E+01	4.92E+03
110-00-9	Furan	6.8E+01	5.4E-03	2.2E-01	1.0E-01	1.2E-05	1.2E+01	7.4E-02	1.0E+04	5.6E-03	1.7E+03	2.2E+03	3.61E-03	3.98E+01	2.21E+03
74-90-8	Hydrogen cyanide	2.7E+01	1.3E-04	5.3E-03	1.8E-01	1.8E-05	1.7E+01	1.0E-01	1.0E+06	2.4E-04	8.1E+03	2.1E+05	1.51E-04	1.94E+02	2.17E+05
193-39-5	Indeno(1,2,3-cd)pyrene							0.0E+00						#DIV/0!	
78-83-1	Isobutanol	7.4E+01	1.2E-05	4.9E-04	8.6E-02	9.3E-06	6.2E+01	3.7E-01	8.5E+04	4.8E-06	5.7E+04	4.0E+04	3.24E-06	1.33E+03	4.10E+04
123-33-1	Maleic hydrazide	1.1E+02	6.6E-03	2.7E-01	9.0E-02	1.1E-05	4.2E+01	2.5E-01	6.0E+03	3.2E-03	2.2E+03	2.4E+03	2.08E-03	5.24E+01	2.42E+03
126-98-7	Methacrylonitrile (surr=acrylonitrile)	2.0E+02	8.8E-05	3.6E-03	1.1E-01	1.3E-05	8.5E-01	5.1E-03	7.9E+04	2.0E-04	8.9E+03	8.4E+03	1.18E-04	2.20E+02	9.27E+03
16752-77-5	Methomyl	1.6E+02	3.8E-02	1.6E+00	6.9E-02	1.0E-05	1.5E+01	8.9E-02	1.7E+05	1.2E-02	1.2E+03	8.2E+04	8.32E-03	2.62E+01	7.63E+04
79-20-9	Methyl acetate (surr=acetone)	2.0E+02	2.1E-05	8.4E-04	1.0E-01	1.0E-05	2.2E+00	1.3E-02	1.0E+06	4.1E-05	2.0E+04	1.1E+05	2.50E-05	4.79E+02	1.25E+05
96-33-3	Methyl acrylate (surr=methyl methacrylate)	2.0E+02	2.4E-01	9.8E+00	9.1E-02	8.6E-06	8.4E+02	5.0E+00	6.0E+01	6.7E-03	1.5E+03	4.2E+02	4.63E-03	3.52E+01	4.03E+02
78-93-3	Methyl ethyl ketone	7.2E+01	2.7E-05	1.1E-03	9.0E-02	9.8E-06	4.5E+00	2.7E-02	2.7E+05	4.2E-05	1.9E+04	3.4E+04	2.58E-05	4.71E+02	3.72E+04
108-10-1	Methyl isobutyl ketone	1.0E+02	1.4E-04	5.7E-03	7.5E-02	7.8E-06	1.3E+02	8.0E-01	1.9E+04	2.5E-05	2.5E+04	1.7E+04	1.63E-05	5.92E+02	1.74E+04
80-62-6	Methyl methacrylate	1.0E+02	3.4E-04	1.4E-02	7.7E-02	8.6E-06	1.3E+01	7.9E-02	1.5E+04	3.1E-04	7.1E+03	2.7E+03	1.93E-04	1.72E+02	2.89E+03
98-83-9	Methyl styrene (alpha) (surr=styrene)	2.0E+02	2.3E-03	9.4E-02	7.1E-02	8.0E-06	3.6E+02	2.2E+00	3.0E+02	1.5E-04	1.0E+04	6.8E+02	1.02E-04	2.37E+02	6.86E+02
25013-15-4	Methyl styrene (mixture) (surr=nitrobenzene)	2.0E+02	2.3E-03	9.4E-02	7.1E-02	8.0E-06	3.6E+02	2.2E+00	3.0E+02	1.5E-04	1.0E+04	6.8E+02	1.02E-04	2.37E+02	6.86E+02
1634-04-4	Methyl tertbutyl ether (MTBE)	8.5E+01	5.9E-04	2.4E-02	8.0E-02	1.0E-05	6.0E+00	3.6E-02	1.5E+05	7.1E-04	4.7E+03	2.1E+04	4.40E-04	1.14E+02	2.27E+04
108-87-2	Methylcyclohexane	9.8E+01	4.3E-01	1.8E+01	7.0E-02	9.0E-06	2.2E+03	1.3E+01	1.4E+01	3.9E-03	2.0E+03	2.3E+02	2.66E-03	4.64E+01	2.25E+02
74-95-3	Methylene bromide	1.7E+02	9.0E-04	3.7E-02	9.6E-02	1.0E-05	2.5E+01	1.5E-01	1.2E+04	7.2E-04	4.7E+03	3.0E+03	4.58E-04	1.12E+02	3.13E+03
75-09-2	Methylene chloride	8.5E+01	2.2E-03	9.0E-02	1.0E-01	1.2E-05	1.2E+01	7.0E-02	1.3E+04	2.5E-03	2.5E+03	2.5E+03	1.60E-03	5.98E+01	2.59E+03
99-08-1	m-Nitrotoluene (surr=nitrobenzene)	1.2E+02	2.4E-05	9.8E-04	7.6E-02	8.6E-06	6.5E+01	3.9E-01	2.1E+03	8.1E-06	4.4E+04	1.0E+03	5.34E-06	1.04E+03	1.05E+03
637-92-3	Ethyl tertbutyl ether (Surr=MTBE)	8.5E+01	5.9E-04	2.4E-02	8.0E-02	1.0E-05	6.0E+00	3.6E-02	1.5E+05	7.1E-04	4.7E+03	2.1E+04	4.40E-04	1.14E+02	2.27E+04
91-20-3	Naphthalene	1.3E+02	4.8E-04	2.0E-02	5.9E-02	7.5E-06	1.2E+03	7.1E+00	3.1E+01	8.4E-06	4.3E+04	2.2E+02	5.58E-06	1.01E+03	2.25E+02
104-51-8	n-Butylbenzene	1.3E+02	1.3E-02	5.4E-01	7.5E-02	7.8E-06	2.8E+03	1.7E+01	1.4E+01	1.2E-04	1.1E+04	2.4E+02	8.11E-05	2.66E+02	2.37E+02
110-54-3	n-Hexane	8.6E+01	1.2E-01	5.0E+00	2.0E-01	7.8E-06	8.9E+02	5.3E+00	1.8E+01	8.2E-03	1.4E+03	1.1E+02	5.54E-03	3.21E+01	1.12E+02
98-95-3	Nitrobenzene	1.2E+02	2.4E-05	9.8E-04	7.6E-02	8.6E-06	6.5E+01	3.9E-01	2.1E+03	8.1E-06	4.4E+04	1.0E+03	5.34E-06	1.04E+03	1.05E+03
924-16-3	N-Nitrosodi-n-butylamine	1.6E+02	3.2E-04	1.3E-02	5.8E-02	9.7E-06	2.6E+02	1.5E+00	1.3E+03	2.4E-05	2.6E+04	2.1E+03	1.60E-05	5.99E+02	2.15E+03
103-65-1	n-Propylbenzene (surr=n-Butylbenzene	1.3E+02	1.3E-02	5.4E-01	7.5E-02	7.8E-06	2.8E+03	1.7E+01	1.4E+01	1.2E-04	1.1E+04	2.4E+02	8.11E-05	2.66E+02	2.37E+02
88-73-3	o-Chloronitrobenzene (surr=nitrobenzene)	1.2E+02	2.4E-05	9.8E-04	7.6E-02	8.6E-06	6.5E+01	3.9E-01	2.1E+03	8.1E-06	4.4E+04	1.0E+03	5.34E-06	1.04E+03	1.05E+03
95-49-8	o-Chlorotoluene (surr=chlorobenzene)	1.1E+02	3.7E-03	1.5E-01	7.3E-02	8.7E-06	2.2E+02	1.3E+00	4.7E+02	4.0E-04	6.3E+03	6.8E+02	2.64E-04	1.47E+02	6.84E+02
88-72-2	o-Nitrotoluene (surr=nitrobenzene)	1.2E+02	2.4E-05	9.8E-04	7.6E-02	8.6E-06	6.5E+01	3.9E-01	2.1E+03	8.1E-06	4.4E+04	1.0E+03	5.34E-06	1.04E+03	1.05E+03
100-00-5	p-Chloronitrobenzene (surr=nitrobenzene)	1.2E+02	2.4E-05	9.8E-04	7.6E-02	8.6E-06	6.5E+01	3.9E-01	2.1E+03	8.1E-06	4.4E+04	1.0E+03	5.34E-06	1.04E+03	1.05E+03
99-99-0	p-Nitrotoluene (surr=nitrobenzene)	1.2E+02	2.4E-05	9.8E-04	7.6E-02	8.6E-06	6.5E+01	3.9E-01	2.1E+03	8.1E-06	4.4E+04	1.0E+03	5.34E-06	1.04E+03	1.05E+03
75-56-9	Propylene oxide	5.8E+01	8.5E-05	3.5E-03	1.2E-01	1.3E-05	2.5E+01	1.5E-01	4.8E+05	8.7E-05	1.3E+04	1.2E+05	5.59E-05	3.20E+02	1.24E+05
135-98-8	sec-Butylbenzene	1.3E+02	1.9E-02	7.7E-01	7.5E-02	7.8E-06	2.2E+03	1.3E+01	1.7E+01	2.3E-04	8.3E+03	2.2E+02	1.51E-04	1.94E+02	2.23E+02
100-42-5	Styrene	1.0E+02	2.8E-03	1.1E-01	7.1E-02	8.0E-06	7.8E+02	4.7E+00	3.1E+02	8.7E-05	1.3E+04	1.5E+03	5.79E-05	3.14E+02	1.48E+03
75-65-0	tert-butyl alcohol (surr=isobutanol)	7.4E+01	1.2E-05	4.9E-04	8.6E-02	9.3E-06	6.2E+01	3.7E-01	8.5E+04	4.8E-06	5.7E+04	4.0E+04	3.24E-06	1.33E+03	4.10E+04
98-06-6	tert-Butylbenzene	1.3E+02	1.3E-02	5.2E-01	7.5E-02	7.8E-06	2.2E+03	1.3E+01	3.0E+01	1.5E-04	1.0E+04	3.9E+02	1.02E-04	2.36E+02	3.93E+02
127-18-4	Tetrachloroethylene (PCE)	1.7E+02	1.8E-02	7.5E-01	7.2E-02	8.2E-06	1.6E+02	9.3E-01	2.0E+02	2.4E-03	2.6E+03	2.3E+02	1.62E-03	5.95E+01	2.32E+02
109-99-9	Tetrahydrofuran	7.2E+01	7.0E-05	2.9E-03	9.8E-02	1.1E-05	9.5E-01	5.7E-03	1.0E+06	1.4E-04	1.1E+04	1.1E+05	8.36E-05	2.62E+02	1.18E+05
108-88-3	Toluene	9.2E+01	6.6E-03	2.7E-01	8.7E-02	8.6E-06	1.8E+02	1.1E+00	5.3E+02	9.9E-04	4.0E+03	6.5E+02	6.57E-04	9.33E+01	6.56E+02
79-01-6	Trichloroethylene (TCE)	1.3E+02	1.0E-02	4.2E-01	7.9E-02	9.1E-06	1.7E+02	1.0E+00	1.1E+03	1.5E-03	3.3E+03	1.3E+03	9.82E-04	7.63E+01	1.29E+03
75-69-4	Trichlorofluoromethane	1.4E+02	9.7E-02	4.0E+00	8.7E-02	1.3E-05	1.6E+02	9.6E-01	1.1E+03	1.0E-02	1.3E+03	2.0E+03	7.02E-03	2.86E+01	1.88E+03
121-44-8	Triethylamine (Surr=Dimethylamine)	4.5E+01	9.0E-05	3.7E-03	1.2E-01	1.3E-05	2.2E+00	1.3E-02	1.0E+06	2.0E-04	8.8E+03	1.1E+05	1.22E-04	2.16E+02	1.25E+05
108-05-4	Vinyl acetate	8.6E+01	5.1E-04	2.1E-02	8.5E-02	9.2E-06	5.3E+00	3.2E-02	2.0E+04	6.8E-04	4.8E+03	2.7E+03	4.21E-04	1.17E+02	2.93E+03
593-60-2	Vinyl bromide (Surr=Bromomethane)	2.0E+02	6.2E-03	2.6E-01	1.0E-01	1.2E-05	1.3E+02	7.6E-01	1.8E+04	1.5E-03	3.3E+03	1.6E+04	9.73E-04	7.67E+01	1.59E+04
75-01-4	Vinyl chloride (child/adult)+++	6.3E+01	2.7E-02	1.1E+00	1.1E-01	1.2E-06	1.9E+01	1.1E-01	2.8E+03	1.5E-02	1.0E+03	1.2E+03	1.02E-02	2.37E+01	1.10E+03
1330-20-7	Xylenes	1.1E+02	7.3E-03	3.0E-01	7.0E-02	7.8E-06	4.1E+02	2.4E+00	1.6E+02	4.2E-04	6.1E+03	4.2E+02	2.80E-04	1.43E+02	4.19E+02

Q/C	7.4517
Exp. Interval (s)	31536000
Bulk Density	1.55
Air filled	0.247
Water Filled	0.173
Total Porosity	0.42
org carbon	0.006

CALCULATION OF CONCENTRATION IN AMBIENT AIR FOR VOLATILE COMPOUNDS DETECTED IN SOIL SAMPLES
USING PROPOSED CUMMULATIVE RISK-BASED REMEDIATION CONCENTRATIONS
FORMER DELPHI BATTERY PLANT, 1201 MAGNOLIA AVE.
ANAHEIM, CALIFORNIA
32486-001

CHEMICAL	CONCENTRATION IN SOIL (MG/KG)	VOLATILZATION FACTOR M^3/KG	CONCENTRATION IN AMBIENT AIR (MG/M^3)
1,1,1-Trichloroethane	3.13	5.16E+01	6.1E-02
1,1,2-Trichloroethane	0.0269	1.54E+02	1.7E-04
1,1-Dichloroethane	0.336	5.72E+01	5.9E-03
1,1-Dichloroethene	0.251	3.30E+01	7.6E-03
1,2,3-Trichlorobenzene	0.0188	1.01E+03	1.9E-05
1,2,4-Trichlorobenzene	0.0622	1.01E+03	6.2E-05
1,2,4-Trimethylbenzene	2.480	4.61E+02	5.4E-03
1,2-Dichloroethane	0.0187	9.39E+01	2.0E-04
1,3,5-Trimethylbenzene	1.360	1.88E+02	7.2E-03
2-Butanone (MEK)	0.0811	4.71E+02	1.7E-04
Acetone	1.34	3.08E+02	4.3E-03
Benzene	0.0084	6.44E+01	1.3E-04
Dibromomethane (as EBD; 1,2, Dibromoethane)	0.0308	2.53E+02	1.2E-04
Ethylbenzene	0.0506	1.26E+02	4.0E-04
Isopropylbenzene (Cumene)	0.0848	8.40E+01	1.0E-03
Naphthalene	6.970	1.01E+03	6.9E-03
n-Propylbenzene	0.26	2.66E+02	9.8E-04
p-Isopropyltoluene (or Cymene, as Isopropyl-benzene)	0.75	8.40E+01	8.9E-03
sec-Butylbenzene	0.493	1.94E+02	2.5E-03
tert-Butylbenzene	0.0302	2.36E+02	1.3E-04
Tetrachloroethene	0.266	5.95E+01	4.5E-03
Toluene	0.0924	9.33E+01	9.9E-04
Xylenes (total)	0.347	1.43E+02	2.4E-03

Di = DIFFUSIVITY IN AIR
Hc = HENRY'S LAW CONSTANT
Koc = ORGANIC CARBON PARTITION
foc = FRACTION OF ORGANIC CARBON
Kd = SOIL/WATER PARTITION COEFFICIENT
Ci = BULK SOIL CONTRATION OF CONTAMINANT
Ei = AVERAGE EMISSION RATE OF CONTAMINANT OVER RESIDENTIAL LOT
Kd = Koc * foc
foc default = 0.02
NOTE: CONCENTRATIONS IN AMBIENT AIR CALCULATED USING FIGURES 2.6 AND 2.7 OF THE PEA GUIDANCE MANUAL (DTSC 1999)
TRICHLOROFLUOROMETHANE PHYSICAL PROPERTY FROM THE 2004 EPA REGION IX PRGs

SITE-SPECIFIC LIFETIME CANCER RISK (OFF-SITE COMMERCIAL WORKER) CALCULATIONS – ENTIRE SITE DURING REMEDIATION/CONSTRUCTION ACTIVITIES
USING REASONABLE MAXIMUM EXPOSURE CONCENTRATIONS
FORMER DELPHI BATTERY PLANT, 1201 MAGNOLIA AVE.
ANAHEIM, CALIFORNIA
32486-001

General Exposure Factors		
Exposure Duration	(yrs)	1
Body Weight	(kg)	70
Averaging Time	(days)	25,500
Dermal exposure factors		
Skin Surface Area	(cm^2/day)	5,700
Soil to Skin Adherence Factor	(mg/cm^2)	0.2
Dermal Absorption Factor	(unitless)	Chemical-specific
Exposure Frequency	(days/yr)	250
Ingestion Exposure Factors		
Soil Ingestion Rate	(mg/day)	100
Absorption Rate	(unitless)	1
Exposure Frequency	(days/yr)	250
Inhalation Exposure Factors		
Inhalation Rate	(m^3/day)	7
Exposure Frequency	(days/yr)	250

Exposure Pathway: Inhalation of Particulates (for non-volatiles)

Chemical	Cs (mg/kg)	*	5.00E-08 (kg/m^3) (Note #1)	*	0.0010 (kg/µg)	*	SFi $(mg/kg\text{-}day)^{-1}$	=	Cancer Risk
Antimony	531	*	5.00E-08	*	0.0010	*	na	=	na
Arsenic	75	*	5.00E-08	*	0.0010	*	1.2E+01	=	4.4E-08
Cadmium	0.92	*	5.00E-08	*	0.0010	*	1.5E+01	=	6.8E-10
Chromium (III)	122	*	5.00E-08	*	0.0010	*	na	=	na
Chromium (VI)	5.45	*	5.00E-08	*	0.0010	*	5.1E+02	=	1.4E-07
Zinc	106	*	5.00E-08	*	0.0010	*	na	=	na
PCBs (total)	892	*	5.00E-08	*	0.0010	*	2.0E+00	=	8.7E-08
2,4-Dimethylphenol	4.3	*	5.00E-08	*	0.0010	*	na	=	na
2-Methylnaphthalene (as Pyrene)	8.25	*	5.00E-08	*	0.0010	*	na	=	na
2-Methylphenol (2-Cresol)	0.3	*	5.00E-08	*	0.0010	*	na	=	na
4-Methylphenol	11.2	*	5.00E-08	*	0.0010	*	na	=	na
Acenaphthene	13	*	5.00E-08	*	0.0010	*	na	=	na
Acenaphthylene	3.78	*	5.00E-08	*	0.0010	*	na	=	na
Anthracene	24.3	*	5.00E-08	*	0.0010	*	na	=	na
Benzo(a)anthracene	1.4	*	5.00E-08	*	0.0010	*	3.9E-01	=	2.7E-11
Benzo(a)pyrene	1.5	*	5.00E-08	*	0.0010	*	3.9E+00	=	2.9E-10
Benzo(b)fluoranthene	2.03	*	5.00E-08	*	0.0010	*	3.9E-01	=	3.9E-11
Benzo(g,h,i)perylene	36.6	*	5.00E-08	*	0.0010	*	na	=	na
Benzo(k)fluoranthene	1.02	*	5.00E-08	*	0.0010	*	3.9E-01	=	2.0E-11
Benzoic Acid	2.56	*	5.00E-08	*	0.0010	*	na	=	na
Bis(2-ethylhexyl) phthalate	19.8	*	5.00E-08	*	0.0010	*	8.4E-03	=	8.2E-12
Chrysene	2.92	*	5.00E-08	*	0.0010	*	3.9E-02	=	5.6E-12
Dibenzofuran	3.25	*	5.00E-08	*	0.0010	*	na	=	na
Di-n-butyl phthalate	0.625	*	5.00E-08	*	0.0010	*	na	=	na
Di-n-octyl phthalate (Dioctyl ester) (as Di-n-butyl phthalate)	20.6	*	5.00E-08	*	0.0010	*	na	=	na
Fluoranthene	151	*	5.00E-08	*	0.0010	*	na	=	na
Fluorene	12.6	*	5.00E-08	*	0.0010	*	na	=	na
Indeno(1,2,3-cd)pyrene	1.57	*	5.00E-08	*	0.0010	*	3.9E-01	=	3.0E-11
Naphthalene	6.97	*	5.00E-08	*	0.0010	*	1.2E-01	=	4.1E-11
Pentachlorophenol	4.09	*	5.00E-08	*	0.0010	*	1.8E-02	=	3.6E-12
Phenanthrene	128	*	5.00E-08	*	0.0010	*	na	=	na
Phenol	5.16	*	5.00E-08	*	0.0010	*	na	=	na
Pyrene	95.1	*	5.00E-08	*	0.0010	*	na	=	na
									3E-07

Exposure Pathway: Inhalation of volatiles

Chemical	Ca (mg/m3)	*	0.0010 (m^3/kg-day) (Note #2)	*	SFi $(mg/kg\text{-}day)^{-1}$	=	Cancer Risk	Soil Conc. mg/kg
1,1,1-Trichloroethane	6.07E-02	*	0.0010	*	na	=	na	3.13
1,1,2-Trichloroethane	1.75E-04	*	0.0010	*	5.70E-02	=	9.8E-09	0.0269
1,1-Dichloroethane	5.88E-03	*	0.0010	*	5.70E-03	=	3.3E-08	0.336
1,1-Dichloroethene	7.60E-03	*	0.0010	*	na	=	na	0.251
1,2,3-Trichlorobenzene	1.86E-05	*	0.0010	*	na	=	na	0.0188
1,2,4-Trichlorobenzene	6.15E-05	*	0.0010	*	na	=	na	0.0622
1,2,4-Trimethylbenzene	5.39E-03	*	0.0010	*	na	=	na	2.480
1,2-Dichloroethane	1.99E-04	*	0.0010	*	7.20E-02	=	1.4E-08	0.0187
1,3,5-Trimethylbenzene	7.23E-03	*	0.0010	*	na	=	na	1.360
2-Butanone (MEK)	1.72E-04	*	0.0010	*	na	=	na	0.0811
Acetone	4.35E-03	*	0.0010	*	na	=	na	1.34
Benzene	1.31E-04	*	0.0010	*	1.00E-01	=	1.3E-08	0.0084
Dibromomethane (as EBD; 1,2, Dibromoethane)	1.22E-04	*	0.0010	*	na	=	na	0.0308
Ethylbenzene	4.00E-04	*	0.0010	*	na	=	na	0.0506
Isopropylbenzene	1.01E-03	*	0.0010	*	na	=	na	0.0848
Naphthalene	6.88E-03	*	0.0010	*	1.20E-01	=	8.1E-07	6.970
n-Propylbenzene	9.79E-04	*	0.0010	*	na	=	na	0.26
p-Isopropyltoluene (or Cymene, as Isopropyl-benzene)	8.93E-03	*	0.0010	*	na	=	na	0.75
sec-Butylbenzene	2.54E-03	*	0.0010	*	na	=	na	0.493
tert-Butylbenzene	1.28E-04	*	0.0010	*	na	=	na	0.0302
Tetrachloroethene	4.47E-03	*	0.0010	*	2.10E-02	=	9.2E-08	0.266
Toluene (Methyl benzene)	9.90E-04	*	0.0010	*	na	=	na	0.0924
Xylenes (total)	2.43E-03	*	0.0010	*	na	=	na	0.347
			Total Cancer Risk Inhalation of Volatiles				**1E-06**	

Cumulative Cancer Risk: 1E-06

Proposed Cumulative Risk Based Remedial Goals are highlighted in yellow
Note #1: SCAWMD Rule 403 threshold of 50 ug/m^3 (1/50 ug/m^3 = 5 x 10^{-8} kg/m^3)
Note #2: ((Inhalation Rate) x (Exposure Frequency) x (Exposure Duration)) / ((Body Weight) x (Averaging Time))

SITE-SPECIFIC HAZARD INDEX (OFF-SITE COMMERCIAL WORKER) CALCULATIONS – ENTIRE SITE DURING REMEDIATION/CONSTRUCTION ACTIVITIES
USING REASONABLE MAXIMUM EXPOSURE CONCENTRATIONS
FORMER DELPHI BATTERY PLANT, 1201 MAGNOLIA AVE.
ANAHEIM, CALIFORNIA
32486-001

General Exposure Factors		
Exposure Duration	(yrs)	1
Body Weight	(kg)	70
Averaging Time	(days)	365
Dermal exposure factors		
Skin Surface Area	(cm^2/day)	5,700
Soil to Skin Adherence Factor	(mg/cm^2)	0.2
Dermal Absorption Factor	(unitless)	Chemical-specific
Exposure Frequency	(days/yr)	250
Ingestion Exposure Factors		
Soil Ingestion Rate	(mg/day)	100
Absorption Rate	(unitless)	1
Exposure Frequency	(days/yr)	250
Inhalation Exposure Factors		
Inhalation Rate	(m^3/day)	7
Exposure Frequency	(days/yr)	250

