EarthTech

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QUALITY ASSURANCE PROJECT PLAN
SOIL INVESTIGATION FOR
HISTORICAL STORMWATER PATHWAY - SOUTH
ECOLOGY CONTROL INDUSTRIES PROPERTY
20846 SOUTH NORMANDIE AVENUE
TORRANCE, CALIFORNIA 90502

Prepared for: **Montrose Chemical Corporation of California**
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June 2006

Draft
Quality Assurance Project Plan
Historical Stormwater Pathway - South
Ecology Control Industries Property
20846 South Normandie Avenue
Torrance, California 90502

Prepared For:	**Montrose Chemical Corporation of California** **600 Ericksen Avenue, NE, Suite 380** **Bainbridge Island, Washington 98110**
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ACRONYMS

AOC	Administrative order on consent
bgs	Below ground surface
BHC	Benzene hexachloride
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
COC	Chain-of-custody
DDD	Dichlorodiphenyl-dichloroethane
DDE	Dichlorodiphenyl-dichloroethylene
DDT	Dichlorodiphenyl-trichloroethane
DQO	Data quality objectives
ECI	Ecology Control Industries
EPA	U.S. Environmental Protection Agency
FID	Flame-ionization detector
FS	Feasibility study
FSP	Field sampling plan
FTL	Field team leader
HASP	Health and safety plan
ICP	Inductively coupled plasma
ICP-MS	Inductively coupled plasma mass spectrometry
IDW	Investigation derived wastes
LACFCD	Los Angeles County Flood Control District
LACDWP	Los Angeles Department of Water and Power
LCS	Laboratory control sample
MDL	Method detection limit
µg/L	Micrograms per liter
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
MS	Matrix spike or mass spectrometry
Msl	mean sea level
MS/MSD	Matrix spike and matrix spike duplicate
PD	Playa deposit
PID	Photoionization detector
PPE	Personal protective equipment
ppm	Parts per million
PRG	Preliminary remediation goal
PVS	Palos verdes sands
QA	Quality assurance
QAO	Quality assurance office
QAPP	Quality assurance project plan
QASR	Quality assurance summary report
QC	Quality control
RI	Remedial investigation

RL	Reporting limit
RPD	Relative percent difference
RPM	Remedial project manager
RRT	Relative retention time
RSD	Relative standard difference
RT	Retention time
RTL	Review team leader
RWQCB	Regional Water Quality Control Board
SDG	Sample delivery group
SM	Site manager
SVE	Soil vapor extraction
TCLP	Toxicity characteristics leaching procedure
TPH	Total petroleum hydrocarbons
TPH-d	Total petroleum hydrocarbons – diesel fraction
TPH-g	Total petroleum hydrocarbons – gasoline fraction
TPH-o	Total petroleum hydrocarbons – oil fraction
TSDF	Treatment, storage, and disposal facility
UAO	Unilateral Administrative Order
UBA	Upper bellflower aquitard
US	United States
UST	Underground storage tank
VOA	Volatile organic analysis
VOC	Volatile organic compound

1.0 PROJECT MANAGEMENT/DATA QUALITY OBJECTIVES

Montrose Chemical Corporation of California (Montrose) retained Earth Tech, Inc. (Earth Tech) to prepare this Quality Assurance Project Plan (QAPP) to support field and laboratory activities for an investigation of soils within the Historical Stormwater Pathway – South (Operable Unit 6) of the Montrose Chemical Superfund Site (Montrose), Los Angeles County, California. This QAPP includes data quality objectives (DQOs), which are presented in **Appendix A** for the work to be performed at the Ecology Controls, Inc. (ECI) property located at 20846 Normandie Avenue, Torrance, California (**Figure 1** from the Field Sampling Plan [FSP]). A draft version of this QAPP was originally prepared by the United States (U.S.) Environmental Protection Agency (EPA) and provided to Montrose and Earth Tech for the subject investigation.

This QAPP is consistent with EPA guidelines contained in *EPA Guidance for Quality Assurance Project Plans* (EPA, 2002a), and *EPA Requirements for Quality Assurance Project Plans* (EPA, 2001a). The development, review, approval, and implementation of the QAPP is part of EPA's mandatory Quality System, which requires all organizations to develop and operate management structures and processes to ensure that data used in agency decisions are of the type and quality needed for their intended use. The following sections of this document correlate with the subtitles found in the EPA guidelines (EPA, 2001a).