Exposure Pathway: Inhalation of Particulates

Chemical	(Cs (mg/kg)	*	5.00E-08 (kg/m^3)	/	RfD (mg/kg-day)	*	0.068 (m^3/kg-day) (Note #2)	=	Hazard Index
Antimony	531	*	5.00E-08	/	5.71E-05	*	0.068	=	0.032
Arsenic	75	*	5.00E-08	/	8.57E-06	*	0.068	=	0.030
Cadmium	0.92	*	5.00E-08	/	5.71E-06	*	0.068	=	0.00055
Chromium (III)	122	*	5.00E-08	/	na	*	0.068	=	na
Chromium (VI)	5.45	*	5.00E-08	/	5.71E-05	*	0.068	=	0.0030
Zinc	106	*	5.00E-08	/	1.00E-02	*	0.068	=	0.00034
PCBs (total)	892	*	5.00E-08	/	3.43E-04	*	0.068	=	0.0089
2,4-Dimethylphenol	4.3	*	5.00E-08	/	2.00E-02	*	0.068	=	0.0000069
2-Methylnaphthalene (as Pyrene)	8.25	*	5.00E-08	/	3.00E-02	*	0.068	=	0.0000088
2-Methylphenol (2-Cresol)	0.3	*	5.00E-08	/	5.00E-02	*	0.068	=	0.00000019
4-Methylphenol	11.2	*	5.00E-08	/	5.00E-03	*	0.068	=	0.000072
Acenaphthene	13	*	5.00E-08	/	6.00E-02	*	0.068	=	0.0000069
Acenaphthylene	3.78	*	5.00E-08	/	3.00E-02	*	0.068	=	0.0000040
Anthracene	24.3	*	5.00E-08	/	3.00E-01	*	0.068	=	0.0000026
Benzo(a)anthracene	1.4	*	5.00E-08	/	na	*	0.068	=	na
Benzo(a)pyrene	1.5	*	5.00E-08	/	na	*	0.068	=	na
Benzo(b)fluoranthene	2.03	*	5.00E-08	/	na	*	0.068	=	na
Benzo(g,h,i)perylene	36.6	*	5.00E-08	/	3.00E-02	*	0.068	=	0.0000042
Benzo(k)fluoranthene	1.02	*	5.00E-08	/	na	*	0.068	=	na
Benzoic Acid	2.56	*	5.00E-08	/	4.00E+00	*	0.068	=	0.0000000022
Bis(2-ethylhexyl) phthalate	19.8	*	5.00E-08	/	2.00E-02	*	0.068	=	0.0000034
Chrysene	2.92	*	5.00E-08	/	na	*	0.068	=	na
Dibenzofuran	3.25	*	5.00E-08	/	2.00E-03	*	0.068	=	0.0000056
Di-n-butyl phthalate	0.625	*	5.00E-08	/	1.00E-01	*	0.068	=	0.000000021
Di-n-octyl phthalate (Dioctyl ester) (as Di-n-butyl phthalate)	20.6	*	5.00E-08	/	4.00E-02	*	0.068	=	0.0000018
Fluoranthene	151	*	5.00E-08	/	4.00E-02	*	0.068	=	0.000013
Fluorene	12.6	*	5.00E-08	/	4.00E-02	*	0.068	=	0.0000011
Indeno(1,2,3-cd)pyrene	1.57	*	5.00E-08	/	na	*	0.068	=	na
Naphthalene	6.97	*	5.00E-08	/	2.57E-03	*	0.068	=	0.000087
Pentachlorophenol	4.09	*	5.00E-08	/	5.71E-05	*	0.068	=	0.0023
Phenanthrenev (as Pyrene)	128	*	5.00E-08	/	3.00E-02	*	0.068	=	0.00014
Phenol	5.16	*	5.00E-08	/	5.71E-02	*	0.068	=	0.0000029
Pyrene	95.1	*	5.00E-08	/	3.00E-02	*	0.068	=	0.00010

Total Hazard Index for Inhalation of Particulates: 0.077

Exposure Pathway: Inhalation of volatiles

Chemical	Ca (mg/m3)	/	RfD (mg/kg-day)	*	0.068 (m^3/kg-day) (Note #2)	=	Hazard Index	Soil Conc. mg/kg
1,1,1-Trichloroethane	6.07E-02	/	2.86E-01	*	0.068	=	0.015	3.13
1,1,2-Trichloroethane	1.75E-04	/	4.00E-03	*	0.068	=	0.0030	0.0269
1,1-Dichloroethane	5.88E-03	/	1.43E-01	*	0.068	=	0.0028	0.336
1,1-Dichloroethene	7.60E-03	/	2.00E-02	*	0.068	=	0.026	0.251
1,2,3-Trichlorobenzene	1.86E-05	/	1.00E-03	*	0.068	=	0.0013	0.0188
1,2,4-Trichlorobenzene	6.15E-05	/	1.00E-03	*	0.068	=	0.004	0.0622
1,2,4-Trimethylbenzene	5.39E-03	/	1.70E-03	*	0.068	=	0.22	2.480
1,2-Dichloroethane	1.99E-04	/	1.14E-01	*	0.068	=	0.00012	0.0187
1,3,5-Trimethylbenzene	7.23E-03	/	1.70E-03	*	0.068	=	0.29	1.36
2-Butanone (MEK)	1.72E-04	/	2.86E-01	*	0.068	=	0.00004	0.0811
Acetone	4.35E-03	/	9.00E-01	*	0.068	=	0.00033	1.34
Benzene	1.31E-04	/	1.71E-02	*	0.068	=	0.00052	0.0084
Dibromomethane (as EBD; 1,2, Dibromoethane)	1.22E-04	/	1.00E-02	*	0.068	=	0.00083	0.0308
Ethylbenzene	4.00E-04	/	5.71E-01	*	0.068	=	0.000048	0.0506
Isopropylbenzene	1.01E-03	/	1.10E-01	*	0.068	=	0.00063	0.0848
Naphthalene	6.88E-03	/	2.57E-03	*	0.068	=	0.18	6.970
n-Propylbenzene	9.79E-04	/	4.00E-02	*	0.068	=	0.0017	0.26
p-Isopropyltoluene (or Cymene, as Isopropyl-benzene)	8.93E-03	/	1.10E-01	*	0.068	=	0.0056	0.75
sec-Butylbenzene	2.54E-03	/	4.00E-02	*	0.068	=	0.0043	0.493
tert-Butylbenzene	1.28E-04	/	4.00E-02	*	0.068	=	0.00022	0.0302
Tetrachloroethene	4.47E-03	/	1.00E-02	*	0.068	=	0.031	0.266
Toluene (Methyl benzene)	9.90E-04	/	8.57E-02	*	0.068	=	0.00079	0.0924
Xylenes (total)	2.43E-03	/	2.00E-01	*	0.068	=	0.00083	0.347

Total Inhalations of volatiles Hazard Index: 0.79

Cumulative Hazard Index 0.87

Proposed Cumulative Risk Based Remedial Goals are highlighted in yellow
Note #1: SCAWMD Rule 403 threshold of 50 ug/m^3 (1/50 ug/m^3 = 5 x 10^{-8} kg/m^3)
Note #2: ((Inhalation Rate) x (Exposure Frequency) x (Exposure Duration)) / ((Body Weight) x (Averaging Time))

VOLATILIZATION FACTOR CALCULATION

COLUMN	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CAS_No	Chemical	MW	H	H'	Di	Dw	Koc	Kd	S	DA-PRG	VF-PRG	SAT-PRG	DA-SS	VF-SS	SAT-SS
		(g/mol)	(atm-m3/mol)	(dimensionless)	(cm^2/s)	(cm^2/s)	(cm^3/g)	(cm^2/s)	(mg/L-water)	(cm2/s)	(m^3/kg)	(mg/kg)	(cm2/s)	(m^3/kg)	(mg/kg)
630-20-6	1,1,1,2-Tetrachloroethane	1.7E+02	3.5E-04	1.4E-02	7.1E-02	7.9E-06	9.3E+01	5.6E-01	3.0E+03	7.9E-05	1.4E+04	2.0E+03	5.17E-05	3.33E+02	2.00E+03
71-55-6	1,1,1-Trichloroethane	1.3E+02	1.7E-02	7.1E-01	7.8E-02	8.8E-06	1.1E+02	6.6E-01	1.3E+03	3.2E-03	2.2E+03	1.2E+03	2.15E-03	5.16E+01	1.18E+03
79-34-5	1,1,2,2-Tetrachloroethane	1.7E+02	3.5E-04	1.4E-02	7.1E-02	7.9E-06	9.3E+01	5.6E-01	3.0E+03	7.9E-05	1.4E+04	2.0E+03	5.17E-05	3.33E+02	2.00E+03
79-00-5	1,1,2-Trichloroethane	1.3E+02	9.1E-04	3.7E-02	7.8E-02	8.8E-06	5.0E+01	3.0E-01	4.4E+03	3.7E-04	6.5E+03	1.8E+03	2.42E-04	1.54E+02	1.85E+03
598-77-6	1,1,2-Trichloropropane	1.5E+02	3.4E-04	1.4E-02	7.1E-02	7.9E-06	5.1E+01	3.1E-01	2.7E+03	1.3E-04	1.1E+04	1.1E+03	8.21E-05	2.64E+02	1.13E+03
92-52-4	1,1-Biphenyl	1.5E+02	3.0E-04	1.2E-02	4.0E-02	8.2E-06	7.8E+03	4.7E+01	7.5E+00	5.5E-07	1.7E+05	3.5E+02	3.70E-07	3.93E+03	3.50E+02
75-34-3	1,1-Dichloroethane	9.9E+01	5.6E-03	2.3E-01	7.4E-02	1.1E-05	3.2E+01	1.9E-01	5.1E+03	2.7E-03	2.4E+03	1.7E+03	1.75E-03	5.72E+01	1.71E+03
75-35-4	1,1-Dichloroethylene	9.7E+01	2.6E-02	1.1E+00	9.0E-02	1.0E-05	5.9E+01	3.5E-01	2.3E+03	7.7E-03	1.4E+03	1.5E+03	5.24E-03	3.30E+01	1.43E+03
563-58-6	1,1-Dichloropropene (Surr=1,3-Dichloropropene)	1.1E+02	1.8E-02	7.3E-01	6.3E-02	1.0E-05	4.6E+01	2.7E-01	2.8E+03	4.6E-03	1.8E+03	1.4E+03	3.13E-03	4.27E+01	1.40E+03
87-61-6	1,2,3-Trichlorobenzene (surr=1,2,4trichlrobenzene)	1.8E+02	1.4E-03	5.8E-02	3.0E-02	8.2E-06	1.8E+03	1.1E+01	3.0E+02	8.4E-06	4.3E+04	3.2E+03	5.60E-06	1.01E+03	3.24E+03
96-18-4	1,2,3-Trichloropropane	1.5E+02	3.4E-04	1.4E-02	7.1E-02	7.9E-06	5.1E+01	3.1E-01	2.7E+03	1.3E-04	1.1E+04	1.1E+03	8.21E-05	2.64E+02	1.13E+03
96-19-5	1,2,3-Trichloropropene (Surr=1,2,3-Trichloropropane)	2.0E+02	3.4E-04	1.4E-02	7.1E-02	7.9E-06	5.1E+01	3.1E-01	2.7E+03	1.3E-04	1.1E+04	1.1E+03	8.21E-05	2.64E+02	1.13E+03
120-82-1	1,2,4-Trichlorobenzene	1.8E+02	1.4E-03	5.8E-02	3.0E-02	8.2E-06	1.8E+03	1.1E+01	3.0E+02	8.4E-06	4.3E+04	3.2E+03	5.60E-06	1.01E+03	3.24E+03
95-63-6	1,2,4-Trimethylbenzene	1.2E+02	5.7E-03	2.3E-01	7.5E-02	7.1E-06	3.7E+03	2.2E+01	5.7E+01	4.1E-05	2.0E+04	1.3E+03	2.70E-05	4.61E+02	1.28E+03
96-12-8	1,2-Dibromo-3-chloropropane	2.4E+02	1.5E-04	6.0E-03	2.1E-02	7.0E-06	1.3E+02	7.8E-01	1.2E+03	7.6E-06	4.6E+04	1.1E+03	5.03E-06	1.07E+03	1.07E+03
106-93-4	1,2-Dibromoethane	1.9E+02	3.2E-04	1.3E-02	7.3E-02	8.1E-06	4.4E+01	2.6E-01	3.4E+03	1.8E-04	1.1E+04	1.2E+03	8.92E-05	2.53E+02	1.27E+03
95-50-1	1,2-Dichlorobenzene	1.5E+02	1.9E-03	7.8E-02	6.9E-02	7.9E-06	6.2E+02	3.7E+00	1.6E+02	7.3E-05	1.5E+04	6.0E+02	4.86E-05	3.43E+02	5.97E+02
107-06-2	1,2-Dichloroethane	9.9E+01	9.8E-04	4.0E-02	1.0E-01	9.9E-06	1.7E+01	1.0E-01	8.5E+03	1.0E-03	3.9E+03	1.8E+03	6.50E-04	9.39E+01	1.89E+03
156-59-2	1,2-Dichloroethylene (cis)	9.7E+01	4.1E-03	1.7E-01	7.4E-02	1.1E-05	3.6E+01	2.1E-01	3.5E+03	1.9E-03	2.9E+03	1.2E+03	1.21E-03	6.87E+01	1.23E+03
156-60-5	1,2-Dichloroethylene (trans)	9.7E+01	9.4E-03	3.8E-01	7.1E-02	1.2E-05	5.3E+01	3.2E-01	6.3E+03	2.9E-03	2.3E+03	3.1E+03	1.93E-03	5.45E+01	3.07E+03
78-87-5	1,2-Dichloropropane	1.1E+02	2.8E-03	1.1E-01	7.8E-02	8.7E-06	4.4E+01	2.6E-01	2.8E+03	1.2E-03	3.6E+03	1.1E+03	7.92E-04	8.50E+01	1.10E+03
108-67-8	1,3,5-Trimethylbenzene	1.2E+02	7.7E-03	3.2E-01	7.5E-02	7.1E-06	8.2E+02	4.9E+00	4.8E+01	2.4E-04	8.0E+03	2.4E+02	1.62E-04	1.88E+02	2.45E+02
106-99-0	1,3-Butadiene	5.4E+01	1.8E-01	7.3E+00	9.8E-02	1.1E-05	1.2E+02	7.2E-01	7.4E+02	1.7E-02	9.6E+02	1.6E+03	1.24E-02	2.15E+01	1.47E+03
541-73-1	1,3-Dichlorobenzene	1.5E+02	1.9E-03	7.8E-02	6.9E-02	7.9E-06	6.2E+02	3.7E+00	1.6E+02	7.3E-05	1.5E+04	6.0E+02	4.86E-05	3.43E+02	5.97E+02
542-75-6	1,3-Dichloropropene	1.1E+02	1.8E-02	7.3E-01	6.3E-02	1.0E-05	4.6E+01	2.7E-01	2.8E+03	4.6E-03	1.8E+03	1.4E+03	3.13E-03	4.27E+01	1.40E+03
764-41-0	1,4-Dichloro-2-butene	1.3E+02	2.6E-04	1.1E-02	7.3E-02	8.1E-06	4.8E+01	2.9E-01	2.8E+03	1.0E-04	1.2E+04	1.1E+03	6.66E-05	2.93E+02	1.12E+03
106-46-7	1,4-Dichlorobenzene	1.5E+02	2.4E-03	1.0E-01	6.9E-02	7.9E-06	6.2E+02	3.7E+00	7.4E+01	9.4E-05	1.3E+04	2.8E+02	6.21E-05	3.04E+02	2.83E+02
75-68-3	1-Chloro-1,1-difluoroethane (surr=dichlorodifluoromethane)	1.2E+02	1.0E-01	4.1E+00	8.0E-02	1.1E-05	5.8E+01	3.5E-01	2.8E+02	1.4E-02	1.1E+03	3.4E+02	1.02E-02	2.37E+01	3.12E+02
109-69-3	1-Chlorobutane (surr=2-Chloro-1,3-butadiene)	8.8E+01	3.2E-02	1.3E+00	1.1E-01	1.1E-05	5.0E+01	3.0E-01	7.4E+02	1.2E-02	1.2E+03	4.8E+02	8.04E-03	2.67E+01	4.59E+02
126-99-8	2-Chloro-1,3-butadiene	8.8E+01	3.2E-02	1.3E+00	1.1E-01	1.1E-05	5.0E+01	3.0E-01	7.4E+02	1.2E-02	1.2E+03	4.8E+02	8.04E-03	2.67E+01	4.59E+02
532-27-4	2-Chloroacetophenone (surr=chlorobenzene)	1.1E+02	3.7E-03	1.5E-01	7.3E-02	8.7E-06	2.2E+02	1.3E+00	4.7E+02	4.0E-04	6.3E+03	6.8E+02	2.64E-04	1.47E+02	6.84E+02
95-57-8	2-Chlorophenol	1.3E+02	3.9E-04	1.6E-02	5.0E-01	9.5E-06	4.0E+02	2.4E+00	2.2E+04	1.7E-04	9.7E+03	5.5E+04	1.11E-04	2.27E+02	5.50E+04
75-29-6	2-Chloropropane (surr=1,2-dichloropropane)	1.1E+02	2.8E-03	1.1E-01	7.8E-02	8.7E-06	4.4E+01	2.6E-01	2.8E+03	1.2E-03	3.6E+03	1.1E+03	7.92E-04	8.50E+01	1.10E+03
75-07-0	Acetaldehyde	4.4E+01	7.9E-05	3.2E-03	1.2E-01	1.4E-05	1.8E+01	1.1E-01	1.0E+06	1.0E-04	1.3E+04	2.1E+05	6.36E-05	3.00E+02	2.21E+05
67-64-1	Acetone	5.8E+01	3.9E-05	1.6E-03	1.2E-01	1.1E-05	5.8E-01	3.5E-03	1.0E+06	1.0E-04	1.3E+04	1.0E+05	6.02E-05	3.08E+02	1.15E+05
75-05-8	Acetonitrile	4.1E+01	2.0E-05	8.2E-04	1.3E-01	1.7E-05	1.6E+01	9.4E-02	1.0E+06	2.9E-05	2.3E+04	1.9E+05	1.85E-05	5.55E+02	2.05E+05
107-02-8	Acrolein	5.6E+01	1.2E-04	4.9E-03	1.1E-01	1.2E-05	2.1E+01	1.3E-01	2.1E+05	1.2E-04	1.2E+04	4.8E+04	7.51E-05	2.76E+02	5.03E+04
107-13-1	Acrylonitrile	5.3E+01	8.8E-05	3.6E-03	1.1E-01	1.3E-05	8.5E-01	5.1E-03	7.9E+04	1.9E-04	9.0E+03	8.4E+03	1.17E-04	2.21E+02	9.27E+03
71-43-2	Benzene	7.8E+01	5.6E-03	2.3E-01	8.8E-02	9.8E-06	5.9E+01	3.5E-01	1.8E+03	2.1E-03	2.7E+03	8.7E+02	1.38E-03	6.44E+01	8.77E+02
100-44-7	Benzyl chloride	1.3E+02	5.1E-05	2.1E-03	6.7E-02	7.8E-06	5.0E+01	3.0E-01	3.3E+03	1.8E-05	2.9E+04	1.3E+03	1.18E-05	6.96E+02	1.36E+03
91-58-7	beta-Chloronaphthalene	1.6E+02	3.1E-04	1.3E-02	3.5E-02	8.8E-06	1.6E+03	9.3E+00	1.2E+01	2.4E-06	8.0E+04	1.1E+02	1.63E-06	1.87E+03	1.13E+02
111-44-4	Bis(2-chloroethyl)ether	1.4E+02	1.8E-05	7.4E-04	6.9E-02	7.5E-06	7.6E+01	4.6E-01	1.7E+04	4.9E-06	5.7E+04	9.6E+03	3.25E-06	1.33E+03	9.76E+03
108-60-1	Bis(2-chloroisopropyl)ether	1.7E+02	1.1E-04	4.6E-03	6.3E-02	6.4E-06	6.1E+01	3.7E-01	1.7E+03	3.3E-05	2.2E+04	7.9E+02	2.13E-05	5.19E+02	8.13E+02
542-88-1	Bis(chloromethyl)ether	1.2E+02	2.0E-04	8.2E-03	8.9E-02	9.4E-06	1.2E+00	7.2E-03	2.2E+04	3.5E-04	6.7E+03	2.4E+03	2.10E-04	1.65E+02	2.64E+03
108-86-1	Bromobenzene (surr=chlorobenzene)	1.1E+02	3.7E-03	1.5E-01	7.3E-02	8.7E-06	2.2E+02	1.3E+00	4.7E+02	4.0E-04	6.3E+03	6.8E+02	2.64E-04	1.47E+02	6.84E+02
74-97-5	Chlorobromomethane (surr=methylene chloride)	8.5E+01	2.2E-03	9.0E-02	1.0E-01	1.2E-05	1.2E+01	7.0E-02	1.3E+04	2.5E-03	2.5E+03	2.5E+03	1.60E-03	5.98E+01	2.59E+03
75-27-4	Bromodichloromethane	1.6E+02	1.6E-03	6.6E-02	3.0E-02	1.1E-05	5.5E+01	3.3E-01	6.7E+03	2.3E-04	8.3E+03	3.0E+03	1.50E-04	1.95E+02	3.05E+03
74-83-9	Bromomethane	9.5E+01	6.2E-03	2.6E-01	7.3E-02	1.2E-05	9.0E+00	5.4E-02	1.5E+04	4.8E-03	1.8E+03	3.1E+03	3.12E-03	4.28E+01	3.14E+03
75-15-0	Carbon disulfide	7.6E+01	3.0E-02	1.2E+00	1.0E-01	1.0E-05	4.6E+01	2.7E-01	1.2E+03	1.1E-02	1.2E+03	7.2E+02	7.65E-03	2.73E+01	6.95E+02
56-23-5	Carbon tetrachloride	1.5E+02	3.0E-02	1.2E+00	7.8E-02	8.8E-06	1.7E+02	1.0E+00	7.9E+02	3.7E-03	2.1E+03	1.1E+03	2.48E-03	4.80E+01	1.07E+03
108-90-7	Chlorobenzene	1.1E+02	3.7E-03	1.5E-01	7.3E-02	8.7E-06	2.2E+02	1.3E+00	4.7E+02	4.0E-04	6.3E+03	6.8E+02	2.64E-04	1.47E+02	6.84E+02
75-45-6	Chlorodifluoromethane (surr=dichlorodifluoromethane)	1.2E+02	1.0E-01	4.1E+00	8.0E-02	1.1E-05	5.8E+01	3.5E-01	2.8E+02	1.4E-02	1.1E+03	3.4E+02	1.02E-02	2.37E+01	3.12E+02
75-00-3	Chloroethane	6.5E+01	1.1E-02	4.5E-01	1.0E-01	1.2E-05	1.5E+01	8.8E-02	5.7E+03	9.0E-03	1.3E+03	1.6E+03	5.98E-03	3.09E+01	1.55E+03
67-66-3	Chloroform	1.2E+02	3.7E-03	1.5E-01	1.0E-01	1.0E-05	4.0E+01	2.4E-01	7.9E+03	2.2E-03	2.7E+03	2.9E+03	1.45E-03	6.29E+01	2.97E+03
74-87-3	Chloromethane	5.1E+01	2.4E-02	9.8E-01	1.1E-01	6.5E-06	3.5E+01	2.1E-01	8.2E+03	1.1E-02	1.2E+03	4.0E+03	7.75E-03	2.72E+01	3.92E+03
218-01-9	Chrysene	2.3E+02	9.5E-05	3.9E-03	2.5E-02	6.2E-06	4.0E+05	2.4E+03	1.6E-03	2.1E-09	2.7E+06	3.8E+00	1.42E-09	6.35E+04	3.82E+00
4170-30-3	Crotonaldehyde (surr=methyl methacrylate)	1.0E+02	3.4E-04	1.4E-02	7.7E-02	8.6E-06	1.3E+01	7.9E-02	1.5E+04	3.1E-04	7.1E+03	2.7E+03	1.93E-04	1.72E+02	2.89E+03
98-82-8	Cumene (isopropylbenzene)	1.2E+02	1.2E-02	4.7E-01	7.5E-02	7.1E-06	2.2E+02	1.3E+00	6.1E+01	1.2E-03	3.6E+03	9.2E+01	8.12E-04	8.40E+01	9.19E+01
460-19-5	Cyanogen	5.2E+01	5.0E-03	2.1E-01	9.6E-02	1.0E-05	2.6E+01	1.6E-01	8.5E+03	3.5E-03	2.1E+03	2.5E+03	2.27E-03	5.02E+01	2.55E+03
506-68-3	Cyanogen bromide	5.2E+01	5.0E-03	2.1E-01	9.6E-02	1.0E-05	2.6E+01	1.6E-01	8.5E+03	3.5E-03	2.1E+03	2.5E+03	2.27E-03	5.02E+01	2.55E+03
506-77-4	Cyanogen chloride	5.2E+01	5.0E-03	2.1E-01	9.6E-02	1.0E-05	2.6E+01	1.6E-01	8.5E+03	3.5E-03	2.1E+03	2.5E+03	2.27E-03	5.02E+01	2.55E+03
110-82-7	Cyclohexane	8.4E+01	2.0E-01	8.2E+00	8.0E-02	9.0E-06	1.6E+02	9.6E-01	5.5E+01	1.3E-02	1.1E+03	1.4E+02	9.54E-03	2.45E+01	1.31E+02
99-87-6	Cymene (surr=isopropylbenzene)	1.2E+02	1.2E-02	4.7E-01	7.5E-02	7.1E-06	2.2E+02	1.3E+00	6.1E+01	1.2E-03	3.6E+03	9.2E+01	8.12E-04	8.40E+01	9.19E+01
124-48-1	Dibromochloromethane	2.1E+02	8.5E-04	3.5E-02	9.6E-02	1.0E-05	4.7E+02	2.8E+00	4.4E+03	6.0E-05	1.6E+04	1.3E+04	3.96E-05	3.80E+02	1.29E+04
75-71-8	Dichlorodifluoromethane	1.2E+02	1.0E-01	4.1E+00	8.0E-02	1.1E-05	5.8E+01	3.5E-01	2.8E+02	1.4E-02	1.1E+03	3.4E+02	1.02E-02	2.37E+01	3.12E+02
77-73-6	Dicyclopentadiene	1.3E+02	1.1E-02	4.4E-01	6.7E-02	1.0E-05	5.7E+02	3.4E+00	1.8E+03	4.2E-04	6.1E+03	6.5E+03	2.81E-04	1.43E+02	6.48E+03
108-20-3	Diisopropyl ether (surr=MTBE)	8.5E+01	5.9E-04	2.4E-02	8.0E-02	1.0E-05	6.0E+00	3.6E-02	1.5E+05	7.1E-04	4.7E+03	2.1E+04	4.40E-04	1.14E+02	2.27E+04
124-40-3	Dimethylamine	4.5E+01	9.0E-05	3.7E-03	1.2E-01	1.3E-05	2.2E+00	1.3E-02	1.0E+06	2.0E-04	8.8E+03	1.1E+05	1.22E-04	2.16E+02	1.25E+05
106-89-8	Epichlorohydrin	9.30E+01	3.20E-05	1.30E-03	8.80E-02	9.80E-06	3.50E+00	2.1E-04	6.00E+04	5.00E-05	1.80E+04	7.30E+03	3.62E-05	3.97E+02	6.72E+03
141-78-6	Ethyl acetate	8.8E+01	1.4E-04	5.7E-03	7.3E-02	9.7E-06	5.9E+01	3.6E-01	8.0E+04	4.8E-05	1.8E+04	3.7E+04	3.12E-05	4.28E+02	3.75E+04
140-88-5	Ethyl acrylate (surr=methyl methacrylate)	2.0E+02	2.4E-01	9.8E+00	9.1E-02	8.6E-06	8.4E+02	5.0E+00	2.0E+01	6.7E-03	1.5E+03	1.4E+02	4.63E-03	3.52E+01	1.34E+02
75-00-3	Ethyl chloride	6.5E+01	1.1E-02	4.5E-01	1.0E-01	1.2E-05	1.5E+01	8.8E-02	5.7E+03	9.0E-03	1.3E+03	1.6E+03	5.98E-03	3.09E+01	1.55E+03
60-29-7	Ethyl ether (surr=Bis(2-chloroethyl)ether)	1.4E+02	1.8E-05	7.4E-04	6.9E-02	7.5E-06	7.6E+01	4.6E-01	1.7E+04	4.9E-06	5.7E+04	9.6E+03	3.25E-06	1.33E+03	9.76E+03
97-63-2	Ethyl methacrylate (surr=methyl methacrylate)	2.0E+02	2.4E-01	1.0E+01	9.1E-02	8.6E-06	8.4E+02	5.0E+00	2.0E+01	6.8E-03	1.5E+03	1.4E+02	4.67E-03	3.50E+01	1.35E+02
100-41-4	Ethylbenzene	1.1E+02	7.9E-03	3.2E-01	7.5E-02	7.8E-06	3.6E+02	2.2E+00	1.7E+02	5.4E-04	5.4E+03	4.0E+02	3.58E-04	1.26E+02	3.96E+02
75-21-8	Ethylene oxide	4.4E+01	7.6E-05	3.1E-03	1.3E-01	1.5E-05	2.2E+00	1.3E-02	1.0E+06	1.8E-04	9.4E+03	1.1E+05	1.08E-04	2.30E+02	1.25E+05
76-13-1	Freon 113	1.9E+02	5.2E-01	2.1E+01	2.9E-02	8.1E-06	1.6E+02	9.6E-01	1.1E+03	6.3E-03	1.6E+03	5.6E+03	4.75E-03	3.47E+01	4.92E+03
110-00-9	Furan	6.8E+01	5.4E-03	2.2E-01	1.0E-01	1.2E-05	1.2E+01	7.4E-02	1.0E+04	5.6E-03	1.7E+03	2.2E+03	3.61E-03	3.98E+01	2.21E+03
74-90-8	Hydrogen cyanide	2.7E+01	1.3E-04	5.3E-03	1.8E-01	1.8E-05	1.7E+01	1.0E-01	1.0E+06	2.4E-04	8.1E+03	2.1E+05	1.51E-04	1.94E+02	2.17E+05
193-39-5	Indeno(1,2,3-cd)pyrene							0.0E+00						#DIV/0!	
78-83-1	Isobutanol	7.4E+01	1.2E-05	4.9E-04	8.6E-02	9.3E-06	6.2E+01	3.7E-01	8.5E+04	4.8E-06	5.7E+04	4.0E+04	3.24E-06	1.33E+03	4.10E+04
123-33-1	Maleic hydrazide	1.1E+02	6.6E-03	2.7E-01	9.0E-02	1.1E-05	4.2E+01	2.5E-01	6.0E+03	3.2E-03	2.2E+03	2.4E+03	2.08E-03	5.24E+01	2.42E+03
126-98-7	Methacrylonitrile (surr=acrylonitrile)	2.0E+02	8.8E-05	3.6E-03	1.1E-01	1.3E-05	8.5E-01	5.1E-03	7.9E+04	2.0E-04	8.9E+03	8.4E+03	1.18E-04	2.20E+02	9.27E+03
16752-77-5	Methomyl	1.6E+02	3.8E-02	1.6E+00	6.9E-02	1.0E-05	1.5E+01	8.9E-02	1.7E+05	1.2E-02	1.2E+03	8.2E+04	8.32E-03	2.62E+01	7.63E+04
79-20-9	Methyl acetate (surr=acetone)	2.0E+02	2.1E-05	8.4E-04	1.0E-01	1.0E-05	2.2E+00	1.3E-02	1.0E+06	4.1E-05	2.0E+04	1.1E+05	2.50E-05	4.79E+02	1.25E+05
96-33-3	Methyl acrylate (surr=methyl methacrylate)	2.0E+02	2.4E-01	9.8E+00	9.1E-02	8.6E-06	8.4E+02	5.0E+00	6.0E+01	6.7E-03	1.5E+03	4.2E+02	4.63E-03	3.52E+01	4.03E+02
78-93-3	Methyl ethyl ketone	7.2E+01	2.7E-05	1.1E-03	9.0E-02	9.8E-06	4.5E+00	2.7E-02	2.7E+05	4.2E-05	1.9E+04	3.4E+04	2.58E-05	4.71E+02	3.72E+04
108-10-1	Methyl isobutyl ketone	1.0E+02	1.4E-04	5.7E-03	7.5E-02	7.8E-06	1.3E+02	8.0E-01	1.9E+04	2.5E-05	2.5E+04	1.7E+04	1.63E-05	5.92E+02	1.74E+04
80-62-6	Methyl methacrylate	1.0E+02	3.4E-04	1.4E-02	7.7E-02	8.6E-06	1.3E+01	7.9E-02	1.5E+04	3.1E-04	7.1E+03	2.7E+03	1.93E-04	1.72E+02	2.89E+03
98-83-9	Methyl styrene (alpha) (surr=styrene)	2.0E+02	2.3E-03	9.4E-02	7.1E-02	8.0E-06	3.6E+02	2.2E+00	3.0E+02	1.5E-04	1.0E+04	6.8E+02	1.02E-04	2.37E+02	6.86E+02
25013-15-4	Methyl styrene (mixture) (surr=nitrobenzene)	2.0E+02	2.3E-03	9.4E-02	7.1E-02	8.0E-06	3.6E+02	2.2E+00	3.0E+02	1.5E-04	1.0E+04	6.8E+02	1.02E-04	2.37E+02	6.86E+02
1634-04-4	Methyl tertbutyl ether (MTBE)	8.5E+01	5.9E-04	2.4E-02	8.0E-02	1.0E-05	6.0E+00	3.6E-02	1.5E+05	7.1E-04	4.7E+03	2.1E+04	4.40E-04	1.14E+02	2.27E+04
108-87-2	Methylcyclohexane	9.8E+01	4.3E-01	1.8E+01	7.0E-02	9.0E-06	2.2E+03	1.3E+01	1.4E+01	3.9E-03	2.0E+03	2.3E+02	2.66E-03	4.64E+01	2.25E+02
74-95-3	Methylene bromide	1.7E+02	9.0E-04	3.7E-02	9.6E-02	1.0E-05	2.5E+01	1.5E-01	1.2E+04	7.2E-04	4.7E+03	3.0E+03	4.58E-04	1.12E+02	3.13E+03
75-09-2	Methylene chloride	8.5E+01	2.2E-03	9.0E-02	1.0E-01	1.2E-05	1.2E+01	7.0E-02	1.3E+04	2.5E-03	2.5E+03	2.5E+03	1.60E-03	5.98E+01	2.59E+03
99-08-1	m-Nitrotoluene (surr=nitrobenzene)	1.2E+02	2.4E-05	9.8E-04	7.6E-02	8.6E-06	6.5E+01	3.9E-01	2.1E+03	8.1E-06	4.4E+04	1.0E+03	5.34E-06	1.04E+03	1.05E+03
637-92-3	Ethyl tertbutyl ether (Surr=MTBE)	8.5E+01	5.9E-04	2.4E-02	8.0E-02	1.0E-05	6.0E+00	3.6E-02	1.5E+05	7.1E-04	4.7E+03	2.1E+04	4.40E-04	1.14E+02	2.27E+04
91-20-3	Naphthalene	1.3E+02	4.8E-04	2.0E-02	5.9E-02	7.5E-06	1.2E+03	7.1E+00	3.1E+01	8.4E-06	4.3E+04	2.2E+02	5.58E-06	1.01E+03	2.25E+02
104-51-8	n-Butylbenzene	1.3E+02	1.3E-02	5.4E-01	7.5E-02	7.8E-06	2.8E+03	1.7E+01	1.4E+01	1.2E-04	1.1E+04	2.4E+02	8.11E-05	2.66E+02	2.37E+02
110-54-3	n-Hexane	8.6E+01	1.2E-01	5.0E+00	2.0E-01	7.8E-06	8.9E+02	5.3E+00	1.8E+01	8.2E-03	1.4E+03	1.1E+02	5.54E-03	3.21E+01	1.12E+02
98-95-3	Nitrobenzene	1.2E+02	2.4E-05	9.8E-04	7.6E-02	8.6E-06	6.5E+01	3.9E-01	2.1E+03	8.1E-06	4.4E+04	1.0E+03	5.34E-06	1.04E+03	1.05E+03
924-16-3	N-Nitrosodi-n-butylamine	1.6E+02	3.2E-04	1.3E-02	5.8E-02	9.7E-06	2.6E+02	1.5E+00	1.3E+03	2.4E-05	2.6E+04	2.1E+03	1.60E-05	5.99E+02	2.15E+03
103-65-1	n-Propylbenzene (surr=n-Butylbenzene	1.3E+02	1.3E-02	5.4E-01	7.5E-02	7.8E-06	2.8E+03	1.7E+01	1.4E+01	1.2E-04	1.1E+04	2.4E+02	8.11E-05	2.66E+02	2.37E+02
88-73-3	o-Chloronitrobenzene (surr=nitrobenzene)	1.2E+02	2.4E-05	9.8E-04	7.6E-02	8.6E-06	6.5E+01	3.9E-01	2.1E+03	8.1E-06	4.4E+04	1.0E+03	5.34E-06	1.04E+03	1.05E+03
95-49-8	o-Chlorotoluene (surr=chlorobenzene)	1.1E+02	3.7E-03	1.5E-01	7.3E-02	8.7E-06	2.2E+02	1.3E+00	4.7E+02	4.0E-04	6.3E+03	6.8E+02	2.64E-04	1.47E+02	6.84E+02
88-72-2	o-Nitrotoluene (surr=nitrobenzene)	1.2E+02	2.4E-05	9.8E-04	7.6E-02	8.6E-06	6.5E+01	3.9E-01	2.1E+03	8.1E-06	4.4E+04	1.0E+03	5.34E-06	1.04E+03	1.05E+03
100-00-5	p-Chloronitrobenzene (surr=nitrobenzene)	1.2E+02	2.4E-05	9.8E-04	7.6E-02	8.6E-06	6.5E+01	3.9E-01	2.1E+03	8.1E-06	4.4E+04	1.0E+03	5.34E-06	1.04E+03	1.05E+03
99-99-0	p-Nitrotoluene (surr=nitrobenzene)	1.2E+02	2.4E-05	9.8E-04	7.6E-02	8.6E-06	6.5E+01	3.9E-01	2.1E+03	8.1E-06	4.4E+04	1.0E+03	5.34E-06	1.04E+03	1.05E+03
75-56-9	Propylene oxide	5.8E+01	8.5E-05	3.5E-03	1.2E-01	1.3E-05	2.5E+01	1.5E-01	4.8E+05	8.7E-05	1.3E+04	1.2E+05	5.59E-05	3.20E+02	1.24E+05
135-98-8	sec-Butylbenzene	1.3E+02	1.9E-02	7.7E-01	7.5E-02	7.8E-06	2.2E+03	1.3E+01	1.7E+01	2.3E-04	8.3E+03	2.2E+02	1.51E-04	1.94E+02	2.23E+02
100-42-5	Styrene	1.0E+02	2.8E-03	1.1E-01	7.1E-02	8.0E-06	7.8E+02	4.7E+00	3.1E+02	8.7E-05	1.3E+04	1.5E+03	5.79E-05	3.14E+02	1.48E+03
75-65-0	tert-butyl alcohol (surr=isobutanol)	7.4E+01	1.2E-05	4.9E-04	8.6E-02	9.3E-06	6.2E+01	3.7E-01	8.5E+04	4.8E-06	5.7E+04	4.0E+04	3.24E-06	1.33E+03	4.10E+04
98-06-6	tert-Butylbenzene	1.3E+02	1.3E-02	5.2E-01	7.5E-02	7.8E-06	2.2E+03	1.3E+01	3.0E+01	1.5E-04	1.0E+04	3.9E+02	1.02E-04	2.36E+02	3.93E+02
127-18-4	Tetrachloroethylene (PCE)	1.7E+02	1.8E-02	7.5E-01	7.2E-02	8.2E-06	1.6E+02	9.3E-01	2.0E+02	2.4E-03	2.6E+03	2.3E+02	1.62E-03	5.95E+01	2.32E+02
109-99-9	Tetrahydrofuran	7.2E+01	7.0E-05	2.9E-03	9.8E-02	1.1E-05	9.5E-01	5.7E-03	1.0E+06	1.4E-04	1.1E+04	1.1E+05	8.36E-05	2.62E+02	1.18E+05
108-88-3	Toluene	9.2E+01	6.6E-03	2.7E-01	8.7E-02	8.6E-06	1.8E+02	1.1E+00	5.3E+02	9.9E-04	4.0E+03	6.5E+02	6.57E-04	9.33E+01	6.56E+02
79-01-6	Trichloroethylene (TCE)	1.3E+02	1.0E-02	4.2E-01	7.9E-02	9.1E-06	1.7E+02	1.0E+00	1.1E+03	1.5E-03	3.3E+03	1.3E+03	9.82E-04	7.63E+01	1.29E+03
75-69-4	Trichlorofluoromethane	1.4E+02	9.7E-02	4.0E+00	8.7E-02	1.3E-05	1.6E+02	9.6E-01	1.1E+03	1.0E-02	1.3E+03	2.0E+03	7.02E-03	2.86E+01	1.88E+03
121-44-8	Triethylamine (Surr=Dimethylamine)	4.5E+01	9.0E-05	3.7E-03	1.2E-01	1.3E-05	2.2E+00	1.3E-02	1.0E+06	2.0E-04	8.8E+03	1.1E+05	1.22E-04	2.16E+02	1.25E+05
108-05-4	Vinyl acetate	8.6E+01	5.1E-04	2.1E-02	8.5E-02	9.2E-06	5.3E+00	3.2E-02	2.0E+04	6.8E-04	4.8E+03	2.7E+03	4.21E-04	1.17E+02	2.93E+03
593-60-2	Vinyl bromide (Surr=Bromomethane)	2.0E+02	6.2E-03	2.6E-01	1.0E-01	1.2E-05	1.3E+02	7.6E-01	1.8E+04	1.5E-03	3.3E+03	1.6E+04	9.73E-04	7.67E+01	1.59E+04
75-01-4	Vinyl chloride (child/adult)+++	6.3E+01	2.7E-02	1.1E+00	1.1E-01	1.2E-06	1.9E+01	1.1E-01	2.8E+03	1.5E-02	1.0E+03	1.2E+03	1.02E-02	2.37E+01	1.10E+03
1330-20-7	Xylenes	1.1E+02	7.3E-03	3.0E-01	7.0E-02	7.8E-06	4.1E+02	2.4E+00	1.6E+02	4.2E-04	6.1E+03	4.2E+02	2.80E-04	1.43E+02	4.19E+02

Q/C	7.4517
Exp. Interval (s)	31536000
Bulk Density	1.55
Air filled	0.247
Water Filled	0.173
Total Porosity	0.42
org carbon	0.006

CALCULATION OF CONCENTRATION IN AMBIENT AIR FOR VOLATILE COMPOUNDS DETECTED IN SOIL SAMPLES
USING PROPOSED CUMMULATIVE RISK-BASED REMEDIATION CONCENTRATIONS
FORMER DELPHI BATTERY PLANT, 1201 MAGNOLIA AVE.
ANAHEIM, CALIFORNIA
32486-001

CHEMICAL	CONCENTRATION IN SOIL (MG/KG)	VOLATILZATION FACTOR M^3/KG	CONCENTRATION IN AMBIENT AIR (MG/M^3)
1,1,1-Trichloroethane	3.13	5.16E+01	6.1E-02
1,1,2-Trichloroethane	0.0269	1.54E+02	1.7E-04
1,1-Dichloroethane	0.336	5.72E+01	5.9E-03
1,1-Dichloroethene	0.251	3.30E+01	7.6E-03
1,2,3-Trichlorobenzene	0.0188	1.01E+03	1.9E-05
1,2,4-Trichlorobenzene	0.0622	1.01E+03	6.2E-05
1,2,4-Trimethylbenzene	2.480	4.61E+02	5.4E-03
1,2-Dichloroethane	0.0187	9.39E+01	2.0E-04
1,3,5-Trimethylbenzene	1.360	1.88E+02	7.2E-03
2-Butanone (MEK)	0.0811	4.71E+02	1.7E-04
Acetone	1.34	3.08E+02	4.3E-03
Benzene	0.0084	6.44E+01	1.3E-04
Dibromomethane (as EBD; 1,2, Dibromoethane)	0.0308	2.53E+02	1.2E-04
Ethylbenzene	0.0506	1.26E+02	4.0E-04
Isopropylbenzene (Cumene)	0.0848	8.40E+01	1.0E-03
Naphthalene	6.970	1.01E+03	6.9E-03
n-Propylbenzene	0.26	2.66E+02	9.8E-04
p-Isopropyltoluene (or Cymene, as Isopropyl-benzene)	0.75	8.40E+01	8.9E-03
sec-Butylbenzene	0.493	1.94E+02	2.5E-03
tert-Butylbenzene	0.0302	2.36E+02	1.3E-04
Tetrachloroethene	0.266	5.95E+01	4.5E-03
Toluene	0.0924	9.33E+01	9.9E-04
Xylenes (total)	0.347	1.43E+02	2.4E-03

Di = DIFFUSIVITY IN AIR
Hc = HENRY'S LAW CONSTANT
Koc = ORGANIC CARBON PARTITION
foc = FRACTION OF ORGANIC CARBON
Kd = SOIL/WATER PARTITION COEFFICIENT
Ci = BULK SOIL CONTRATION OF CONTAMINANT
Ei = AVERAGE EMISSION RATE OF CONTAMINANT OVER RESIDENTIAL LOT
Kd = Koc * foc
foc default = 0.02
NOTE: CONCENTRATIONS IN AMBIENT AIR CALCULATED USING FIGURES 2.6 AND 2.7 OF THE PEA GUIDANCE MANUAL (DTSC 1999)
TRICHLOROFLUOROMETHANE PHYSICAL PROPERTY FROM THE 2004 EPA REGION IX PRGs

APPENDIX C

CONFIRMATION SAMPLING AND WASTE MANAGEMENT PLAN

CONFIRMATION SAMPLING AND WASTE MANAGEMENT PLAN
FORMER ANAHEIM BATTERY PLANT
1201 N. MAGNOLIA AVENUE
ANAHEIM, CALIFORNIA

Prepared By

Haley & Aldrich, Inc.
Brea, California

Prepared For

DELPHI CORPORATION
2100 E. LINCOLN ROAD
KOKOMO, IN 46904

August 2007

TABLE OF CONTENTS

LIST OF ABBREVIATIONS AND ACRONYMS

bgs	below ground surface
COPC	chemical of potential concern
DMP	Data Management Plan
EDMS	Environmental Data Management System
EIA	environmental investigation area
EPA	United States Environmental Protection Agency
ESA	environmental site assessment
ET	environmental target
FDAS	Field Data Acquisition System
FMP	Fill Management Plan
GPS	global positioning system
Haley & Aldrich	Haley & Aldrich, Inc.
HASP	Health and Safety Plan
IDW	investigation-derived waste
LARWQCB	Los Angeles Regional Water Quality Control Board
MCLs	Maximum contaminant levels
MeCl	methylene chloride
OEHHA	Office of Environmental Health Hazard Assessment
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PID	photoionization detector
PPE	personal protective equipment
ppm/v	parts per million by volume
QAPP	Quality Assurance Project Plan
SAP	Sampling and Analysis Plan
SCAQMD	South Coast Air Quality Management District
SMA	Status Map Application
SRA	screening-level human health risk assessment
SRG	soil remediation goals
SVE	soil vapor extraction
SVOC	semi-volatile organic compound
SWMP	Soil and Waste Management Plan
TCE	trichloroethene
TPH	total petroleum hydrocarbons
UST	underground storage tank
VOCs	volatile organic compounds

1. INTRODUCTION

This plan describes confirmation sampling and waste management for confirmation of remediation of vadose zone soils at the Delphi Corporation - Former Anaheim Battery Operations Facility (Site) located at 1201 N. Magnolia Avenue, Anaheim, California. The Corrective Measures Proposal will be implemented as part of the completion of demolition to remove the building foundation slabs and surface pavements and remediation of impacted soils to Site-specific clean up goals at the Facility prior to Site redeveloped. This confirmation sampling and waste management plan has been prepared on behalf of Delphi Corporation by Haley & Aldrich, Inc. (Haley & Aldrich).

1.1 Project Overview

The Facility is a 22-acre former battery manufacturing plant located at 1201 North Magnolia Avenue in Anaheim, California. The location of the Site is shown on Figure 1 of the CMP. A Site plan is presented as Figure 2 of the CMP. A review of historical aerial photographs and topographic maps indicates that prior to construction of the battery manufacturing facility in 1953; the Site was agricultural and likely used as an orange grove. Delco-Remy (General Motors) began manufacturing lead-acid automobile batteries at this Site in 1954 until 1999. In January 1999, Delphi Automotive Systems separated from GM to form a new company. Later, the company was renamed Delphi Corporation. 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.

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.

The chemicals of potential concern (COPC) identified during the site-wide investigations 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. In addition, elevated concentrations of VOCs that would require remediation, based upon 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.

A human health risk assessment (HHRA) was performed at the site 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. Groundwater protection criteria were also derived for the protection of groundwater from further degradation of vadose zone soil impacts. The derived

human health risk-based remediation criteria for soil and soil gas, and groundwater protection criteria for soil are presented in Table 1 of the CMP.

Despite the comprehensive nature of the Facility Investigation, it is possible that other, as yet undiscovered, impacts may be revealed as floor slabs and surface pavement are removed during demolition. Accordingly, near-surface soil conditions will be monitored for potential undiscovered impacts as soil is exposed during demolition activities. Additional impacts, if any, revealed during demolition, will be evaluated to determine whether remedial measures are required based on human health risk assessment and the potential impact to groundwater quality.

1.2 Approach and Implementation Plan Organization

This confirmation sampling and waste management plan describes the procedures and decision-making processes to be followed during the Corrective Measures (CM) program. Program fieldwork will be performed in accordance with the Site-specific Health and Safety Plan (HASP) prepared by Haley & Aldrich located in Appendix A of the Corrective Measures Proposal.

Section 2.0 of this sampling and waste management plan presents a brief summary of background information. Section 3.0 describes the planned procedures for assessment confirmation monitoring. Section 4.0 describes the planned procedures for characterizing additional impacts, if any, discovered during the monitoring and oversight of demolition and soil remediation activities. Section 5.0 outlines the expedited remediation measures and confirmation soil sampling planned for known and any additional impacts discovered. Section 6.0 outlines the proposed documentation and reporting procedures. Supporting information is included in tables, figures, and appendices as appropriate.

1.3 Program Objectives

The overall objective of the CM program is to expedite land reuse and to minimize future risks to human health and the environment as well as potential environmental liability by addressing known and potential undiscovered subsurface environmental impacts within the top 10 feet of soil matrix and top 15 feet of soil gas matrix, thereby enabling the remedial program to advance in a safe, timely, cost-effective, and technically defensible manner. Specific objectives of the CM program are to:

- Confirm removal of impacted soils and concrete with concentrations of chemicals of concern that exceed the Site-specific human health risk and/or groundwater quality protection criteria.
- Monitor exposed soil conditions for potential undiscovered vadose zone impacts during removal of building floor slabs, spread footings, pavement and impacted soils.
- Identify and characterize additional impacts and determine whether remediation is required based on Site-specific human health risk and/or groundwater quality protection considerations.
- Mitigate known and additional impacts as necessary on an expedited basis by excavation.

- Characterize generated waste and dispose of the impacted materials at an appropriate offsite facility.
- Evaluate excavated concrete and soils against Site-specific human health risk and/or groundwater quality protection criteria for potential re-use on the Site.
- Evaluate soils to be imported for potential impacts prior to importing them.
- Prepare daily and weekly and grid-specific reports documenting the CM program, including the assessment confirmation monitoring, any additional impacts discovered, and the mitigation of any additional and/or previously known impacts.

2. BACKGROUND INFORMATION

Delphi Corporation – Former Anaheim Battery Operations Facility is presented in the Corrective Measures Proposal and more detailed information can be found in the Facility Investigation Report (Haley & Aldrich, 2007).

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. The Site is a relatively flat rectangular property with frontage along Magnolia Avenue. Prior to the 2005 decommissioning and plant demolition, the Site included the following:

- Main Production Building (approximately 187,000 square feet),
- 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.

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). The CACA relates to thirteen solid waste management units (SWMUs) and 53 Areas of Concern (AOIs) identified during investigations performed for Phase I Environmental Site Assessment (ESA), Current Conditions Report (CCR) and Facility Investigation (FI) performed by Haley and Aldrich and others at 1201 North Magnolia Avenue, Anaheim, California (the Site). At the required by the CACA issued by DTSC, Delphi is submitting a Corrective Measures Proposal (CMP) to DTSC.

3. ASSESSMENT CONFIRMATION MONITORING

The purpose of the assessment confirmation monitoring component of the CM program is to confirm the findings of the Facility Investigation in areas where access was limited and identify any undiscovered impacts. As such, assessment confirmation monitoring may not be performed in the vicinity of known impacts, although additional information in these areas may be useful for remedial planning purposes. Assessment confirmation monitoring will involve systematically evaluating near-surface soil conditions during the removal of floor slabs, surface paving, footings, and subsurface utilities. Specifically, assessment confirmation monitoring will involve visual and olfactory observations, and headspace screening for VOCs. Assessment confirmation monitoring and related procedures are described below.

3.1 Facility-Wide Grid

The data gathered during the CM program will be referenced to a Site-wide grid. Horizontally, the grid is based on the California Coordinate System, Zone 5, North American Datum of 1983 (NAD 83), adjusted in 1995. The Facility Investigation borings and soil gas probes can be referenced to the same grid, as can the existing groundwater monitoring wells at the Site.

The grid divides the entire Facility and the adjacent areas into 50-foot by 50-foot squares, which can be referenced using a numeric identifier consisting of northing and easting numbers from the NAD 83 system. The Site-wide grid is shown in Figure 3 of the CMP.

Although numerous survey control points were established during the Facility investigation, most are likely to be destroyed during the demolition process and will be replaced as necessary to provide adequate site controls for filed mapping. In addition, a global positioning system (GPS) may be used to establish locations in the field. Specifically, the CM team may use hand-held GPS receivers to locate points or features and sample locations in the field. This type of GPS receiver is typically capable of approximately three to ten feet of horizontal accuracy, which may be adequate for some assessment confirmation monitoring purposes. The GPS receivers will be calibrated at the beginning and end of each day using control points, such as groundwater monitoring wells, which will be protected during the demolition process. Vertical control will be achieved by using a laser level that is tied into a local control point.

3.2 Data to be Recorded

Data gathered during the assessment confirmation monitoring will be recorded in the field primarily using hand-held personal digital assistant (PDA) or laptop computers. However, "hard copy" data collection forms will also be available as a backup in the event that computer problems are encountered or weather conditions are such that hand-held or laptop computers cannot be used. Hard copy data collection forms are provided in Appendix A.

The use of hand-held computers and GPS receivers as part of the FDAS will electronically capture and use:

- Field data such as visual field observations, subsurface geologic conditions, PID readings, electronic chain-of-custody sheets, impact types, etc.;
- Object-specific identification numbers (soil impacts, stockpiles, etc.);
- Area and sample location vertical and horizontal control;
- Field access to relevant site figures as ArcView shape files;
- Field access to FI soil chemical data; and
- Field access to relevant SRG tables and other risk assessment information

Hand-held computers will be synchronized with an internal database on a daily basis to make field information available for queries and report generation.

3.3 Field Monitoring

Currently only the floor slabs and the surrounding asphalt or concrete pavement is remaining on the Site. The floor slabs and pavement will be broken, and impacted, non-impacted or suspected impacted concrete will be segregated. Based on this approach to demolition, near-surface soils will be exposed almost exclusively during the removal of floor slabs, spread footings, and paved surfaces. Because indications of environmental impacts that may be revealed as paving is broken and removed could quickly be obliterated by subsequent demolition activities, the field oversight personnel will work as close to the concrete/pavement removal equipment as is safely possible.

Once the soil has been exposed, it will be monitored for indications of potential environmental impacts. Indications of potential environmental impacts may include:

- Stained or discolored soils.
- Wet or saturated soils.
- Odors in ambient air.
- Elevated readings for VOCs with a photoionization detector (PID)
- Other previously unknown subsurface features, such as "wet" subsurface utilities, sumps, or other features that may be indicative of past chemical use.

Although odors may be indicative of a potential environmental impact, nothing in this confirmation sampling and waste management plan should be construed as encouraging field workers to "sniff" soil samples to detect odors. Rather, the HASP (Haley & Aldrich, July 2007) requires field workers to wear respiratory protection as appropriate based on Site-specific ambient air quality conditions. In the

context of this implementation plan, the odors referred to are those that may be noted in ambient air when impacted soil is first exposed or otherwise disturbed during pavement and slab removal.

If an indication of a potential environmental impact is observed, the field personnel will immediately alert the demolition contractor foreman and prime contractor. Once alerted, the contractor will be required to proceed with caution with input from the field observer. Specifically, the contractor will proceed to remove broken concrete or asphalt so that the full extent of the potential impact is uncovered, but with minimal disturbance to the underlying soils. Thus, mixing of potentially impacted and clean soil will be minimized. If the indication is in the vicinity of a subsurface feature, such as a deep footing or utility, where significant soil disturbance cannot be avoided, the demolition contractor will be instructed to work around the area, without delay to the overall schedule, until such time as the potential impact is confirmed, characterized, delineated and evaluated in terms of its potential impact on human health and/or groundwater quality.

3.4 Headspace Screening

Based on the visual monitoring, near-surface "grab" soil samples may be collected at selected locations for headspace screening for VOCs using a calibrated PID. Specifically, near-surface soil samples for headspace screening will be collected in potentially impacted areas and at other, randomly selected locations within each sub-grid, or at any area of interest. Soil samples for headspace screening will be collected by:

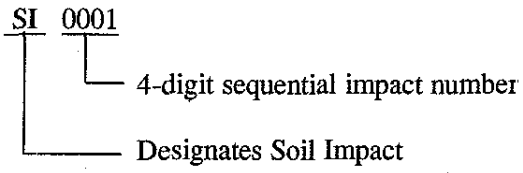
- Collecting the samples from at three to six inches bgs to help assure they are representative of in-situ VOC conditions.
- Approximately six ounces of soil will be sealed inside a one-pint Zip-Lock-type freezer bag or one-pint glass jars and agitated to promote the volatilization of VOCs, if any, into the head space.
- After allowing two minutes for VOCs to volatilize and equilibrate, the PID probe will be inserted into the headspace and the peak and/or steady PID reading recorded.
- To minimize variability, all of the PIDs used during the CM program will be calibrated on a daily basis using hexane or isopropylbenzene (to be consistent with South Coast Air Quality Management District [SCAQMD] Rule 1166 requirements).

Based on its use as a decision-making criterion for SCAQMD Rule 1166, a headspace PID reading of 50 parts per million by volume (ppmv) or greater will be considered indicative of a potential VOC or TPH impact. In practice, a 50 ppmv headspace reading is significantly more conservative than a 50 ppm/v reading in ambient air at a distance of three inches from the soil surface. It should be noted, however, that several factors affect the level of VOCs volatilizing from soils. These include the VOC concentration in the soil, soil and air temperature, organic carbon content of the soil, equilibration time, moisture content of the soil, and the chemical and physical characteristics of the VOCs. Rule 1166 monitoring procedures are discussed in Section 5.4.2.

The PID readings, date, time, and location of soil samples collected for headspace screening will be electronically entered into the Field Data Acquisition System (FDAS) and maintained in the field database for inclusion in daily reports.

3.5 Potential Impact Identification

Areas in which there are field indications of possible soil contamination within the vadose zone will be considered "potential impacts." Specifically, areas in which there are visual indications of a possible impact, olfactory indications of a possible impact, or headspace PID readings greater than 50 ppm/v will be considered potential impacts. Potential vadose zone impacts will be assigned a unique identification number and will be evaluated as described in Section 4.0, and documented in accordance with Section 6.0. The structure of the unique identification number is as follows:



Note: the unique impact identification number will become part of the identification number for any related remedial excavations and stockpiles/containers of excavated soil.

3.6 Notifications

At the end of each day, a field report will be completed for documentation purposes and weekly updates provided to Delphi. If there are no field indications of potential environmental impacts in a particular grid square, and no known impacts based on the Facility Investigation and/or previous investigations (therefore no remediation requirements), and no requirements for import of stockpiles from other sources, no further environmental assessment in that grid square will be undertaken. As such, that particular grid square will be designated as "CM complete – no additional work required."

If, however, one or more suspected impacts are discovered in a particular grid square, that grid square will be designated for further assessment, excavation, or remediation as necessary.

4. IMPACT ASSESSMENT

This phase of the CM program will involve the analysis of soil samples to assess potential impacts discovered during assessment confirmation monitoring. If an impact is confirmed, it will be characterized in terms of its lateral and vertical extent. This phase of the CM program will also include completing, as necessary, the Facility Investigation in previously inaccessible areas of the Facility.

4.1 Initial Confirmation

If necessary, to confirm potential impacts identified during assessment confirmation monitoring, the following steps will be conducted:

- Step 1: Review existing data pertinent to the area. Data will be available in several locations such as the GIS figures and FI hard copy reports. Evaluate the nature of the potential source and chemicals based on existing data.
- Step 2: Assess the size and area of the potential impact primarily using visual observation and PID headspace analyses. Excavation of one or more "potholes" can be performed to depths of less than four feet to determine approximate depth of impact.
- Step 3: If the area and depth of impact is limited, excavate and stockpile or containerize impacted soils and conduct confirmation and stockpile/container sampling (Sections 5.4 and 5.5) and stop; or if area and depth is not limited, proceed with Step 4.
- Step 4: Evaluate the analytical data with respect to maximum acceptable shallow soil concentrations, as described in Section 4.4.4.
- Step 5: Conduct confirmation sampling in accordance with the procedures presented in this section. If no data is available for the area, the confirmation sampling may be expanded so that potential source(s) have been identified.

One or more soil samples will be collected for additional field screening or chemical analysis using standard EPA methods. The number of soil samples collected and the analysis performed will be governed largely by observations recorded in the field during assessment confirmation monitoring. At a minimum, however, it is anticipated that at least one soil sample will be collected for chemical analysis. Samples will be collected from a depth of approximately 0-6 inches bgs at or near the center of the suspected impact. These samples will attempt to target "worst case" conditions to the extent this can be performed based on visual observations.

The information for samples associated with a given impact will be entered into the database. The sample naming convention will be as follows:

Object Name: GSXXXX

Object Type Code and sequential sample number
(GS = Grab Sample)

Sample Description: SS 01-0 01

Sequential Sample Identification Number
(01 – Primary and 02 – Duplicate Sample)

Depth (feet) - Depth (tenth of a foot)

Matrix (SS = Soil Sample)

The methods used to analyze soil samples for potential impact assessment and the required minimum reporting limits will be consistent with those used during the Facility investigation.

If elevated PID readings are recorded during assessment confirmation monitoring, the soil sample(s) will be collected using EPA method 5035 and analyzed for VOCs using EPA Method 8260B. Other methods of analyses will be dependent on the field observations and the location of the impact. For example, dark staining and fuel hydrocarbon odors in a sample collected in or near fuel facilities area would trigger analysis for TPH. Depending on the resulting TPH concentration, analyses for SVOCs, PAHs, and PCBs will be requested. When collecting soil samples that are to be analyzed for TPH, an additional soil sample will need to be collected using EPA Method 5035 for VOC analysis, should VOC analysis be required. The additional sample will be collected from a location as near as practical to the location where the TPH soil sample was collected.

To the extent practical, the CM team plans to use a fixed-base laboratory during the CM program and assign accelerated turn-around times to expedite the availability of analytical data for decision-making purposes. However, mobile laboratories or XRF may be used if there is a large enough number of samples per day (typically about 12) to make them cost-effective and if they are certified for the required methods of analysis. Thus, analysis for SVOCs, PAHs, PCBs, and metals will likely be performed in a fixed laboratory. If a mobile laboratory is used, soil sample collection will be conducted in accordance with those procedures presented in the Quality Assurance Project Plan.

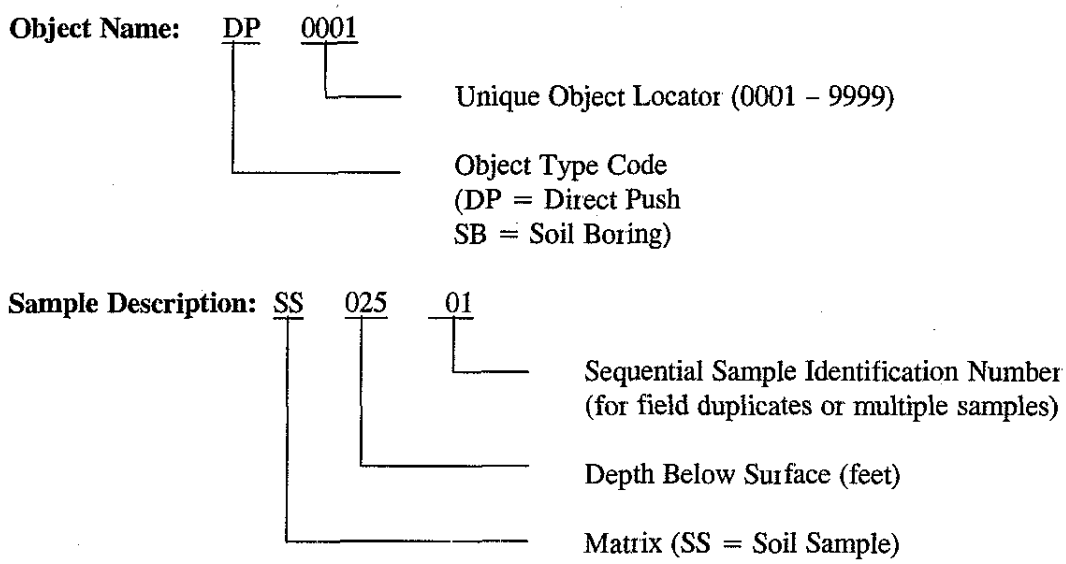
In the interest of expediting the CM program, professional judgment may be used to omit the potential impact confirmation stage of the process and proceed directly from identifying a potential impact to characterizing it. Omitting the impact confirmation stage may be appropriate if the potential impact is large and can be confirmed based on visual and/or olfactory observations or PID readings. Examples could include soils saturated with hydrocarbons in the immediate vicinity of a source, such as a transformer, fuel pipeline, or the like. Similarly, it may also be appropriate to omit the confirmation and characterization stages if the potential impact is small. In other words, it may be more cost-effective to simply remove a small potential impact and stockpile or containerize the soil for profiling and then collect a confirmation soil sample from the excavation bottom and/or sidewall (Section 5.5).

4.2 Impact Characterization

Once a new impact has been identified or is associated with a previously inaccessible area, it will be characterized to assess its lateral and vertical extent. Specifically, soil matrix samples for chemical analysis may be collected from hand-augered and/or direct-push borings, as described in the QAPP located in Appendix C of the CMP. Because the surface structures, floor slabs, and surface paving will have been removed at this stage, alternate methods of investigation may also be performed during the CM program. These include sampling from test pits, test trenches, or excavations. Irrespective of how the samples are collected, the objective will be to gather sufficient data on the impact for human health risk assessment and to assess the potential impact on groundwater quality. If deeper soil matrix samples are required, direct-push borings or excavations to the desired depth may be used. Soil sampling procedures for hand-augered or direct-push borings will be as described in the FI Workplan (Haley & Aldrich, 2006) with the following modification:

1) Utility clearance within the demolition zone will be coordinated with the demolition contractor as many of the utilities will have been de-energized for demolition activities. Based on health and safety considerations, soil samples from the floor and sidewalls of test pits or test trenches will be collected using a backhoe bucket. Hand-auger tools may also be used to collect samples from the floor and walls of open excavations.

Impact characterization samples will be assigned a unique identification number as follows:



As the mobile and/or fixed laboratories report analytical results, they will be evaluated and compared to soil human health and groundwater protection criteria. As in the Facility Investigation, an impact will be considered adequately characterized if the lateral and vertical extent of the impacted zone can be delineated based on data from sidewall and bottom samples, adjacent borings (including Facility Investigation and earlier borings) and/or by extrapolating decreasing concentration trends, such that the trend supports delineation of concentrations at, near, or below the background soil concentrations for the respective compounds/constituents.

During the course of a delineation investigation, particularly if test pits or trenches are used, it may become apparent that a confirmed impact is very limited in extent. In such instances, the impact may simply be removed in its entirety, thereby bypassing the delineation stage of the CM program. If a confirmed impact is removed under this circumstance, one or more confirmation soil samples (Section 5.5) will be collected from the floor and/or walls of the excavation for verification purposes. Also, the impacted soil removed from the excavation would be stockpiled or containerized in accordance with the procedures described in Section 5.4.

Activities related to the delineation of confirmed impacts will include a review of subsurface utility information, equipment decontamination, boring abandonment, location surveying, and the handling of investigation-derived waste (IDW). These activities are briefly described below.

4.2.1 Subsurface Utility Review

A large majority of the subsurface utilities at the Site have been removed or deactivated. Certain utilities, however, such as storm drains that originate in offsite areas and temporary overhead electrical supply lines will be active. Accordingly, subsurface utility information

will be reviewed with the prime demolition contractor prior to any direct-push borings or excavations.

4.2.2 Sampling Equipment Decontamination

Field equipment likely to come into contact with soil will be decontaminated in accordance with the field procedures outlined in the QAPP prepared from the CMP. This procedure includes washing the equipment with a trisodium phosphate-based detergent, followed by successive rinses with tap water and/or de-ionized water.

4.2.3 Boring Abandonment

Hand-augered borings will be backfilled by compacting the drill cuttings back into the hole. Direct-push borings will be sealed with bentonite pellets, which will be hydrated in place with potable water.

4.2.4 Surveying

Soil sample locations, soil boring locations, and excavation locations will be surveyed for location and elevation by field mapping from control points on the site and/or using GPS and laser level equipment. The survey will enable such locations to be related to the site grid. Depending on their size, either the approximate centroid or the perimeter of the test pits, test trenches, or excavations will be surveyed.

4.2.5 Data Validation

A two-tiered validation program will be conducted by the laboratory for the soil matrix sample analyses. Approximately five percent of the soil matrix sample analyses conducted will be subjected to Tier 1 validation, and approximately four percent will be subjected to Tier 2 validation. Tier 1 validation involves checking for completeness, sample holding time violations, and the laboratory's QA/QC procedures, including method blank, matrix spike, and matrix spike duplicate analyses. Tier 2 validation involves all of the Tier 1 activities in addition to checks for transcription errors and a review of instrument calibration data.

4.2.6 Investigation-Derived Waste

Investigation Derived Waste (IDW) is expected to include used personal protective equipment (PPE), hand-auger cuttings, and soil excavated from test pits and test trenches. Used PPE will be containerized in 55-gallon drums, which will be managed as non-hazardous waste.

4.2.7 Excavated Soils

Soil from excavations will be stockpiled nearby until such time as soils being investigated in the area have been evaluated in terms of the associated potential human health risk or threat to groundwater quality. Stockpiling protocols will be as described in Section 5.4, including the use of a polyethylene bottom liner, a caution tape perimeter, and orange flagging indicating that analytical data are pending. The backfilling and compaction of excavations

will be the responsibility of the excavation contractor. Soil excavated from confirmed impacts or the known remediation areas will be managed in accordance with Section 5.4

4.3 Data to be Recorded

Data to be recorded during the confirmation and characterization of new impacts will be similar to that gathered during the Facility investigation, as specified in the QAPP (Appendix C of the CMP).4.4 Notification

Notifications may be issued to Delphi at several stages during the process of confirming, characterizing, and evaluating new impacts. Specific verbal or electronic notifications to Delphi may occur:

- When a potential additional impact is confirmed, i.e., the concentrations of one or more chemicals exceed health-based or groundwater protection remediation criteria.
- To alert the prime and demolition contractors indicating the estimated time that the contractor is expected to stay out of an area undergoing characterization.
- If a decision is made to remove a confirmed impact prior to evaluating its human health risks and potential threat to groundwater quality, i.e., the confirmed impact is small in volume and easily removed.

5. IMPACT REMEDIATION

Impacts to be remediated during the CM program will include the known excavation areas and additional impacts above remediation criteria encountered and confirmed during the assessment confirmation program. *It is noted in this regard that certain of the impacts identified during the* Facility Investigation and the proceeding investigations have already impacted groundwater quality. This known impact is considered groundwater "source areas" and is being addressed within the subject CM program. Specifically, longer-term monitoring and natural attenuation measures are being planned or are in progress in the source area. It should also be noted that based on expediency and/or cost considerations, Delphi may elect to excavate potential impacts that could present unacceptable human health risk but that have that have not been confirmed, rather than perform addition testing.

5.1 Pre-Excavation Delineation

In 2005 and 2006, Haley & Aldrich conducted soil sampling around 54 AOIs during the CCI and FI. This sampling was performed in an attempt to confirm the known impacts and delineate the extent of necessary remediation excavations. In a few cases, the limits of chemicals at concentrations that result in unacceptable human health risks and/or a threat to groundwater quality were not fully determined. Completion of the delineation of these known impacts will be conducted as part of the CM program. For these areas the impacted area will be delineated by confirmation soil sampling during excavation if soil is not removed up to the pre-excavation sampling locations. Other areas are fully delineated and soil will be removed up to the pre-excavation sampling locations which also serve as confirmation samples if they are below the Site-specific cleanup criteria. Summaries of the data collected to date in the known impact areas are presented in the Facility Investigation Report (Haley & Aldrich, 2007).

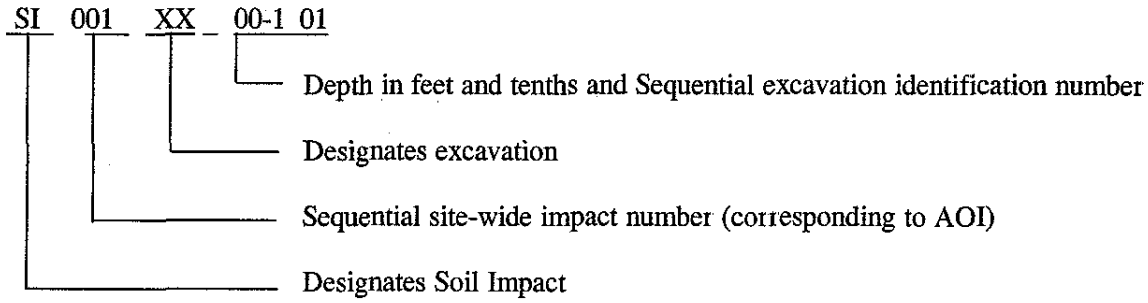
5.2 Subsurface Utility Review

As discussed in Section 4.2.1, it is anticipated that a majority of the subsurface utilities at the Facility will have been removed or deactivated by the time the CM program is implemented. Excavations to remove potential or confirmed impacts will be preceded by a review of subsurface utility information with the prime demolition contractor. If necessary, the locations of active utilities will be verified using geophysical, or other utility locating techniques, and staked in the field.

5.3 Impacted Soil Excavation

The most frequently used method of removing impacted soil will be by open, unshored excavation using a rubber-tired backhoe or track-mounted excavator. However, it is possible that shoring may be required to support vertical-sided excavations adjacent to the Site boundary or in other areas where restrictions preclude sloped excavation walls due to removal depth or adjacent structures. If deeper impacts of limited lateral extent are to be removed, techniques such as large-diameter borings may be considered. Impact removal techniques involving shored excavations or other removal techniques will be addressed in impact-specific Technical Memorandum addenda to this Confirmation Sampling and Waste Management Plan.

Each excavation to remove an impact will be assigned a unique identification number. The structure of the excavation identification number is as follows:



Note that the structure of the excavation identification number allows for more than one excavation to be associated with a given impact. This scenario could arise, for example, if excavations were performed to remove localized "hot spots" within a larger impact being addressed using SVE. An excavation table is included in the FDAS record data pertinent to each excavation. Related information includes x, y, z coordinates to define the geometry of the excavation and locations (perimeter, sidewall, or bottom) of soil samples.

5.3.1 Open Excavation

The geometry of open excavations to remove known impacts will be determined by the occurrence, distribution, and concentration(s) of the target chemical(s). Impact delineation data, whether collected during the FI and/or during the CM program, are expected to provide an initial understanding of the occurrence and distribution of the target chemical(s) and, hence, the approximate geometry of the excavation. If it is not possible to remove the entire impact to the desired cleanup level by open excavation, the goal of the open excavation will be to remove as much of the impact as is cost-effectively and safely possible and the potential human health risk and/or threat to groundwater associated with residual impacted material will be reevaluated based on the results of confirmation soil samples.

While site-specific conditions may dictate otherwise, most remedial excavations will begin at or near the center of the known impact. If possible, the excavation will be advanced to the total planned depth and then extended laterally away from the center until the lateral limits of the planned excavation are reached. For safety, and to facilitate compaction during backfilling, the walls of the excavation may be sloped at one horizontal to one vertical if warranted by the depth of the excavation and the soil type. Flatter slopes or ramps may be excavated if it is anticipated that vehicular access to the floor of large excavations is required.

As soil is removed from the excavation, it will be visually screened for the target chemicals and stockpiled or containerized as appropriate. Other screening techniques may include using a PID for VOC or TPH impacts, field test equipment for metals or PCBs. PID screening will include both headspace screening and PID readings in ambient air at a distance of three inches from the surface of the soil in the excavator bucket or in the associated stockpile or container. Headspace analyses will be performed as described in

Section 3.3. Ambient air PID readings for VOCs will be in accordance with the requirements of SCAQMD Rule 1166 and will be used to satisfy the associated monitoring and reporting obligations.

While within the limits of the planned excavation, the screening data will be used to verify the interpreted extent of the known impact. The screening data may also be used to extend the lateral and/or vertical limits of the excavation. When the screening data indicate that the known impact has been removed, excavation (at least in that direction) will be terminated when defined by the analytical results of pre-excavation samples and/or analytical results of excavation confirmation soil samples.

5.3.2 Shored Excavations

Generally, the known impacts requiring excavation are shallow and sufficiently far from the facility boundaries and/or features to be preserved to permit open excavation. However, the possible need for shoring cannot be ruled out should excavation be required immediately adjacent to a boundary or feature to be preserved. Should shoring be required, it will be designed on a case-by-case basis by a suitably qualified and experienced civil or geotechnical engineer provided by the prime demolition contractor. As noted above, impact-specific Technical Memorandum addenda to this implementation plan will be prepared should shored excavations be required.

5.3.3 Deep Localized Excavations

In some areas, it may not be cost-effective to remove deep impacts by open excavation. Examples include instances where chemicals have migrated down to the capillary fringe in a localized area such that the ratio of clean overburden to impacted soil makes excavation cost prohibitive. In such instances, it may be appropriate and cost-effective to remove impacted soil using large-diameter augers or by small vertical-sided excavations. Impact-specific addenda to this implementation plan will be prepared should this type of excavation be required.

5.3.4 Monitoring for SCAQMD Rule 1166 Permit

Excavation soil and construction debris generated at the Site may be subject to the requirements of the SCAQMD's Rule 1166, which limits emissions of VOCs. Monitoring VOC emissions and daily inspection of stockpiles will be the responsibility of the CM field personnel. The demolition contractor will handle all soil materials, construct stockpiles, fill containers, and maintain stockpile covers and stormwater controls in accordance with the SCAQMD site-specific Rule 1166 permit. Specific mitigation and monitoring protocols will be included in the Rule 1166 Mitigation Plan if one is necessary.

Throughout the CM program, the CM personnel will ensure that the necessary measures are employed to minimize the release of VOCs, odors, and dust. Mitigation measures may include the use of vapor and odor suppressants on excavated and stockpiles surfaces, covering soil stockpiles, and maintaining the surrounding paved areas so to minimize dust generation

At least 24 hours prior to commencing remediation excavations with VOCs, Delphi will provide SCAQMD, via facsimile, the information required pursuant to Rule 1166(c)(1)(B), the name of the contractor performing the excavation, and the application number listed on the approved mitigation plan. At the time of the notification, a reference number will be obtained from SCAQMD and retained as proof of compliance with Rule 1166 requirements. Within 48 hours of the facsimile/telephone notification, a hard copy of the notification form will be mailed to SCAQMD.

Haley & Aldrich will conduct organic vapor monitoring in the vicinity of the active demolition areas during each workday using a calibrated organic vapor analyzer (OVA) or PID. A calibrated OVA/PID will be onsite at all times during soil excavation. A trained and suitably experienced person, proficient in the use of the OVA/PID selected for use at the site, will conduct the monitoring. Field records of OVA/PID monitoring and the associated calibration data will be recorded in a format approved by the SCAQMD. Field records will be generated manually in the field and scanned for electronic transfer to the data management portal and the Haley & Aldrich FDAS.

In addition, VOC-impacted soil may be placed in covered 8- or 20-yard capacity roll-off bin containers. Containers will be labeled and managed in accordance with similar procedure for stockpiles. Stockpiles of VOC-contaminated soil will be inspected on a daily basis (five days per week) to confirm the integrity of the polyethylene covers and the integrity of the seams between adjacent sheets. Holes, tears, or areas where the cover had been displaced will be immediately repaired or otherwise addressed by the demolition subcontractor. Daily inspection records will be maintained to ensure compliance.

Haley & Aldrich will perform perimeter air monitoring for VOC emissions upwind and downwind of the soil excavation areas. The monitoring will include documentation of weather conditions, odors, and VOC concentrations upwind and downwind of the working area. Perimeter monitoring data and observations will be recorded on separate monitoring sheets from those used to record the excavation monitoring data.

5.4 Confirmation Soil Sampling

Upon completion of a remedial excavation, soil samples will be collected from the floor and/or sidewalls and analyzed to confirm that the known impact has been removed. As noted in Section 5.3.1, a remedial excavation will be considered complete when it reaches the planned lateral and vertical limits and/or laboratory analyses of confirmatory samples indicates that soil with COC concentrations greater than the Site-specific remediation criteria have been removed.

5.4.1 Confirmation Soil Sample Locations

The number and locations of the confirmation soil samples will be determined based on the site-specific conditions. Specifically, confirmation sample locations may be dictated largely by indications of residual contamination in the excavation floor or sidewalls. For general guidance purposes, however, confirmation soil samples will be collected as follows:

- One discrete sample for approximately every 400 square feet of excavation surface area for shallow soil excavations (less than 4 feet in depth), which is equivalent to collecting bottom samples at 20 feet on center. However, rather than collect all samples based on grid pattern some sample locations may be selected based on visual observations.

- For deeper excavations (greater than 4 feet in depth) additional discrete samples will be collected from sidewalls at a frequency of one for every 200 square feet of sidewall area projected into the vertical plane. However, rather than collect all samples based on grid pattern some sample locations may be selected based on visual observations.

Professional judgment will be used to select the number and location of confirmation soil samples for small excavations. At a minimum, however, at least one sample will be collected from each open excavation.

For deep vertical-walled excavations (Section 5.3.2), it may not be possible to safely collect undisturbed sidewall samples. Disturbed sidewall samples could, however, be collected from a backhoe or excavator bucket. Disturbed bottom samples could also be collected from the backhoe or excavator bucket or from the flight of the bit-auger if large-diameter borings are used for impact removal. Samples collected in this manner will be obtained by pushing a jar or sleeve into the compacted and least disturbed soil near teeth of the bucket or the cutting bit of the auger. However the sidewall or bottom samples are collected, the general guidance outlined above regarding the number of samples to be collected will apply.

5.4.2 Confirmation Soil Sample Identification

Excavation confirmation soil samples will be assigned a unique identification number, as follows:

Object Name: CSX 001

- 001 — Excavation Number Corresponding to AOI number
- CSX — Object Type Code (CS = Excavation Confirmation Sample)

Sample Description: SS NW010-0 _ 01

- 01 — Sequential Sample Identification Number (01 - 02)
- NW010-0 — Location and Depth in feet and tenths (North Wall at 10.0 feet bgs
- SS — Matrix (SS = Soil Sample)

5.4.3 Confirmation Soil Sample Analyses

Confirmation soil samples will be collected and analyzed for the chemicals that triggered the remedial excavation including metals (As, Pb, Sb), PCBs, VOCs and/or SVOCs. Samples collected for VOC analysis will be prepared in the field in accordance with EPA Method 5035. When collecting soil samples that are to be analyzed for TPH, an additional soil sample will need to be collected using EPA Method 5035 for VOC analysis, should VOC analysis be required. The additional sample will be collected from a location as near as is practical to the location where the TPH soil sample was collected. If there are field indications that other contaminants may be present, additional analyses may be requested as appropriate.

Upon receipt from the analytical laboratory, the results of the confirmation soil sample analyses will be evaluated in terms of the remedial objectives. If the remedial objectives, i.e., target cleanup criteria, have been achieved, the excavation will be conditionally released for backfill or re-grading, subject to:

- Review of the origin and chemical content of the proposed backfill material as backfill material may be acceptable from a human health risk and/or groundwater protection perspective at one location but not at another location.
- Review of the results of any stockpile and/or waste container samples as they may indicate the possible presence of chemicals other than those for which the excavation was targeted.

If the confirmation soil sample analyses indicate that the remedial objectives have not been achieved, the remedial excavation may be extended laterally and/or vertically and additional confirmation soil samples collected as described above.

6. STOCKPILE MANAGEMENT AND SAMPLING PROGRAM

6.1 Soil and Concrete Stockpile/Container Segregation and Management

Areas to be excavated will be delineated prior to excavation activities in accordance with the soil and concrete removal figures included as part of the CMP. Excavated soils may be placed in stockpiles on polyethylene sheeting, direct loaded into trucks and/or placed in roll-off containers. Stockpile and container locations will be the responsibility of the remediation contractor and selected based on site logistics. However, the CM field observers will be responsible for overseeing the segregation of excavated soil and the sampling of stockpiled or containerized soils, as necessary for waste characterization prior to disposal. Each stockpile or roll-off container of soil will be segregated based on chemical impacts, assigned a tracking number, and placed in designated areas. Any clean overburden soil will also be segregated from impacted soil for potential re-use on site.
Concrete and asphalt removed will be stockpiled onsite separately from soil until properly characterized, disposed or crushed for potential reuse on site. Concrete areas will be delineated prior to removal and stockpiled in to three main types as follows:

- Areas previously tested and found to be impacted and requiring off-site disposal;
- Areas previously tested and found to be acceptable for re-use onsite; and
- Areas with limited testing and believed to potentially be acceptable for re-use onsite and which will require post-crush confirmation testing.

Piles of concrete from areas that have previously been sufficiently tested and determined to be suitable for re-use onsite will be stockpiled, crushed and maintained in separate stockpiles from other concrete materials.

6.1.1 Monitoring for SCAQMD Rule 1166 Permit

Excavation soil and construction debris (concrete) generated at the Site may be subject to the requirements of the SCAQMD's Rule 1166, which limits emissions of VOCs, if the material is impacted with significant concentrations of VOCs. As necessary for compliance with SCAQMD and health and safety during excavation, stockpiling or loading of soils or concrete, monitoring of VOC emissions will be performed by CM personnel with a calibrated PID. It will be the contractor's responsibility to make certain CM personnel are present during excavation and loading activities. The demolition contractor will handle all soil materials, construct stockpiles, fill containers, and maintain stockpile covers and storm water controls in accordance with the SCAQMD Rule 1166 permit.

At least 24 hours prior to commencing excavation of VOCs impacted materials, Delphi will fax or call in to SCAQMD the information required pursuant to Rule 1166(c)(1)(B) including the name of the contractor performing the excavation and the application number listed on the approved mitigation plan. At the time of the notification, a reference number

will be obtained from SCAQMD and retained as proof of compliance with Rule 1166 requirements. Within 48 hours of the facsimile/telephone notification, a hard copy of the notification form will be mailed to SCAQMD. Per Rule 1166, soils emitting > 50 ppmv must be covered and soils emitting > 1000 ppmv must be removed from the site the same day or placed in AQMD-approved air-tight 8- or 20-yard capacity roll-off bin containers. If these levels are exceeded then AQMD will be notified within 24-hours and monitoring reports submitted to them within 45 days. If concentrations above 1,000 ppmv are encountered a site specific mitigation and monitoring Rule 1166 Mitigation Plan will be obtained from SCAQMD.

Stockpiles of VOC-contaminated soil will be inspected regularly, daily if practical, to confirm the integrity of the polyethylene covers and the integrity of the seams between adjacent sheets. Holes, tears, or areas where the cover had been displaced will be immediately repaired or otherwise addressed by the demolition subcontractor. Daily inspection records will be maintained by the CM field members to ensure compliance.

Throughout the CM program, the CM personnel will ensure that the necessary measures are employed to minimize the release of VOCs, odors, and dust. Mitigation measures may include the use of vapor and odor suppressants on excavated and stockpiles surfaces, covering soil stockpiles, and maintaining the surrounding paved areas so to minimize dust generation. Stockpiles will be inspected regularly by the CM field personnel to ensure piles are adequately covered, dust is not being generated and storm water controls are in place. Haley & Aldrich will conduct organic vapor monitoring in the vicinity of the active demolition areas during each workday using a calibrated organic vapor analyzer (OVA) or PID. A calibrated OVA/PID will be onsite at all times during soil excavation. A trained and suitably experienced person proficient in the use of the OVA/PID selected for use at the site will conduct the monitoring. Field records of OVA/PID monitoring and the associated calibration data will be recorded in a format approved by the SCAQMD. Field records will be generated manually in the field and scanned for electronic transfer to the data management portal and the Haley & Aldrich FDAS.

Haley & Aldrich will perform perimeter air monitoring for VOC emissions upwind and downwind of the soil excavation areas. The monitoring will include documentation of weather conditions, odors, and VOC concentrations upwind and downwind of the working area. Perimeter monitoring data and observations will be recorded on separate monitoring sheets from those used to record the excavation monitoring data. Additional details are provided in the site-specific Dust Monitoring Plan.

6.1.2 Storm Water Controls

Each stockpile not contained in a roll-off bin will be covered with polyethylene sheeting and a perimeter berm will be constructed to minimize storm water run-on or runoff in accordance with the Stormwater Pollution Prevention Plan (SWPPP). In addition, the sheeting for stockpiles potentially exposed to precipitation will be anchored to the berm. Stockpile covers and berms will be maintained until the soil is characterized and either

disposed or reused onsite. The demolition and excavation subcontractor(s) will be responsible for stockpile configuration and maintenance of covers and storm water controls.

6.2 Soil Stockpile Sampling and Testing

Additional soil samples to perform waste characterization of soil stockpiles will be collected as necessary to supplement existing analytical data. As needed to supplement existing data, soil samples of stockpiles will be collected from various locations and depths on the stockpiles as follows:

- Piles up to 1,000 cubic yards = 1 sample per 250 cubic yards
- Piles of 1,000 to 5,000 cubic yards = 4 samples for the first 1,000 cubic yards plus 1 sample for each additional 500 cubic yards
- Piles of greater than 5,000 cubic yards = 12 samples for the first 5,000 cubic yards plus 1 sample for each additional 1,000 cubic yards
- Alternatively, the accepting facility may determine the sampling requirements necessary for compliance with their permits for each particular waste type to be received.

Samples will be analyzed for the specific constituents of concern that typically will include PCBs, lead, arsenic, antimony, VOCs and SVOCs as appropriate. If necessary, samples with Total Threshold Limit Concentration (TTLC) values exceeding 20X the Toxicity Characteristic Leaching Procedure (TCLP) level for any constituent will be analyzed for leachable concentrations by TCLP. If necessary, samples with TTLC concentrations exceeding 10X the Soluble Threshold Limit Concentration (STLC) level for any constituent will be analyzed for leachable concentrations by STLC unless a baseline level has been established by prior testing that indicates the materials are likely to fail the leachability tests, therefore, the additional testing may be unnecessary for waste characterization.

6.2.1 Soil Stockpile and Sample Identification

Soil stockpiles and stockpile samples will be assigned a unique identification number, as follows:

Object Name: SP001

- Stockpile Number
- Object Type Code (SP = Stockpile Number)

Sample Description: SS 01NW10 01

- Sequential Point Specific Sample Number (01 - 02)
- Pile Specific Sample Number and Depth (Northwest Quadrant at 10 feet
- Matrix (SS = Soil Sample)

Containers will be labeled and managed in accordance with similar procedure for stockpiles.

6.3 Concrete Stockpile Sampling and Testing

Many areas of existing concrete have been pre-tested, and post-crush sampling and analysis will only be performed on specific areas where prior sampling is deemed insufficient. For concrete that has not been adequately tested but where preliminary data and investigation indicates that the material may be suitable for re-use onsite, the material will be segregated, crushed, sampled and tested post-crushing for evaluation of potential re-use onsite. In to supplement existing analytical data, as necessary, in order to perform additional waste characterization of concrete stockpiles samples of stockpiled concrete will be collected from various locations and depths on the stockpiles.

Testing of concrete will be performed on the crushed piles of concrete with prior limited testing and believed to potentially be acceptable for re-use onsite. It is estimated that daily piles of crushed concrete we will have a size of approximately 2,000 tons, or two 1,000 ton piles. The crushed concrete piles that require testing will be sampled as follows:

One discrete post-crush grab sample for every 250 cubic yards (500 tons). The samples will be analyzed for the specific constituents of concern that typically will include PCBs, lead, arsenic, antimony, VOCs and SVOCs as appropriate. If necessary, samples with Total Threshold Limit Concentration (TTLC) values exceeding 20X the Toxicity Characteristic Leaching Procedure (TCLP) level for any constituent will be analyzed for leachable concentrations by TCLP. If necessary, samples with TTLC concentrations exceeding 10X the Soluble Threshold Limit Concentration (STLC) level for any constituent will be analyzed for leachable concentrations by STLC unless a baseline level has been established by prior testing that indicates the materials are likely to fail the leachability tests, therefore, the additional testing may be unnecessary for waste characterization.

Piles of concrete from areas that have previously been sufficiently tested do not require additional testing, and will be crushed and maintained separately from other concrete materials.

For concrete to be disposed offsite, existing data will be used and supplemented as determined necessary by the accepting waste disposal facility for compliance with their permits.

6.3.1 Concrete Stockpile and Sample Identification

Soil stockpile samples will be assigned a unique identification number, as follows:

Object Name: SP 001

- 001 — Stockpile Number
- SP — Object Type Code (SP = Stockpile Number)

Sample Description: CS 01NW10 _ 01

- 01 — Sequential Point Specific Sample Number (01 – 02)
- 01NW10 — Pile Specific Sample Number and Depth (Northwest Quadrant at 10 feet
- CS — Matrix (CS = Concrete Sample)

6.3.2 Impacted Concrete Stockpile Management

It is assumed that stockpiles of crushed concrete will be made in piles of approximately 1,000 tons and that two confirmatory samples will be collected from each pile of crushed material. The piles will be managed according to the analytical results as follows:

- If the concentrations of all chemicals of concern are below the site-specific health risk remediation criteria, then the pile will remain segregated or combined with other acceptable piles for re-use onsite.
- If one of the two samples has reported concentrations of one or more chemicals of concern above the site-specific health-risk remediation criteria, then that area of the pile may be excavated for off-site disposal and that area of the pile resampled. If the subsequent sample is less the site-specific health risk remediation criteria, then the pile will be deemed acceptable for re-use on site. If concentrations of chemicals of concern in subsequent samples are above site specific health-risk remediation criteria then additional removal and resampling may be performed or the entire pile disposed of offsite.
- If both samples have reported concentrations of chemicals of concern above the site-specific health-risk remediation criteria, then the pile will be removed and disposed offsite.

For existing piles that exceed 1,000 tons, testing will be performed for chemicals of concern. For these piles, areas found to have chemicals of concern exceeding site specific health risk remediation criteria may be removed and that area of the pile resampled.

If necessary, samples with Total Threshold Limit Concentration (TTLC) values exceeding 20X the Toxicity Characteristic Leaching Procedure (TCLP) level for any constituent will be analyzed for leachable concentrations by TCLP. If necessary, samples with TTLC concentrations exceeding 10X the

Soluble Threshold Limit Concentration (STLC) level for any constituent will be analyzed for leachable concentrations by STLC unless a baseline level has been established by prior testing that indicates the materials are likely to fail the leachability tests, therefore, the additional testing may be unnecessary for waste characterization.

7. PROGRAM REPORTING

CM program activities will be documented in daily, weekly, and grid-specific reports. Reports will be given to the project management for review. Reports will be generated from the FDAS databases which are updated daily. Report formats are provided in Appendix A.

The anticipated scope and content of each of these reports is outlined below

7.1 Log Tracking Sheets

Log sheets will be maintaining for:

- Sample numbers and x, y & z coordinates of samples and tests performed;
- Excavation numbers;
- Stockpiles including stockpile numbers, matrix, and suspected contaminant, and date generated;
- Rule 1166 Monitoring;
- PID field screening readings; and
- Daily Activities.

7.2 Daily Field Reports

Daily field reports will contain at a minimum:

- Contractor activities, both CM subcontractor and demolition subcontractor when conducting additional work to meet CM requirements.
- Details of CM field activities; impacts encountered, confirmed, and delineated; excavations and stockpiles created; import fill management; and Rule 1166 monitoring. OVA readings.
- Sample log summaries.
- Health and safety monitoring and issues.
- Applicable attachments including figures, tables, and photographs

Each daily report will be prepared for documentation purposes and reviewed by the project manager.

7.3 Weekly Field Reports

The weekly reports will include information from all grids where work is being conducted and will contain, at a minimum, the following information:

- Location of excavations and stockpiles/containers
- Status of excavations, stockpiles/containers
- Results of excavation, stockpile/container, impact confirmation sampling, and risk evaluations
- Number and location of samples collected and cross-referenced to the site grid system
- Planned work and upcoming schedules
- Manpower summary for the coming week
- Project safety issues

The weekly reports will be prepared in electronic format.

7.4 Grid-Specific Reports

After CM tasks are completed in each grid, Delphi will be provided with a data submittal report for the specific grid. Completion of CM tasks is preliminarily defined as completion of any activities that generate data necessary for a closure evaluation of the area by the DTSC. Final soil importing and grading may therefore occur after the grid reports are produced, assuming that no other relevant environmental data is generated.

The grid report will contain, at a minimum, a brief narrative summary of the dates and CM activities conducted in the grid and a compilation of all associated data collected in the grid during CM activities.

8. REFERENCES

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

2. Haley & Aldrich, Inc., Facility Investigation Workplan, Former Delphi Anaheim Battery Operations Facility, Anaheim, CA, April, 2006.

APPENDIX A

REPORTING DOCUMENT AND DATA COLLECTION FORMATS

HALEY & ALDRICH

SAMPLING REPORT

Page of

Project _____ Field Representative _____ Date _____

Grid Number _____ Excavation Number _____ Weather _____

Soil Impact _____ Stockpile Number _____ Temperature _____

Subcontractor _____

Activity Type ☐ Initial Confirmation ☐ Stockpile
☐ Impact Characterization ☐ Import Fill (Stockpile)
☐ Excavation Bottom ☐ Import Fill (In-Site)
☐ Excavation Side Wall ☐ Debris

Sample ID	X-Coord	Y-Coord	Elevation	Depth	Time	Matrix	Method	TAT	Hold?

Issues _____

HALEY & ALDRICH

DAILY ACTIVITY REPORT

Page of

Project _____ **Field Representative** _____

Grid No. _____ **Date** _____

Soil Impact No. _____ **Weather** _____

Excavation No. _____ **Temperature** _____

Subcontractor _____ **Haley & Aldrich Related?** ☐ Yes ☐ No

Activity Type ☐ 1166 Monitoring ☐ Assessment Confirmation ☐ Excavation ☐ Fill and Material Placement

☐ Hallow Stem Auger ☐ HASP Monitoring ☐ Impact Assessment ☐ Soil Vapor

☐ Stockpile Management ☐ Other _____

Monitoring Equipment ☐ PID ☐ FID ☐ CGI ☐ Dust Monitor ☐ Colorimetric ☐ Other _____

Equipment Type _____

Start Time _____ : _____ **End Time** _____ : _____ **Number of Operators** _____

Day Type ☐ Regular ☐ Extended ☐ Other _____

Summary _____

Issues _____

Documents	Name	Type	Description

HALEY & ALDRICH

EXCAVATION REPORT

Page of

Project _____ **Field Representative** _____

Grid No. _____ **Date (Modified)** _____

Soil Impact No. _____ **Weather** _____

Excavation No. _____ **Temperature** _____

Subcontractor _____ **Back filled?** ☐ Yes ☐ No

Approximate Removed Material(Cu. Yd.) _____ **Excavation Status** ☐ Awaiting Lab Result ☐ Active ☐ OK for Backfill

Start Date _____ **End Date** _____

Remarks _____

DRAWING

Approx. Scale:

Documents	Name	Type	Description

HALEY & ALDRICH

STOCKPILE MANAGEMENT REPORT

Page of

Project _____ Field Representative _____

Grid No. _____ Date _____

Soil Impact No. _____ Weather _____

Excavation No. _____ Temperature _____

Stockpile No. _____ Primary Chemical _____

Subcontractor _____ OK for Reuse? ☐ Yes ☐ No

Approximate Removed Material(Cu. Yd.) _____ X-Coord _____ Y-Coord _____

Stockpile Status ☐ Awaiting Lab Result ☐ Awaiting Risk Assess. ☐ Active ☐ OK for Backfill ☐ Off-Site ☐ On-Site

Stockpile Config. ☐ 20-yard Rolloff ☐ 8-yard Rolloff ☐ Slab ☐ Visqueen

Last Date Moved _____ Facility Removed to _____

Remarks _____

DRAWING

Approx. Scale:

Documents	Name	Type	Description

HALEY & ALDRICH

1166 MONITORING REPORT

Page of

Project _____ **Field Representative** _____

Grid No. _____ **Date** _____

Soil Impact No. _____ **Weather** _____

Excavation No. _____ **Temperature** _____

Stockpile No. _____ **Subcontractor** _____

Activity Type ☐ Ambient Air ☐ Excavation / Stockpile ☐ Perimeter ☐ Other _____

Equipment Used ☐ PID ☐ FID ☐ CGI ☐ Dust Monitor ☐ Colorimetric ☐ Other _____

Equipment Make/Model _____ **Equipment Range** _____

Item	Start Time	End time	Max Reading	Description

Issues _____

HALEY & ALDRICH

DAILY FIELD REPORT

Date :

Project		**Report No.**	Report #
Client		**Page**	1 of 4
GRID(s)		**File No.**	File #
		Weather	
		Temperature	° *F*

I. CONTRACTOR'S ACTIVITIES

1. Haley & Aldrich Contractor(s):

Contractor Name:
Activity:
Grid Number:
Equipment Type:
Number of Operators:
Total hours:
Type of Billing:
Ticket Number:
Summary:

Issue:

2. Demolition Contractor(s):

Contractor Name:
Activity:
Grid Number:
Equipment Type:
Number of Operators:
Total hours:
Type of Billing:
Ticket Number:
Summary:

Issue:

II. FIELD OBSERVATION

Primary Activities: **ASSESSMENT CONFIRMATION**

Grid Number	Soil Impact	Summary	Description

Reference attached document(s):

HALEY & ALDRICH

DAILY FIELD REPORT

Date :

Project
Client
GRID(s)

Report No. Report #
Page 2 of 4
File No. File #
Weather
Temperature ° *F*

Primary Activities: IMPACT ASSESSMENT

Grid Number	Soil Impact	Sample ID	Analysis

Cont ID	Type	Matrix	Summary

Reference attached document(s):

Primary Activities: EXCAVATION

Grid Number:
Soil Impact:
Excavation Name:
Approximate Removed Materials (ft^3):
Description:

Sample ID	Matrix	Analysis	TAT

Primary Activities: STOCKPILE MANAGEMENT

SP ID	Grid Number	Soil Impact	Volume	Moved from	Configuration	Status

Reference attached document(s):

HALEY & ALDRICH

DAILY FIELD REPORT

Date :

Project
Client
GRID(s)

Report No. Report #
Page 3 of 4
File No. File #
Weather
Temperature ° *F*

Primary Activities: 1166 MONITORING

Grid Number	Soil Impact	Inst ID	Activity	Start	End	MAX Reading	Description

Reference attached document(s):

Primary Activities: HASP FIELD MONITORING

Grid Number	Soil Impact	Inst ID	Activity	Start time	End Time	MAX Reading

Reference attached document(s):

III. REFERENCES

1. **Sample Log Summary Form**

Sample ID	Matrix	Analysis	Depth	TAT

2. **Risk Assessment Sample Track**

Grid Number	Soil Impact	Sample ID	Request Description

HALEY & ALDRICH

DAILY FIELD REPORT

Date :

Project		**Report No.**	Report #
Client		**Page**	4 of 4
GRID(s)		**File No.**	File #
		Weather	
		Temperature	° *F*

ATTACHMENTS

Grid Number	Soil Impact	Doc Name	Doc Type	Description

FIELD REPRESENTATIVES

Personnel	Hours	Billing Type

Delphi Representative: **Date:**

Haley & Aldrich Authorization: **Date:**

Distribution: *[Company Name; Attn: Contact Name]*

HALEY & ALDRICH

WEEKLY FIELD REPORT

Date :

Project
Client
GRID(s)
Week of Week #

Page

Report No. Report # 1 of 2
File No. File #

I. WORK PROGRESS REVIEW

ASSESSMENT CONFIRMATION

Grid No.	Soil Impact No.	Soil Samples	Result Status	Comments

ACER MONITORING

Grid No.	Soil Impact No.	Soil Samples	Result Status	Comments

STOCKPILE MANAGEMENT

Grid No.	Soil Impact No.	Soil Samples	Volume	Result Status	Comments

EXCAVATION

Grid No.	Soil Impact No.	Soil Samples	Volume	Result Status	Comments

1166 MONITORING

Grid No.	Soil Impact No.	OVA Reading	ARBP	Start Date	End Date	Met Permit?	Comments

II. SCHEDULE REVIEW

Item	Date	Upcoming Schedule
1		■
2		■

HALEY & ALDRICH

WEEKLY FIELD REPORT

Date :

Project
Client
GRID(s)
Week of Week

Page

Report No. Report # 2 of 2
File No. File #

III. MANPOWER SUMMARY

Haley & Aldrich Estimate Workload

Staff	Function Type	S	M	T	W	T	F	S	Comments

General agreement on man power requirements:

IV. PROJECT SAFETY

Item	Date	Description
1		■
2		■

V. REPORTS/SUMITTALS

Item	Date	Type	Producer	Request Date	Complete Date	Comments
1						
2						
3						

VI. ISSUES

Item	Date	Description
1		■
2		■

ATTACHMENTS

Grid Number	Soil Impact	Doc Name	Doc Type	Description

Distribution: *[Company Name, Attn Contact Name]*

HALEY & ALDRICH

HASP MONITORING REPORT

Page of

Project _____ Field Representative _____

Grid No. _____ Date _____

Soil Impact No. _____ Weather _____

Excavation No. _____ Temperature _____

Stockpile No. _____ Subcontractor _____

Activity Type ☐ Ambient Air ☐ Excavation / Stockpile ☐ Perimeter ☐ Other _____

Monitoring Equipment ☐ PID ☐ FID ☐ CGI ☐ Dust Monitor ☐ Colorimetric ☐ Other _____

Equipment Make/Model _____ Equipment Range _____

Item	Start Time	End time	Max Reading	Description

Issues _____

HALEY & ALDRICH

OVA READING REPORT

Page of

Project _____ **Field Representative** _____

Grid No. _____ **Date** _____

Soil Impact No. _____ **Weather** _____

Excavation No. _____ **Temperature** _____

Stockpile No. _____ **Subcontractor** _____

Activity Type ☐ Ambient Air ☐ Excavation / Stockpile ☐ Perimeter ☐ Other _____

Equipment Used ☐ PID ☐ FID ☐ CGI ☐ Dust Monitor ☐ Colorimetric ☐ Other _____

Time	X-Coord	Y-Coord	Elevation	Depth	Max Reading

Issues _____

DELPHI SYSTEMS CORP.

CORRECTIVE MEASURES PROPOSAL

APPENDIX D

QUALITY ASSURANCE PROJECT PLAN

QUALITY ASSURANCE PROJECT PLAN
DELPHI CORPORATION
FORMER ANAHEIM BATTERY OPERATION FACILITY
1201 N. MAGNOLIA AVENUE
ANAHEIM, CALIFORNIA

by

Haley & Aldrich, Inc.
Brea, California

for

Delphi Corporation
Kokomo, Indiana

File No. 32486-011
August 2007

5. QUALITY CONTROL ELEMENTS

This section presents QC requirements relevant to analysis of environmental samples that will be followed during the project analytical activities. The purpose of the QC program is to produce data of known quality that satisfy the project objectives and that meet or exceed the requirements of the standard methods of analysis. This program provides a mechanism for ongoing control and evaluation of data quality measurements through the use of QC materials.

5.1 Quality Control Procedures

The chemical data to be collected for this effort will be used to determine that the extent of contamination is properly evaluated. As such, it is critical that the chemical data is documented to be of the highest confidence and quality. Consequently, strict QA/QC procedures will be adhered to. These procedures include:

- Adherence to protocols for field sampling and decontamination procedures;
- Collection and laboratory analysis of appropriate field and equipment blanks to monitor for contamination of samples in the field or the laboratory;
- Collection and laboratory analysis of site specific MS, MSD, and blind duplicate samples to evaluate precision and accuracy; and
- Attainment of completeness goals.

5.1.1 Equipment Decontamination

Non-dedicated equipment will be decontaminated before and after each sample is collected. The equipment will be washed in a non-phosphate detergent and potable water, rinsed in potable water, and then rinsed in distilled water. A description of the specific methodologies to be followed to maximize proper decontamination of non-dedicated sampling equipment is provided in the CMP.

5.1.2 Standards

Standards used for calibration or to prepare samples will be certified by National Institute of Standards and Technology (NIST), EPA, or other equivalent source. The standards will be current. The expiration date will be established by the manufacturer, or based on chemical stability, the possibility of contamination, and environmental and storage conditions. Standards will be labeled with expiration dates, and will reference primary standard sources if applicable. Expired standards will be discarded.

5.1.3 Supplies

Supplies will be inspected prior to their use in the field or laboratory. The descriptions for sample collection and analysis contained in the methods will be used as a guideline for establishing the acceptance criteria for supplies. A current

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1. INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been prepared by Haley & Aldrich, Inc. (Haley & Aldrich) on behalf of Delphi Corporation to address quality assurance (QA) and quality control (QC) policies associated with the collection of environmental data at the Former Anaheim Battery Operation Facility (site) located in Anaheim, California. Together with the Corrective Measures Proposal (CMP), this QAPP presents the plan for assuring the quality of the data analysis as part of the remediation performed under the direction of the California Environmental Protection Agency, Department of Toxic Substance Control (DTSC). U.S. Environmental Protection Agency (EPA) policy requires a QAPP for environmental data collection projects mandated or supported by the EPA through regulations or other formalized means (EPA 1998a). The purpose of this QAPP is to identify the methods to be employed to establish technical accuracy, precision, and validity of data that is generated at the site.

1.1 Overview

The sampling program is formally described in the CMP. 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.

Guidelines followed in the preparation of this QAPP are described in EPA Requirements for Quality Assurance Plans for Environmental Data Operations, External Review Draft Final, EPA QA/R-5 (EPA 1998a) and EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5 (EPA 1998b). Other documents that have been referenced in this plan include Guidance for the Data Quality Objectives Process, EPA QA/G-4 (EPA 1994a) and Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, Third Edition (EPA 1996).

1.2 Project History and Background

The Site is located at 1201 North Magnolia Avenue in the city of Anaheim, Orange County, California (Figures 1 and 2 of the CMP). The Site occupies approximately 22 acres in an area that is primarily commercial/industrial. The Site is bounded by Magnolia Avenue on the east, Knollwood Circle on the west, Highway 91 and Interstate 5 on the north and Woodland Street on the south.

The Site is generally flat with a gentle slope to the west and north although slopes vary locally across the site. A chain link fence extends around the perimeter of the Site.

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. 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.

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). Under DTSC oversight environmental investigations have delineated the extent of impacts from former activities onsite. In addition, a health risk assessment has been performed to establish Site-specific clean up goals that are protective of human health and the environment and that will enable the Site to be returned to beneficial use.

The CACA addresses assessment and clean up of impacts found in some of the thirteen solid waste management units (SWMUs) and 53 Areas of Concern (AOIs) identified during investigations performed for Phase I Environmental Site Assessment (ESA), Current Conditions Report (CCR) and Facility Investigation (FI) performed by Haley and Aldrich and others at the Site. As the required by the CACA issued by DTSC, Delphi is submitting a Corrective Measures Proposal (CMP) to DTSC to describe proposed Site remediation activities. This Quality Assurance Project Plan (QAPP) is a component of the proposed corrective measures outlined in the Site-specific CMP.

2. PROJECT DESCRIPTION

This section presents information concerning the proposed sampling activities, selected analytical parameters, data quality objectives, and the resulting project decisions. The CMP provides specifications for field activities.

2.1 Analytical Scope

The planned sampling effort includes the sampling and analysis of shallow soils poly lead, arsenic, antimony, chromium VI, chlorinated biphenyls (PCBs), SVOCs, VOCs, polycyclic aromatic hydrocarbons (PAHs),. A detailed plan of this investigation is provided in the site-specific CMP, and includes specified numbers and locations of samples to be collected. The CMP also provides specific procedures for sample collection at designated locations. Samples will be collected in accordance with methods presented in the CMP.

Soil samples will be analyzed in the field for the above mentioned analyses and submitted to a stationary California-certified analytical laboratory. Soil samples will be analyzed for the following methods:

- Metals (including lead and arsenic) by EPA Method 6010
- PCBs by EPA Method 8082
- SVOCs by EPA Method 8270C.
- VOCs by EPA Method 8260B.
- PAHs by EPA Method 8310.

Also, soil samples will be analyzed for lead using X-Ray Fluorescence (XRF) technology in general accordance with the *DTSC Standard Operating Procedure (SOP) for Metals Determination in Soil By Niton 702 XRF (EPA/DTSC January 14, 1999)*. In addition, approximately 20 percent of the soil samples analyzed for lead concentrations by XRF with concentrations above 200 mg/kg will be analyzed at a stationary laboratory by EPA Method 6010. In addition, one equipment rinsate blank will be collected and submitted daily to a stationary California-certified analytical laboratory for analysis of lead following EPA Test Method 6010.

2.2 Data Use

Decisions to be made based upon the planned sampling and analysis effort will be determined by the data compiled from the sampling and analysis program. It is intended that data collected through implementation of this QAPP will satisfy federal, state, and local data quality requirements. These data may be used to characterize the nature and extent of contamination, support risk assessment, support the evaluation of corrective/remedial action, and/or assist in determination of additional actions.

The presence of environmental contaminants will be determined by the extent of valid detectable concentrations of the constituents identified in Section 2.1. If the data associated with any detections of chemicals of potential concern (COPCs) are confirmed, the data will be used to assess risk using accepted methods for determining potential carcinogenic and non-carcinogenic exposures. If results from the risk screening evaluations indicate no risks of exposure with respect to the use of the property, then Delphi will use the data to support No Further Action consent from DTSC, and the proposed development may continue without modification. If the evaluation indicates unacceptable risks of exposure, then the data can be used by Delphi for further consideration of action.

3. PROJECT ORGANIZATION

This section provides a description of the organizational structure and responsibilities of the individual roles for this project. This description defines the lines of communication and identifies key personnel assigned to various activities for the project.

3.1 Regulatory Agency

Mr. John Geroch of the DTSC will act as representative for regulatory oversight for the project. Mr. Geroch's responsibilities will include the review and approval of work activities for the project. Mr. Geroch will provide direction of DTSC policy and environmental objectives.

3.2 Delphi Corporation

Mr. Tim Renner is the Contact Person designated by Delphi. Mr. Renner will be responsible for the directional decisions, as well as budget control, and for work conducted at the site. Mr. Renner or his designee, may perform document review of related workplans, reports, and drawings for activities associated with this project.

3.3 Haley & Aldrich

The investigation contractor has responsibility for assigned phases of investigation and reporting. Together the management team (Project Manager and Field Manager), will be responsible for the technical planning and implementation of the work prescribed in the site-specific CMP. The QA staff has responsibility for effective planning, verification and management of QA activities associated with the assigned project.

Mr. Tom Tatnall is the Haley & Aldrich Project Manager and Professional Geologist and will serve as the primary contact with the DTSC and Delphi. His responsibilities include strategy development, budget control, document control, project management, risk assessment, and document review.

The Haley & Aldrich Field Geologist/Field Managers. Their responsibilities include field activities, oversight, confirmation sample collection and preservation, preparation of required reports and data validation including quality assurance/quality control.

3.4 Laboratory

The offsite stationary laboratory that will conduct soil sample analysis of the above mentioned analyses will be a State-certified laboratory such as American Environmental Testing Laboratory in Burbank, California or another State-certified laboratory. Samples collected for PM10 analysis will also analyzed by a State-certified laboratory. The onsite XRF analysis will be performed by a qualified XRF team. The respective laboratory's project manager will report to the Haley & Aldrich Project Manager and the laboratory manager will advise the Haley & Aldrich Project Manager of any matters related to data quality during the course of the project.

4. DATA QUALITY OBJECTIVES

DQOs have been specified for each data collection activity. The project work will be conducted and documented so that the data collected are of sufficient quality for their intended use (EPA 1998). DQOs specify the data type, quality, quantity, and uses needed to make decisions, and are the basis for designing data collection activities. The DQOs have been used to design the data collection activities presented in the CMP. The DQOs for the project are discussed in the following sections.

4.1 Data Quality Objective Process

The project DQOs developed specifically for the planned sampling and analysis program have been determined based on EPA's seven-step DQO process (EPA 1994a). The Project Manager will evaluate the DQOs to determine if the quantitative and qualitative needs of the sampling and analysis program have been met. The project definition associated with each step of the DQO process can be summarized as follows:

State the problem: The purpose of the sampling program is to determine if the site is acceptable for the development of a commercial / industrial facility. Although the proposed development of the site will result in asphalt or concrete surfacing over the majority of the site, unpaved areas may exist in landscaped areas where site occupants could come into contact with soil.

Identify the Decision: The data obtained from the sampling and analytical activities will be used to evaluate if releases of hazardous substances from historical uses may pose a significant health risk to future site occupants. The results will be compiled and used to assess the relative threat associated with any contamination identified, through screening level risk evaluations. Based on the calculation of human health and ecological risks for the site, the suitability of the property for its intended development will be determined.

Identify Inputs to the Decision: Inputs to the decision will include results of analytical testing of soil gas and shallow soils from selected locations on the site. Soil gas and soil samples will be analyzed as necessary for the specified chemicals identified in Section 2 above.

Define the Study Boundaries: The boundaries of the field sampling and analysis program will be the perimeter of the site as discussed above and detailed in the CMP.

Develop a Decision Rule: Decisions will be based upon laboratory results for the target constituents presented in Tables 1 through 3. If no valid detectable concentrations of target compounds are reported for the given samples, then a decision will be made that the site area is adequately remediated with respect to the compounds tested and no further sampling will be required as part of this CMP. If target constituents are detected in the samples tested, then the data will be compiled for use in calculating the human health and ecological risk of exposure. If the results of the risk evaluation are acceptable they will be used by Delphi to support obtaining No Further Action consent from DTSC.

Specify Limits on Decision Error: The results of all analytical testing will be subjected to data validation specified in Section 8.3. Data are determined to be valid if the specified

DQOs for precision, accuracy, representativeness, comparability and completeness are achieved. The results of any detected target constituents will be considered in evaluating the need for additional sampling of site soil and/or soil gas (as applicable), and assessing the necessity for reducing any risks posed by the potential contamination.

Optimize the Design: The field sampling program has been designed to provide the type and quantity of data needed to satisfy each of the aforementioned objectives. The CMP provides the specifications for the data collection activities, including the numbers of samples, respective locations, and sampling techniques. The quality of the data will be assessed through the procedures further described in this QAPP.

4.2 Precision, Accuracy, Representativeness, Comparability and Completeness

The basis for assessing the elements of data quality is discussed in the following subsections. In the absence of laboratory specific precision and accuracy limits, the QC limits listed in this section must be met.

4.2.1 Precision

Precision measures the reproducibility of repetitive measurements. It is strictly defined as the degree of mutual agreement among independent measurements as the result of repeated application of the sample process under similar conditions.

Analytical precision is a measurement of the variability associated with duplicate or replicate analyses of the same sample in the laboratory. Precision is assessed by analysis of the results between laboratory quality control sample pairs. These include laboratory control sample (LCS) and LCS duplicates, matrix spike (MS) and MS duplicates (MSD), or sample duplicates (as applicable). If the recoveries of analytes in the specified control samples pairs are comparable within established control limits, then precision criteria are satisfied. Refer to Table 3 for acceptable limits.

Total precision is a measurement of the variability associated with the entire sampling and analytical process. It is determined by analysis of duplicate (two) or replicate (more than two) field samples, and measures variability introduced by both the laboratory and field operations. Field duplicate samples are analyzed to assess combined field and analytical precision.

Duplicate results are assessed using the relative percent difference (RPD) between duplicate measurements. If the RPD for laboratory quality control samples exceeds 30 percent, data will be qualified as described in the applicable validation procedure. If the RPD between primary and duplicate field samples exceeds 100 percent for soil and/or soil gas (as applicable), data will be qualified as described in the applicable validation procedure. The RPD is calculated as the difference between the two sample results (absolute value) divided by the average of the two sample results. The equation can be expressed as follows:

$$\%RPD = 200 \times ((x_2 - x_1) / (x_2 + x_1))$$

4.2.2 Accuracy

Accuracy is a statistical measurement of correctness of a measured value, and includes components of random error (variability due to imprecision) and systematic error. It reflects the total error associated with a measurement. A measurement is accurate when the value reported does not differ from the true value of a known concentration, spike, or standard.

Accuracy of laboratory analyses will be assessed by LCS recoveries, surrogate standard recoveries, matrix spike recoveries, and initial and continuing calibrations of instruments. Laboratory accuracy is expressed as the percent recovery (%R). Accuracy limits are statistically generated by the laboratory or required by specified EPA methods. If the percent recovery is determined to be outside of acceptance criteria, data will be qualified as described in the applicable validation procedure. The calculation of percent recovery is provided below:

$$\% R = 100 \times (X_s - X)/T$$

where X_s is the measured value of the spiked sample, X is the measured value of the unspiked sample, and T is the true value of the spike solution added.

Accuracy is also assessed by the analysis of laboratory and field blanks. Assessment of blank results provides information regarding potential bias imparted to analytical results from measurement systems and/or field conditions. Field accuracy will be assessed through the analysis of field equipment blanks. Analysis of field blanks documents bias associated with the sampling process, field contamination, sample preservation, and sample handling. The DQO for field equipment and trip blanks is that each value is less than the reporting limit for each target constituent. If contamination is reported in the field equipment or trip blanks, data will be qualified as described in the applicable validation procedure.

4.2.3 Representativeness

Representativeness is the degree to which data accurately and precisely represent selected characteristics of the media sampled. Representativeness of data collection is addressed by careful preparation of sampling and analysis programs. This QAPP, together with the CMP, address representativeness by specifying sufficient numbers and locations of samples; incorporating appropriate sampling methodologies; specifying proper sample collection techniques and decontamination procedures; selecting appropriate laboratory methods to prepare and analyze soil and/or soil gas (as applicable); and establishing proper field and laboratory QA/QC procedures.

4.2.4 Completeness

Completeness is the measure of valid data obtained compared to the amount that was expected under ideal conditions. The number of valid results divided by the number of possible results, expressed as a percentage, determines the completeness of the data set. The objective for completeness is to obtain at least 90 percent of the planned data to support evaluation and assessment efforts. The formula for calculation of completeness is presented, as follows:

$$\% \text{ Completeness} = 100 \times \frac{\textit{number of valid results}}{\textit{number of expected results}}$$

4.2.5 Comparability

Comparability is an expression of confidence with which one data set can be compared to another. The objective of comparability is to ensure that data developed during the investigation are comparable with data previously collected (i.e., methods of analysis are comparable), and that the methods used adequately address applicable criteria or standards established by the EPA and California Department of Health Services (CADHS). This QAPP addresses comparability by specifying laboratory methods that are consistent with the current standards of practice as approved by the EPA and CADHS. Field methods are discussed in the CMP.

inventory and appropriate storage system for these materials will assure their integrity prior to use.

5.1.4 Holding Time Compliance

Sample preparation and analysis will be completed within the required method holding times (Table 1). Holding time begins at the time of sample collection. If holding times are exceeded, and the analyses are performed, the associated results will be qualified as described in the applicable validation procedure. The following definitions of extraction and analysis compliance are used to assess holding times:

- Preparation or extraction completion - completion of the sample preparation process as described in the applicable method, prior to any necessary extract cleanup.

- Analysis completion - completion of the analytical runs, including dilutions, second-column confirmations, and any required re-analyses.

5.1.5 Preventative Maintenance

The Field Manager for Haley & Aldrich is responsible for documenting the maintenance of the field equipment prescribed in the manufacturer's specifications. Scheduled maintenance will be performed by trained personnel. Procedures specific to the calibration, use and maintenance of field equipment are presented in the CMP. The analytical laboratory is responsible for analytical equipment calibration and maintenance as described in their laboratory QA Plan. Subcontractors are responsible for maintenance of the equipment needed to carry out subcontracted duties.

5.2 Quality Assurance and Quality Control (QA/QC) Samples

The purpose of this QA/QC program is to produce data of known quality that satisfy the project objectives and that meet or exceed the requirements of the standard methods of analysis. This program provides a mechanism for ongoing control and evaluation of data quality measurements through the use of QC materials. Quality assurance and quality control samples will be collected as part of the overall QA/QC program. The QA/QC procedures for the field XRF technology will be performed in general accordance with the *DTSC Standard Operating Procedure (SOP) for Metals Determination in Soil By Niton 702 XRF).*

5.2.1 Laboratory Reagent Blanks

A laboratory reagent blank is de-ionized/distilled water that is extracted by the laboratory and analyzed as a sample. Analysis of the reagent blank indicates potential sources of contamination from laboratory procedures (e.g., contaminated reagents, improperly cleaned laboratory equipment, or persistent contamination due to presence of compounds in the ambient laboratory air). A reagent blank will be analyzed at least once each day for each method utilized by the laboratory for that day.

5.2.2 Field Equipment Blanks

A field equipment blank is a sample that is prepared in the field by pouring de-ionized/distilled water into cleaned sampling equipment. The water is then collected and analyzed as a sample. Field equipment blanks are typically blind (given a fictitious name so that the laboratory will not recognize it as a blank). The field equipment blank gives an indication of contamination from field procedures (e.g., improperly cleaned sampling equipment, cross-contamination). Field equipment blanks will be collected at a minimum frequency of at least one per day when non-dedicated equipment is utilized. The field equipment blanks should be analyzed using the same analyses requested for the associated primary samples collected. For field equipment blanks collected for XRF analyses, the collection and testing procedure will follow DTSC guidelines as presented in the *Interim Guidance for Evaluating Lead-Based Paint and Asbestos-Containing Materials at Proposed School Sites* (DTSC 2001) and Standard *Operating Procedures (SOP) for Metals Determination in Soil By Niton XRF (EPA/DTSC January 14, 1999)*.

5.2.3 Trip Blanks

The primary purpose of trip blanks is to detect potential additional sources of contamination that could potentially influence contaminant values reported in field samples, both quantitatively and qualitatively. Trip blanks serve as a mechanism of control for sample bottle preparation, blank water quality and sample handling. They are generally submitted to the laboratory for analysis of soil or water samples for VOCs.

5.2.4 Matrix Spike Samples

Matrix spikes are performed by the analytical laboratory to evaluate the efficiency of the sample extraction and analysis procedures, and are necessary because matrix interference (interferences from non-target compound in the sample matrix, water or soil) may have a widely varying impact on the accuracy and precision of the extraction analysis. The MS prepared by the addition of known quantities of target compounds to a sample. The sample is extracted and analyzed. The results of the analysis are compared with the known additions and an MS recovery is calculated giving an evaluation of the accuracy of the extraction and analysis procedures. Matrix spike recoveries are reviewed to check that they are within acceptable range. However, the acceptable ranges vary widely with both sample matrix and analytical method. Matrix spikes and MSD will be analyzed by the laboratory at a frequency of at least one per twenty, or 5 percent of the primary field samples. Typically, MS are performed in duplicate in order to evaluate the precision of the procedures as well as the accuracy. Precision objectives (represented by agreement between MS and MSD recoveries) and accuracy objectives (represented by MS recovery results) are based on statistically generated limits established annually by the analytical laboratory. It is important to note that these objectives are to be viewed as goals, not as criteria. If matrix bias is suspected, the associated data will be qualified and the direction of the bias indicated in the data validation report. Refer to Table 3 for proposed limits.

5.2.5 Field Duplicate Samples

Field duplicate samples will be collected and analyzed to evaluate sampling and analytical precision. Field duplicates are collected and analyzed in the same manner as the primary samples. Agreement between duplicate sample results will indicate good sampling and analytical precision. Specific locations will be designated for collection of field duplicates prior to the start of field activities. Field duplicates will be collected at a frequency of 10 percent of the primary soil samples collected, and at a frequency of at least one per day for soil gas samples. The duplicate sample will be analyzed for the laboratory analyses requested for the primary sample collected. The precision goal for field duplicates analyses will be plus or minus 50 percent relative percent difference for aqueous samples and plus or minus 100 percent relative percent difference for soil, or air samples. Results for samples exceeding these goals will be qualified as estimated. Professional judgment will be used to determine if all samples in the associated batch will be qualified as well.

5.2.6 Performance Evaluation Samples

Double blind performance evaluation (PE) samples may be submitted to the analytical laboratory during any site investigation. These samples may be of water or soil matrix, and are used to assess the accuracy of analytical procedures employed for a given sample set. PE samples will be used if questionable data quality is suspected as determined during laboratory audits or data validation.

Double blind PE samples will be prepared using NIST and/or A2LA certified standards. The project-specific PE samples will contain known concentrations of the analytes of interest. Laboratory results will be evaluated against the original Certificates of Analyses for precision and accuracy. PE samples may be submitted for analysis as part of the laboratory quality review process, or as part of quality assurance for a given sampling event. Results will be reported to the laboratory and presented with associated field sample results.

6. SAMPLING PROCEDURES

The defensibility of data is dependent on the use of well defined, accepted sampling procedures. This section describes the sampling and handling procedures that will be followed for each sampling event.

6.1 Sample Collection Procedures

Collection of high integrity environmental samples is important to the quality of chemical data to be generated. To this end, field procedures have been developed to guide sample collections during each phase of the field investigation. These procedures are contained in the CMP.

6.2 XRF Sample Collection Procedures

Samples are collected and analyzed in the field for lead utilizing a portable X-Ray Fluorescence Spectrum Analyzer (XRF) unit (Niton Models 702 or 703) in a manner consistent with the requirements of the California Department of Toxic Substances Control's (DTSC) I*nterim Guidance for Evaluating Lead-Based Paint and Asbestos - Containing Materials At Proposed School Sites* dated July 23, 2001 (DTSC Interim Guidance) and the *DTSC Standard Operating Procedure for Metals Determination in Soil by Niton 702 XRF*, dated January 14, 1999 (DTSC SOP). The DTSC SOP parallels EPA Method 6200 in many aspects. Additionally, select soil samples and approximately 20 percent field duplicate samples are generally submitted to an offsite laboratory for confirmatory analysis for lead by EPA Method 6010B.

Soil sampling is conducted using a direct-push sampling device equipped with a 1-inch diameter core, if necessary, hand trowels, shovels or direct sampling with container. Typically samples from less than one foot are collected manually. If samples deeper than one foot are necessary then either a hand auger or direct-push device may be utilized. The push-probe system is driven to sample depth by a percussion hammer. As the core barrel is advanced, soil is driven into an inner acetate sleeve. Each push interval of up to four feet is sampled continuously. After being driven the required distance, the sample barrel is withdrawn and the acetate sleeve containing the soil is removed from the sample barrel. Soil samples are collected from target zones and are typically 3-inches long. The 3-inch interval of soil is homogenized and transferred into a Chemplex XRF Soil Sampling Cup for field analysis with the XRF.

6.3 Sample Containers, Preservation and Holding Times

Table 1 lists the required sample containers and recommended maximum holding times for samples. Sample containers provided by the laboratory will be new, and purchased commercially from I-Chem, Eagle Pitcher, or other equivalent validated sources.

Soil gas samples (if collected) will be collected in glass syringe or as gas-tight canister (Summa canister).

6.4 Sample Handling and Storage

In the field, each sample container will be marked with the sampling location number, and date and time of sample collection. The sample containers will be securely packed, in a cooler on ice, in preparation for delivery to the laboratory. Soil gas samples collected in syringes will be analyzed onsite by a mobile laboratory.

Upon receipt of the samples, the laboratory will immediately notify the Field Manager if conditions or problems are identified which require immediate resolution. Such conditions include container breakage, missing or improper chain-of-custody, exceeded holding times, improper preservation, missing or illegible sample labeling, or temperature excursions.

6.5 Sample Custody

For each sample that is submitted to the laboratory for analysis, an entry will be made on a chain-of-custody form supplied by the laboratory. The information to be recorded includes the sampling date and time, sample identification number, matrix type, requested analyses and methods, preservatives, and the sampler's name. Sampling team members will maintain custody of the samples until they are relinquished to laboratory personnel or a professional courier service. The chain-of-custody form will accompany the samples from the time of collection until received by the laboratory. Each party in possession of the samples (except the professional courier service) will sign the chain-of-custody form signifying receipt. The chain-of-custody form will be placed in a plastic bag and shipped with samples inside the cooler. After the samples, ice, and chain-of-custody forms are packed in the coolers, the cooler will be appropriately sealed before it is relinquished to the courier. A copy of the original completed form will be provided by the laboratory along with the report of results. Upon receipt, the laboratory will inspect the condition of the sample containers and report the information on chain-of-custody or similar form.

7. ANALYTICAL PROCEDURES

The analytical methods used for this project are primarily EPA approved methods and are listed in Tables 1 through 3. Specific analytical method procedures are detailed in the laboratory QA Plan and standard operating procedures (SOPs) of the selected laboratory. These documents may be reviewed by Haley & Aldrich quality assurance staff during laboratory audits to ensure that project specifications are met. Laboratory audits are discussed in Section 9.2.

7.1 Internal Standards

Internal standards are measured amounts of method-specified compounds added after preparation, or extraction, of a sample. Internal standards are added to samples, controls, and blanks in accordance with method requirements to identify column injection losses, purging losses, or viscosity effects.

Acceptance limits for internal standard recoveries are set forth in the applicable method. If the internal standard recovery falls outside of acceptance criteria, the instrument will be checked for malfunction and reanalysis of the sample will be performed after any problems are resolved.

7.2 Retention Time Windows

Retention time windows will be established as described in SW-846 Method 8000A for applicable analyses of organic compounds. Retention time windows are used for qualitative identification of analytes and are calculated based on multiple, replicated analyses of a respective standard. Retention time windows are not used for inorganic analyses.

Retention times will be checked on a daily basis. Acceptance criteria for retention time windows are established in the referenced method. If the retention time falls outside the respective window, actions will be taken to correct the problem. The instrument must be re-calibrated after any retention time window failure and the affected samples must be reanalyzed.

7.3 Method Detection Limits

The method detection limit (MDL) is the minimum concentration of an analyte, or compound, that can be measured and reported with 99 percent confidence that the concentration is greater than zero. MDLs are established for each method, matrix and analyte, and for each instrument used to analyze project samples. MDLs are derived using the procedures described in 40CFR 136 Appendix B (EPA 1990a). MDLs must be less than applicable reporting limits for each target analyte presented in Table 2.

7.4 Instrument Calibration

Analytical instruments will be calibrated in accordance with the procedures specified in the applicable method. The analytes that are reported shall be present in the initial and continuing calibrations, and these calibrations must meet the acceptance criteria specified in the reference method. Records of standard preparation and instrument calibration will be maintained. Records shall unambiguously trace the preparation of standards and their use in calibration and quantitation of sample results. Calibration records will be traceable to standard materials as described in Section 5.2.

At the onset of analysis, instrument calibrations will be checked using all of the analytes of interest. This applies equally to multi-response analytes. At a minimum, calibration criteria will satisfy method requirements. Analyte concentrations can be determined with either calibration curves or response factors, as defined in the method. Guidance provided in SW-846 should be considered to determine appropriate evaluation procedures.

7.5 XRF Calibration and Standards

Prior to analyzing samples, the calibration of the XRF is verified using at least three standards supplied by the National Institute of Standards and Technology (NIST). A listing of the concentrations of lead (Pb) in these standards, and acceptable ranges, as read by the XRF, is presented in Table 1. In addition "check standards", provided by a local laboratory, or prepared from materials relatively well characterized with respect to the concentrations of Pb, or other metal(s) of interest, may be run to verify the instrument is operating correctly at a given concentration or matrix of interest. To confirm that the instrument, and/or the sample preparation system is not contaminated, a blank prepared by the manufacturer, or from materials known to have concentrations of Pb, or other metals of interest, below the detection limit (BDL), are also run.

After every 10th sample, the middle range NIST standard along with one or more check standards and the blank are run with at least one duplicate sample to access both the accuracy and precision on an ongoing basis. To be acceptable, the results from the mid range NIST standard and check samples must be within 20% of expected values and duplicates must be within 30%.

	Table 1	
NIST Standards	Concentration Pb in ppm	Acceptable Range
2709 Low	18.9	27 to 15.00 (or BDL)
2711 Mid	1162	1394 to 930
2710 High	5532	6638 to 4426

7.6 XRF Quality Assurance Analysis

To verify results of the XRF analyses approximately 20 percent of the soil samples analyzed by XRF for lead with concentrations greater than 200 mg/kg will split after homogenization and submitted to a stationary California-certified analytical laboratory for analysis of lead by EPA Test Method 6010. In addition, one equipment rinsate blank will be collected and submitted daily to a stationary California-certified analytical laboratory for analysis of lead following EPA Test Method 6010.

8. DATA REPORTING

This section presents reporting requirements relevant to the data produced during the project analytical activities.

8.1 Field Data

Data measured by field instruments will be recorded in field notebooks, laptops, and/or on required field forms. Units of measure for field analyses are identified on the field forms. The field data will be reviewed by the Project or Field Manager to evaluate completeness of the field records and appropriateness of the field methods employed. The field records will be retained in the project files.

8.2 Laboratory Data

Analytical data will contain the necessary sample results and quality control data to evaluate the data quality objectives defined for the project. Documentation requirements for laboratory data are defined in EPA Region IX Laboratory Documentation Requirements for Data Validation (EPA 1990b). The laboratory reports will include the following data and summary forms:

- Narrative, cross-reference, chain of custody, and method references;
- Analytical results;
- Surrogate recoveries (as applicable for organic analyses only);
- Calibration summary;
- Blank results;
- Laboratory control sample recoveries; and
- Duplicate sample results or duplicate spike recoveries.

Data validation criteria are derived from the EPA *Contract Laboratory Program National Functional Guidelines for Organic and Inorganic Data Review* (EPA 2004). The Functional Guidelines provide specific data validation criteria that can be applied to data generated for this investigation.

The laboratory data will be reviewed for compliance with the applicable method and the quality of the data reported as applicable to the analytical method. The following summarizes the areas which may be used for data validation.

- Holding Times;
- Calibrations;
- Blanks;
- Laboratory Control Samples;

- Matrix Spike/Matrix Spike Duplicates (as applicable);
- Surrogates/Internal Standards (as applicable);
- Field Quality Control Samples; and
- Compound Identification and Quantification.

In addition, the following additional comprehensive QA/QC criteria may be provided:

- Field blanks (as applicable);
- Trip blanks (as applicable); and/or
- Electronic data deliverables.

Temperature blanks are not necessary as temperature of the sample container contents will be recorded upon receipt of the laboratory using a digital thermometer.

The application of data validation criteria is a function of project-specific DQOs. The Project Manager will determine if the data quality objectives for the analytical data have been met. Results of the data validation review will be documented and summarized in the Implementation Report.

8.3 Procedures for Data Validation

Procedures for performing data validation for the types of analyses to be performed for this investigation are documented in the *National Functional Guidelines*. Data validation will be documented in a manner consistent with the functional guidelines. The results of the data validation will be included in the Implementation Report. This documentation will be maintained by Haley & Aldrich in the project files.

8.4 Data Qualifiers

The data validation procedures were designed to review each data set and identify biases inherent to the data and determine its usefulness. Data validation flags are applied to those sample results that fall outside of specified tolerance limits, and, therefore, did not meet the program's quality assurance objectives described in Section 4.2. Data validation flags to be used for this project are defined in the *National Functional Guidelines*. Data validation flags will indicate if results are considered quantitative, estimated, or rejected. Only rejected data are considered unusable for decision-making purposes; however, other qualified data may require further verification.

8.5 Project Data Management

Data management is the process of organizing, maintaining, and applying a variety of data to provide a useful and coherent view of the site conditions. Data collected for this CMP include sample collection data, field measurement data, onsite laboratory analytical data, and offsite laboratory analytical data. The data management resources include staff to review and maintain project data, a computerized data management system, and a documentation filing

system. The project database management system has the capability to maintain the relationship between sampling locations, samples collected, and filed and laboratory analytical results.

9. PERFORMANCE AND SYSTEM AUDITS

Audit programs are established and directed by the Haley & Aldrich staff to ensure that field and laboratory activities are performed in compliance with project controlling documents. This section describes responsibilities, requirements and methods for scheduling, conducting and documenting audits of field and laboratory activities.

9.1 Field Audits

Field audits, if conducted, will focus on appropriateness of personnel assignments and expertise, availability of field equipment, adherence to project controlling documents for sample collection and identification, sample handling and transport, use of QA samples, chain of custody procedures, equipment decontamination and documentation. Field audits are not required, but may be performed in the event significant discrepancies are identified that warrant evaluation of field practices.

9.2 Laboratory Audits

Laboratory audits, if conducted, will include reviews of sample handling procedures, internal sample tracking, SOPs, analytical data documentation, QA/QC protocols, and data reporting. Any selected mobile or offsite laboratory will be licensed by the State of California as a certified testing laboratory.

9.3 Data Audits

Data audits will be performed on analytical results received from the laboratories. These audits will be accomplished through the process of data validation as described in Section 8.3, or may involve a more detailed review of laboratory analytical results. Data audits require the laboratory to provide complete raw data files for validation. Validation will be conducted as described in the *National Functional Guidelines* (EPA 2004). This level of validation consists of a detailed review of sample data, including verification of data calculations for calibration and quality control samples to assess if these data are consistent with method requirements.

9.4 Reports to Management and Responsibilities

Upon completion of any audit, the auditor will submit to the Project Manager and Field Manager a report or memorandum describing any problems or deficiencies identified during the audit. It is the responsibility of the Project Manager to determine if the deviations will result in any adverse effect on the project conclusions. If it is determined that corrective action is necessary, procedures outlined in Section 9.5 will be followed.

9.5 Corrective Action

Corrective actions will be initiated whenever data quality indicators suggest that DQOs have not been met. Corrective actions will begin with identifying the source of the problem. Potential problem sources include failure to adhere to method procedures, improper data reduction, equipment malfunctions, or systemic contamination. The first level of responsibility for identifying the problems and initiating corrective action lies with the analyst/field personnel. The second level of responsibility lies with any person reviewing the data. Corrective actions may include more intensive staff training, equipment repair followed by a more intensive preventive maintenance program, or removal of the source of systemic contamination. Once resolved, the corrective action procedure will be fully documented, and if DQOs were not met, the samples in question must be recollected and/or reanalyzed utilizing a properly functioning system (EPA 1998).

REFERENCES

1. *DTSC Standard Operating Procedure (SOP) for Metals Determination in Soil By Niton 702 XRF (EPA/DTSC January 14, 1999)*.

2. DTSC I*nterim Guidance for Evaluating Lead-Based Paint and Asbestos - Containing Materials At Proposed School Sites* dated July 23, 2001

3. EPA, 1990a. Code of Federal Regulations, Title 40 – Protection of Environment. Office of the Federal Register. U.S. National Archives and Records Administration, Washington, D.C.

4. EPA, 1990b. Region 9 Laboratory Documentation Requirements for Data Validation. Document Control No. 9QA-07-90. U.S. Environmental Protection Agency, Region 9. San Francisco, California.

5. EPA, 1994a. Guidance for the Data Quality Objectives Process. EPA QA/G-4. Office of Research and Development U.S. Environmental Protection Agency. Washington, D.C.

6. EPA, 1994b. Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. EPA540/R-94/013. Office of Emergency and Remedial Response. Washington, D.C.

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8. EPA, 1996. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods. SW-846, Third Edition, Office of Solid Waste and Emergency Response U.S. Environmental Protection Agency. Washington, D.C.

9. EPA, 1998a. EPA Guidance for Quality Assurance Project Plans. EPA QA/G-5. Office of Research and Development U.S. Environmental Protection Agency. Washington, D.C.

10. EPA, 1998b. EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations, External Review Draft Final. EPA QA/R-5. Washington, D.C

11. *EPA, 2004. Contract Laboratory Program National Functional Guidelines for Organic and Inorganic Data Review*. Washington, D.C.

Table 1
Sample Containers, Preservatives, and Holding Times
Delphi Corporation
Former Anaheim Battery Operations Facility
1201 N. Magnolia Avenue
Anaheim, California

Analyte	Method	Container -Soil	Container-Water	Holding Time
SOIL ANALYSES				
Polychlorinated Biphenyls	EPA 8082A	8 oz glass or sleeve	1,000-ml Amber Glass Bottle	Extraction within 14 days for soil / 7 days for water, 40 days to analysis
Title 22 Metals	EPA 6010B	8 oz glass or sleeve	250 ml poly	180 days
Total Petroleum Hydrocarbons	EPA 8015M-ext	8 oz glass or sleeve	1,000-ml Amber Glass Bottle	14 days
Volatile Organic Compounds	EPA 8260B	Syringe or Summa cannister	40-ml VOA Vials	14 days
Semi-Volatile Organic Compounds	EPA 8270B	8 oz glass or sleeve	1,000-ml Amber Glass Bottle	14 days soil / 7 days for water
Polynuclear Aromatic Hydrocarbons (PAHS)	EPA 8310	8 oz glass or sleeve	1,000-ml Amber Glass Bottle	Extraction within 14 days for soil / 7 days for water, 40 days to analysis

Table 2
List of Method Compounds and Reporting Limits
Soil and Water Analyses
Delphi Corporation
Former Anaheim Battery Operations Facility
1201 N. Magnolia Avenue
Anaheim, California

Title 22 Metals			
Method	Compound	Soil Reporting Limit mg/kg	Water Reporting Limit mg/l
EPA 7471A	Mercury	0.1	0.20
EPA 6020	Antimony	2.0	0.0050
	Arsenic	1.0	0.010
	Barium	1.0	0.0030
	Beryllium	1.0	0.0030
	Cadmium	1.0	0.0030
	Chromium	1.0	0.0030
	Cobalt	1.0	0.0030
	Copper	2.0	0.0050
	Lead	1.0	0.0050
	Nickel	1.0	0.0050
	Molybdenum	1.0	0.0050
	Selenium	1.0	0.010
	Silver	1.0	0.0030
	Thallium	1.0	0.015
	Vanadium	1.0	0.0030
	Zinc	1.0	0.010

Organochlorine Pesticides			
Method	Compound	Soil Reporting Limit ug/kg	Water Reporting Limit ug/l
EPA 8081A	Alpha-BHC	5	0.025
	Beta-BHC	5	0.025
	Delta-BHC	5	0.025
	Gamma-BHC	5	0.025
	Heptachlor	5	0.025
	Aldrin	5	0.025
	Heptachlor Epoxide	5	0.025
	Endosulfan I	5	0.025
	Dieldrin	5	0.05
	4,4'-DDE	5	0.05
	4,4'-DDD	5	0.05
	Endrin	5	0.05
	Endosulfan II	5	0.05
	Endosulfan Sulfate	5	0.05
	4,4'-DDT	5	0.05
	Methoxychlor	5	0.25
	Endrin Ketone	5	0.05
	Endrin Aldehyde	5	0.05
	Chlordane	50	0.25
	Toxaphene	100	2.5

Volatile Organic Compounds			
Method	Compound	Soil Reporting Limit ug/kg	Water Reporting Limit ug/l
EPA 8260B	1,1,1-Trichloroethane	5	1
	1,1,2,2-Tetrachloroethane	5	1
	1,1-Dichloroethane	5	1
	1,1-Dichloroethene	5	1
	1,2-Dibromo-3-chloropropane	50	10
	1,2-Dichlorobenzene	5	1
	1,2-Dichloroethane	5	1
	1,2-Dichloropropane	5	1
	1,3-Dichlorobenzene	5	1
	1,4-Dichlorobenzene	5	1
	2-Butanone (MEK)	50	10
	2-Hexanone	50	10

Table 2
List of Method Compounds and Reporting Limits
Soil and Water Analyses
Delphi Corporation
Former Anaheim Battery Operations Facility
1201 N. Magnolia Avenue
Anaheim, California

Volatile Organic Compounds			
	4-Methyl-2-pentanone	50	10
	Acetone	50	10
	Benzene	5	1
	Bromochloromethane	5	1
	Bromodichloromethane	5	1
	Bromoform	5	1
	Bromomethane	5	1
	Carbon Disulfide	50	10
	Carbon Tetrachloride	5	1
	Chlorobenzene	5	1
	Chloroethane	5	1
	Chloroform	5	1
	Chloromethane	5	1
	cis-1,2-Dichloroethene	5	1
	cis-1,3-Dichloropropene	5	1
	Dichlorodifluoromethane	5	1
	Ethylbenzene	5	1
	Methylene chloride	50	10
	Methyl-tert-butyl ether	5	1
	Naphthalene	50	10
	Styrene	5	1
	Tetrachloroethene	5	1
	Toluene	5	1
	Total Xylenes2	5	1
	trans-1,2-Dichloroethene	5	1
	trans-1,3-Dichloropropene1	5	1
	Trichloroethene	5	1
	Trichlorofluoromethane	50	10
	Vinyl chloride	5	0.5

Total Petroleum Hydrocarbons			
Method	Compound	Soil Reporting Limit mg/kg	Water Reporting Limit mg/l
EPA 8015 Modified	C7 through C36	5	1

Polynuclear Aromatic Hydrocarbons			
Method	Compound	Soil Reporting Limit ug/kg	Water Reporting Limit ug/l
EPA 8310	Acenaphthene	50	1.0
	Acenaphthylene	50	1.0
	Anthracene	50	0.050
	Benzo (a) Anthracene	50	0.050
	Benzo (a) Pyrene	50	0.050
	Benzo (b) Fluoranthene	50	0.10
	Benzo (g,h,i) Perylene	50	0.10
	Benzo (k) Fluoranthene	50	0.50
	Chrysene	50	0.20
	Fluoranthene	50	0.10
	Fluorene	50	0.10
	Indeno (1,2,3-c,d) Pyrene	50	0.10
	Naphthalene	50	0.5
	Phenanthrene	50	0.10
	Pyrene	50	0.10

DELPHI SYSTEMS CORP.

CORRECTIVE MEASURES PROPOSAL

APPENDIX E

TRANSPORTATION PLAN

TRANSPORTATION PLAN
DELPHI CORPORATION
FORMER ANAHEIM BATTERY FACILITY
ANAHEIM, CALIFORNIA

by

Haley & Aldrich, Inc.
Brea, California

for

Delphi Corporation
Kokomo, Indiana

File No. 32486-011
August 2007

TABLE OF CONTENTS

1. INTRODUCTION

The Transportation Plan describes how concrete and soil removed during the implementation of the excavation phase of the of the Corrective Measures Proposal (CMP) for the Delphi Corporation – Former Anaheim Battery Operations Facility located in Anaheim, California (Delphi), will be managed during transportation to the selected offsite disposal facility. The Transportation Plan was prepared in order to comply with the May 1994 Interim Final Guidance for Preparation of Transportation Plans at Hazardous Substance Release Sites prepared by the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC). The Transportation Plan provides the following information:

- A detailed description and map of route(s) to be followed by trucks transporting waste removed from the site to the offsite treatment facility selected for this project.
- Method(s) to seal trucks after impacted concrete and soil is loaded prior to their departure to minimize the release of dust and vapors during transport.
- A list of emergency service organizations along the route of transport which are to be notified prior to the shipment of hazardous soil/concrete/debris through their area of jurisdiction.
- A description of emergency response capabilities for accidental spillage or air release of dusts and vapors from the transport vehicles, including excavation and monitoring procedures.
- Prerequisites for transportation equipment and personnel to ensure compliance with transportation and safety regulations, and to ensure that personnel have been adequately trained to effectively respond to potential emergencies or accidental spills.
- A contingency plan for transportation personnel that outlines response procedures in the event of injury, exposure to contaminants, or accidental spillage. The contingency plan includes the names, addresses and telephone numbers of Emergency Response Contractors (ERC), ambulance services and hospitals, should their involvement be necessary.

2. BACKGROUND

The Delphi Corporation – Former Anaheim Battery Operations Facility site is located at 1201 North Magnolia Boulevard in the city of Anaheim, Orange County, California (Figure 1 of the CMP). The site occupies approximately 22+ acres in an area that is primarily industrial. The site is bounded by Interstate 5 on the north, North Magnolia Boulevard on the east, and industrial or commercial buildings on the west and south.

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 Facility Investigation 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. 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.

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.

The chemicals of potential concern (COPC) identified during the site-wide investigations included metals (primarily lead, arsenic and antimony), volatile organic compounds (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. 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.

A human health risk assessment (HHRA) was performed at the site 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. Groundwater protection criteria were also derived for the protection of groundwater from further degradation of vadose zone soil impacts. The derived human health risk-based remediation criteria for soil and soil gas and groundwater protection criteria for soil are presented in Table 1 of the CMP.

3. PURPOSE AND OBJECTIVE

Removal Action Objectives (RAOs) have been established for the site to give direction and guidance during the remedial activities. These are:

- Groundwater RAOs: Prevent/minimize contaminant migration from soil to groundwater.

- Surface Water RAOs: Minimize production and migration of contaminants on ground surface or to groundwater. Protect human health and the environment from direct contact through ingestion, inhalation, and dermal adsorption of contaminated surface water. Minimize production and migration of contaminants that would result in sediment concentrations above clean goals.

- Soil RAOs: Prevent 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 production and migration of contaminants from soil to air, surface water, or groundwater. Minimize erosion of contaminated soil by wind or water.

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

The purpose of this transportation plan is to minimize potential health, safety, and environmental risks resulting from the transportation of material and/or equipment during the proposed removal action.

4. CHARACTERISTICS OF WASTE/MATERIAL TO BE TRANSPORTED

The material to be removed and transported from the site will include the following materials:

- The estimated volume of impacted soil to be removed from all excavation proposed is approximately 6,700 cubic yards (yd^3). The soil has metals (lead, arsenic and antimony), PCBs, VOCs, SVOCs, and PAHs at concentrations ranging from non-hazardous to hazardous. The same chemicals have also been detected locally in concrete in former process areas. The proposed concrete and soil removal areas are shown on Figures in the CMP.

- COC-impacted waste debris (personal protective equipment [PPE], plastic lining, miscellaneous trash and debris);

- COC-impacted waste water derived from decontamination activities;

- Waste water from the waste water treatment unit and caustic neutralization materials from former above ground tanks; and

- Miscellaneous trash and debris.

- Remaining Waste Water Treatment unit equipment and any associated wastes will be decommissioned and disposed in accordance with applicable regulations and the DTSC approved closure plan for that unit.

5. DESTINATION OF SOIL AND CONCRETE MATERIAL

A licensed hazardous waste transporter will load and transport an approximate in-place soil volume of 6,700 yd^3 (approximately 10,300 tons) of impacted soil to an appropriate treatment/storage and disposal facility (TSDF). The facility will be properly permitted to accept the type of waste it will be receiving. Material will be disposed of as follows:

- All Extremely Hazardous and TSCA waste types will be disposed at the Kettleman Landfill, a Class I landfill operated by Waste Management or the U.S. Ecology Landfill. The Kettleman landfill information is: 35251 Old Skyline Road, Kettleman City, California 93239 (559) 386-9711. The U.S. Ecology landfill information is Highway 95 S, Beatty, Nevada 89003 (775) 553-2203

- All other Hazardous waste types (RCRA and California hazardous) will be disposed at the Kettleman Landfill, a Class I landfill operated by Waste Management. The landfill information is: 35251 Old Skyline Road, Kettleman City, California 93239 (559) 386-9711

- All Non-Hazardous waste types will be disposed at either the Kettleman landfill or Azusa-BDC Special Waste Services Landfill operated by Waste Management. The Azusa landfill information is: 766 S. Ayon, Azusa, California 91702 (626) 969-1384.

6. TRANSPORTATION MODE

The waste will be transported in end dump trucks by a licensed hazardous waste transporter. The end dump trucks are equipped with 5 axles and capable of transporting approximately 24 tons of soil per load. All trucks are required to be periodically inspected by the California Highway Patrol and every driver performs and records daily safety inspections of their vehicles. Truck dump beds will be covered with tight fitting tarp type covers and securely fastened prior to the trucks leaving the site. Each truck will be issued a waste manifest that must be signed by the receiving facility and returned to document proper disposal and weight.

The assumed daily loading is approximately 25 to50 trucks per day or approximately 1,200 tons per day assuming that each truck is capable of hauling 21-22 tons per trip. Therefore, if 10,300 tons of soil is excavated, it will require approximately 485 truck loads to transport the soil from the site. An estimated 7,600 tons of impacted concrete will be removed and disposed offsite, which will require approximately 345 truck loads. Transportation schedule will likely be over a 60 day period with an estimated 16 to 30 days of trucking depending on the availability of trucks, the landfills daily acceptance capacity, the logistics of removing materials from the site and the final quantities requiring offsite disposal. The number of truckloads will be dependant on the availability of trucks. The gross vehicle weight for the trucks is 80,000 pounds, as specified by the California Department of Transportation (CalTrans). Scales will not likely be utilized, as most new trucks are equipped with gauges on each axle to measure approximate allowable loads. Each truckload will also carry at least a bill of lading, detailing the materials carried, weight, point of departure, and final destination. Streets that could be damaged by the passage of soil- or debris-loaded trucks will be avoided. The condition of streets along designated traffic routes will be examined before soil/concrete removal operations begin and the maximum number of trucks allowed to be hauling off the site will be verified with the City of Anaheim Traffic Engineering Department.

6.1 Transporter and Driver Qualifications

The transporter will be registered with the DTSC and the U.S. Environmental Protection Agency (EPA). The transportation will be registered with the Department of Motor Vehicles (DMV) and will have liability insurance. The transporter will be permitted to operate in the State of California and will have a current hazardous waste certified a driver’s license.

7. TRAFFIC ROUTES

The City of Anaheim Public Works Department issues permits for work activities that impact public right-of-ways or easements. In advance of commencing concrete removal and soil excavation at the site, the Transportation Plan will be submitted to Anaheim Public Works Department, Traffic Division, along with a letter request seeking confirmation that transportation routes described in this plan are acceptable.

Trucks loaded with soil or concrete will exit the project site along Magnolia Avenue then travel north approximately ¼ mile to access State Route 91 directly off of Magnolia Avenue or go1/2 mile north then west on Orangethorpe Avenue for 1/4 mile to enter Interstate 5 Freeway to travel highways to the appropriate landfills mentioned in Section 5 above for disposal. For trucks heading to Kettleman Landfill, they will enter onto Interstate 5 Freeway north for 194 miles and exit State Route 41 and turn left. Travel on SR-41 south for 2.8 miles and turn right at Old Skyline Drive and the landfill is in 1.7 miles. For trucks heading to U.S. Ecology landfill they will enter State Route 91 east for approximately 25 miles to Interstate 15 Freeway north for approximately 120 miles. Trucks will then turn left on CA State Route 127 north for 90 miles and continue on Nevada State Route 373 for 17 miles and turn left on US Highway 95 and arrive at the landfill. Trucks heading to Azusa BDC Special Waste Services Landfill will enter onto Interstate 5 Freeway north for 9 miles and then take Interstate 605 Freeway north for 14 miles. Trucks will exit Live Oak Avenue towards Irwindale and merge onto Live Oak Avenue and continue on Arrow Highway for 1.6 miles. Trucks will turn left on Irwindale Avenue and travel for 0.3 miles, turn right on Ornelas Street and travel for 0.3 miles, and turn right on Ayon Avenue and arrive at the landfill. Empty trucks to be loaded with soil or concrete will be exiting Interstate 5 or State Route 91 onto North Magnolia Avenue and enter the Site at the main entrance on North Magnolia Avenue on the right hand side of the street. This traffic route was selected to minimize the risk for potential exposure to surrounding communities. None of the roadways selected for transport are listed with the California Highway Patrol as prohibited for the hauling of hazardous waste. Additionally, local ordinances or road maintenance activities do not restrict the designated routes. The proposed local traffic route is illustrated on Figure 1.

8. TRAFFIC CONTROL AND LOADING PROCEDURES

In considering potential traffic routes for loaded trucks to leave the site and enter the highway, a number of site soil management practices will be implemented at the excavation and adjacent staging areas to prevent potential nuisance conditions from arising during soil/concrete transportation on public right-of-ways.

8.1 Dust and Odor Control During Transportation

Although dust and odor control is not strictly a traffic issue, it is certainly a major concern for soil transport on public right-of-ways and through the community. If necessary, soils will be moisture conditioned to minimize dust generation before leaving the site. If necessary, a foam agent such as Concover will be applied to eliminate odors and dust from the soils. Non-hazardous debris and soil will be placed in transport trucks equipped with visqueen bed liners, if necessary. All truck loads of soil/concrete and debris will be covered with a tarp before leaving the site. The tarp covers will be secured and inspected by drivers prior to leaving the site. In the event a tarp rips or comes loose during transit, the truck will stop at a safe location and the tarp will be repaired or replaced. If the tarp cannot be repaired, the truck will not be moved until a replacement tarp is obtained. Once tarp repair or replacement is completed, the truck will proceed on its designated transport route to the treatment and/or disposal facility.

8.2 Noise Management

The traffic route selected and proposed for soil/concrete transport attempts to minimize exposure to hospitals, schools and other noise sensitive locations. The selected proposed traffic route has been selected to minimize noise impacts residential neighborhoods. Trucks used to transport the soils/concrete will be required to have mufflers in good working order in accordance with applicable State requirements.

8.3 Traffic

Existing traffic patterns at various times of day will be examined so that the operation will not impact traffic conditions more than necessary. If needed, routes may change during the day as traffic conditions change. It is anticipated that the work will occur between the hours of 7:00 a.m. and 7:00 p.m. If necessary, efforts will be made to avoid heavy truck traffic during peak traffic hours.

8.4 Loading Procedures

Stockpiles will be loaded using an articulated front-end loader or similar piece of equipment onto end-dump dumptrucks that are licensed as hazardous waste haulers. Trucks will be weighed onsite if necessary. Dust generation will be minimized by spraying loads with water during dumping as necessary, slowly dumping each bucket load and minimizing the dumping height. Truck dump beds will be covered with tight fitting tarp type covers and securely fastened prior to the trucks leaving the site. Any loose soil that has fallen on to other areas of the trucks will be brushed off of the trucks prior to them leaving the site. Each truck will be issued a waste manifest that must be signed by the receiving facility and returned to document proper disposal.

8.5 Truck Decontamination

To decontaminate trucks, a dry wipedown area will be constructed onsite. The wash down area will be approximately 50 feet by 50 feet. The washdown area will be constructed by laying plastic sheeting, sealing seams and berming edges to soil brushed from trucks. A thin layer of sand will be placed under the sheeting if necessary to reduce the potential for tears from vehicle tires. All equipment and trucks entering the impacted excavation will be decontaminated and inspected before leaving the site. Vehicles requiring decontamination will drive onto the wipedown area for cleaning and then drive off after decontamination is completed. Trucks will be brushed off or washed with water and detergent scrubbed and rinsed if necessary.

9. RECORD KEEPING

Delphi or Delphi-appointed field personnel will maintain a list of the trucks leaving the site and will record appropriate information for each load.

The following transportation documents must be carried with the driver when transporting the waste:

- Shipping documents (i.e. Manifests);
- Appropriate DOT placards; and
- Instructions including the route, emergency procedures and contacts for the transporter.

10. HEALTH AND SAFETY

10.1 Training Requirements

Personnel involved with the transportation of hazardous material at the former Delphi Anaheim Battery Operations Facility site will not be permitted to participate in or supervise field activities until they have been trained to a level required by their job function and responsibility. Haley & Aldrich employees, contractors, subcontractors, and site visitors who have the potential to be exposed to contaminated materials or physical hazards must complete the training described in the following sections.

10.2 40-Hour Health and Safety Training

This basic course is required for all personnel working on-site, such as equipment operators, general laborers, electricians, plumbers, supervisors, management, etc., who may be potentially exposed to hazardous substances, health hazards, or safety hazards consistent with 29 CFR 1910.120 (e) (8).

10.3 8-hour Annual Refresher Training

Personnel will be required to have current annual 8-hour Hazardous Waste Operations Refresher Training in accordance with 29 CFR 1910.120 (e) (8).

10.4 8-Hour Supervisor Training

On-site management and supervisors directly responsible for, or who supervise, employees engaged in hazardous waste operations must have eight additional hours of Supervisor training in accordance with 29 CFR 1910.120 (e) and 8 CCR 5192. This course includes, but is not limited to, elements appropriate to supervising hazardous waste related projects (e.g., accident reporting/investigation, regulatory compliance, work practice observations, auditing, emergency response procedures, etc.).

10.5 Communication Requirements

All personnel involved in hazardous waste operations will be required to review the site Health and Safety Plan (HASP). In addition, a daily Health and Safety "tailgate" meeting will be held with all personnel involved in hazardous waste operations. The Site Safety Officer (SSO) will be responsible for enforcing the HASP.

A transportation coordinator will be identified along with procedures for notification of an accidental spill or truck breakdown during the transportation of any hazardous materials.

10.6 Personnel Responsibilities

Duties and responsibilities of the SSO include:

- Ensuring that the specific provisions of the HASP are followed and work activities carried out according to the plan, including the use of proper PPE by site workers;
- Ensuring that all site workers have met the project training and medical requirements;

- Establishing adequate work area controls, such as exclusion zones and decontamination stations;

- Ensuring that all measures stipulated by the HASP are employed to minimize the exposure of site personnel and the neighboring community to the chemical hazards of the site;

- Interfacing with the community and passers-by, as necessary, to ensure they do not intrude on site operations and remain outside of work control areas; and

- Maintaining required documentation and a record of site Health and Safety activities.

10.7 Documentation Requirements

All personnel involved with the transportation of hazardous material at the Delphi Former Anaheim Battery Operations Facility site will be required to provide proof of Health and Safety training commensurate with the requirement of their job function and responsibility.

11. CONTINGINCIES AND SAFEGUARDS TO BE ESTABLISHED FOR SOIL AND CONCRETE TRANSPORTATION

The implementation of the Transportation Plan at this site will be an integrated effort amongst the Delphi Project Manager, the transportation contractor, the job site managers, a contracted Emergency Response Contractor (ERC), and field personnel involved in the project. The organization and responsibilities for implementing safe working activities, and more specifically, the requirements contained in the Transportation Plan, are described below.

Prior to the start of soil and concrete transport operations, the Delphi Project Manager will identify an Emergency Response Contractor (ERC) that can be utilized for this project. The transportation company personnel will be briefed on procedures for contacting either the Delphi Project Manager or the ERC in the event of a spill or incident during soil/concrete transport. The ERC will provide necessary emergency spill response measures, including cleanup and disposal of any spilled material.

The following paragraphs outline individual responsibilities of parties expected to be involved in this project.

11.1 Emergency Response Contractor Responsibilities

The following matters shall be the responsibility of the ERC:

- Upon notification that a spill has occurred, the ERC will call the reporting party to obtain complete details regarding the incident. Enough information must be obtained to develop initial emergency response actions.

- Communications with the scene will be established.

- In the event of an emergency, the ERC will respond to the scene as soon as possible after gathering information to gauge an appropriate response to the spill.

11.2 Transportation Contractor Responsibilities

Adherence to the following conditions shall be the responsibility of the transporter firm contracted for the project:

- The contractor used to transport soil/concrete from the project site will be fully permitted by the U.S. EPA and the required State(s).

- All Department of Transportation (DOT) safety regulations will be strictly followed. These include use of qualified drivers, written and road tests of drivers, medical evaluation, hours of service limitation, equipment standard and inspections, and operating procedures.

- The contractor will possess an EPA Transporters Identification Number.

- The contractor will maintain public liability and property damage insurance in an amount specified by Delphi.

- The contractor will be provided a copy of the Health and Safety Plan for the project. Delphi will expect that the transportation contractor will adhere to conditions of the plan. Delphi also expects that the transportation contractor will advise its drivers regarding the characteristics of the material being hauled, and corrective measures that must be taken in the event of an accident or exposure.

- The transportation contractors vehicles, including trucks and trailers, must be equipped and maintained in accordance with the Federal Motor Carrier Safety Regulations (49 CFR Parts 393 and 396). These regulations specify minimum standards for equipment, including brakes, tires, lights, suspension, steering, emergency equipment and maintenance. Trucks will be equipped with radios.

11.3 Driver Responsibilities

In the event of an emergency, a driver's responsibilities are as follows:

- Park the unit in the most secure area available, away from homes, traffic or businesses.

- Never abandon the truck or disconnect the trailer unless told to do so by the proper authorities or unless there is an immediate danger which could affect the cargo.

- Set out flares or reflectors.

- Warn all persons to keep away (minimum distance 500 feet, actual distance to be determined by the DOT emergency response guidebook).

- Protect manifest, paperwork, instruction materials, and equipment for later use.

- Notify the Emergency Contact listed on the manifest, the Delphi Project Manager, the driver's dispatcher, or supervisor, providing the following:

  - Proper shipping name, hazard class, and ID number of materials;
  - Exact location;
  - Quantity of material spilled;
  - Location and distance to any surface water;
  - Nature and extent of any injuries or property damage;
  - Weather conditions;
  - A telephone number where communications with the scene can be established; and
  - An estimate of what response and cleanup will be needed.

- Speak only to properly identified authorities. Do not speak to news or TV reporters and refer them to the Site manager for any information.

- Stay at the scene until relieved by an ERC.

- If the nature of the spill allows the driver, using appropriate PPE, to safely take action, he may attempt to dike the area, place a plastic liner down to collect the

material or otherwise respond to the emergency. The driver is not to attempt to enter a closed unit or handle waste materials without qualified assistance.

11.4 Responsibilities of Jobsite Contractor

The project general contractor overseeing the soil/concrete removal project will be responsible for assuring that the Transportation Plan prepared for the project is followed. The project general contractor will act as liaison between the site and the transporter. The Delphi Project Manager and/or the project general contractor will oversee the proper preparation of manifests to comply with applicable federal, state, and DOT regulations.

SOIL/CONCRETE TRANSPORTATION ROUTE
NOTIFICATION LIST OF EMERGENCY SERVICE ORGANIZATIONS

NAME	TELEPHONE NUMBER
Los Angeles County Fire Department	(323) 262-2111 (310) 638-6121
Orange County Fire Department	(714) 527-6722 (714) 538-3501
City of Anaheim Fire Department	(714) 765-4000
Emergency Services	911
Los Angeles County Sheriff's Department	(323) 264-4151 (213) 473-6100
Orange County Sheriff's Department	(714) 647-7000
City of Anaheim Police Department	(714) 765-1900
CA Department of Transportation	(213) 897-3800 (916) 654-5266
CalTrans-District 12-Orange County	949-724-2000
CalTrans-District 7-Los Angeles County	213-897-3656
CA Highway Patrol	(949) 559-7888
Chemtrec	(800) 424-9300
U.S. National Response Center	(800) 424-8802

REFERENCES

1. California EPA, DTSC 1994. Transportation Plan Preparation Guidance for Site Remediation. Sacramento, California.

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

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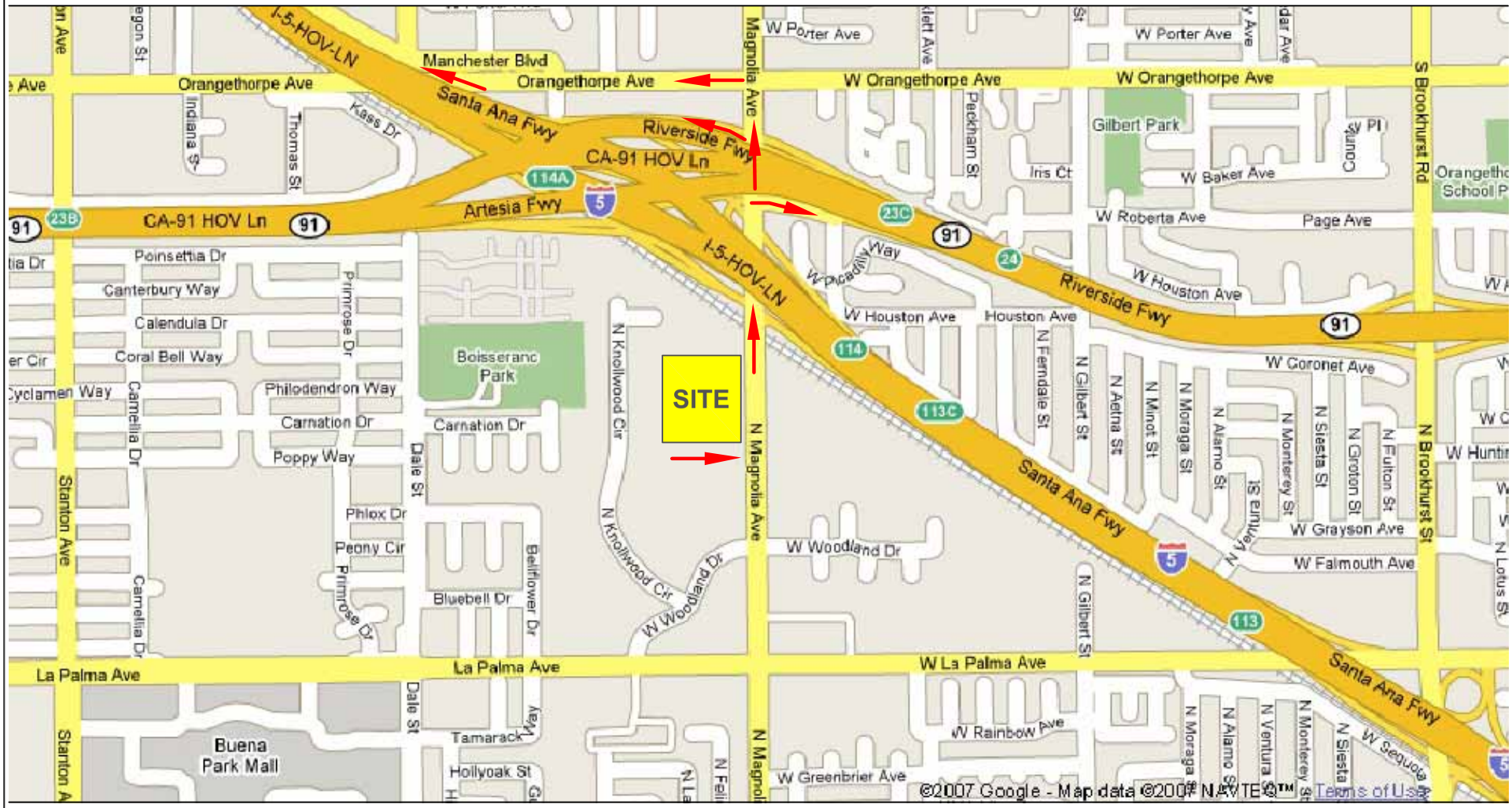

LEGEND

5 INTERSTATE 5

91 CALIFORNIA HIGHWAY 91

23C EXIT

REFERENCE: SOURCE MAP OBTAINED FROM GOOGLE

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W E
S

HALEY & ALDRICH

DELPHI CORPORATION
FORMER BATTERY OPERATIONS, 1204 N. MAGNOLIA
ANAHEIM, CALIFORNIA
32486-011

TRAFFIC ROUTE

SCALE: NOT TO SCALE
JULY 2007

FIGURE 1