The document is organized into the following sections and appendixes:

- **Section 1.0 Introduction.** Provides an introduction and describes the organization of the QAPP.
- **Section 2.0 Project Management/Data Quality Objectives.** Describes project organization, background, goals, and DQOs (through reference to **Appendix A**); summarizes data needs, uses, performance criteria, and task descriptions.
- **Section 3.0 Measurement Data Acquisition.** Defines the sampling methods, sample handling, chain-of-custody (COC), analytical methods, and quality control (QC) data to be acquired.
- **Section 4.0 Assessment/Oversight.** Describes procedures to assess and oversee quality of data collection procedures.
- **Section 5.0 Data Validation and Usability.** Describes the data quality assurance/quality control (QA/QC) procedures.
- **Section 6.0 References.** Provides a list of references used in preparing this document.
- **Appendix A Data Quality Objectives.** Presents the DQO process that identifies the specific objectives, the associated data needs, decisions, and subsequently the sampling design.
- **Appendix B Analytical Technical Specifications.** Provides specification requirements for analytical techniques to be used in quantitation of samples collected.

This QAPP is accompanied by the FSP, Soil Investigation for Historical Stormwater Pathway - South, ECI Property, Torrance, California (Earth Tech , 2006a).

2.0 PROJECT ORGANIZATION

This project is being conducted under the oversight of the EPA. The QAPP and the accompanying FSP will be implemented by Earth Tech working under contract to Montrose. A Montrose representative, Mr. Paul Sundberg and Earth Tech Site Manager (SM) Mr. Brian Dean, will work directly with the EPA Remedial Project Manager (RPM) to implement the QAPP and the FSP. Mr. Sundberg is a consultant to Montrose and will manage the financial, schedule, and technical status of the work assignment. The key people interfacing with the RPM are Mr. Sundberg and the SM.

Key Earth Tech personnel include the Quality Assurance Officer (QAO), Review Team Leader (RTL), Field Team Leader (FTL), and Health and Safety Officer. Although the primary responsibility for project quality rests with the SM, independent QC is provided by the RTL and QAO. The RTL/review team and QAO review project planning documents, data evaluation, and all deliverables. The Sampling Team will implement the QAPP and FSP. The SM is responsible for ensuring adherence to the amended project Health and Safety Plan (HASP; Earth Tech, 2006b) and field decontamination procedures. The entire field effort is directed by the FTL. Where QA problems or deficiencies requiring special action are uncovered, the SM, RTL, and QAO will identify appropriate corrective action to be initiated by the FTL or the laboratory.

Project organization and the line of authority for efforts are illustrated in **Figure 1**. Data users and recipients are shown in **Figure 2**. All technical and QA personnel are shown in **Figure 1**.

2.1 PROBLEM DEFINITION/BACKGROUND

2.1.1 PURPOSE

This QAPP presents the policies, organizations, objectives, and functional activities/procedures associated with the soil sampling and analysis activities to be conducted by Montrose in a segment of the historical stormwater pathway, south of Torrance Boulevard (Historical Stormwater Pathway – South). This QAPP includes the DQOs, which can be found in **Appendix A.**

This QAPP is consistent with EPA guidelines contained in *EPA Guidance for the Data Quality Objectives Process* (EPA, 2000) and *EPA Requirements for Quality Assurance Project Plans* (EPA, 2001a). Thus, the section headings contained herein correlate with the subtitles found in the EPA guidelines (EPA, 2002a).

2.1.2 PROBLEM STATEMENT

The following discussion is a general description of the primary problems. Specific problem statements are prepared in the DQO process and are presented in **Appendix A**. The area of initial investigation of the EPA Study Area includes a portion of the commercial property located at 20846 Normandie Avenue, southeast of the intersection of Normandie Avenue and Torrance Boulevard, in Los Angeles County, California. The commercial property is occupied by ECI. A Site location map is provided as **Figure 3**, and a Site Plan is provided as **Figure 4**. The historical stormwater pathway passed through a portion of the ECI property as shown on **Figure 5**.

The location of soils with total 4,4'-dichlorodiphenyltrichloroethane (DDT) concentrations exceeding residential background levels at the ECI property roughly coincides with the historical stormwater pathway, which crossed through what is now the eastern portion of the ECI property. EPA believes that the DDT-impacted soils at the ECI property are the result of contaminated storm-water runoff from the former Montrose technical-grade DDT manufacturing plant located at 20201 Normandie Avenue, in Los Angeles County, California (**Figure 3**). The ECI property is located "down stream" from the former Montrose plant property, by way of the historical stormwater drainage pathway. It is noted that Montrose disputes EPA's preliminary conclusion regarding the source of total DDT at the ECI property.

In the spring of 2005, soil sampling was conducted at 20846 Normandie Avenue, in Los Angeles County, California, a commercial property occupied by ECI, as part of due diligence activities prior to sale of the property. That sampling reported several chemical constituents present in soils exceeding regulatory action levels, including: DDT, 4,4'-dichlorodiphenyldichloroethene (DDE), and 4,4'-dichlorodiphenyldichloroethane (DDD), as well as several other chemicals including chlordane, petroleum hydrocarbons, and polychlorinated biphenyls (PCBs). The sum of DDT, DDE, and DDD concentrations (referred to collectively as total DDT) were detected in subsurface soil samples from the eastern and southeastern portions of the ECI property at concentrations exceeding residential background levels and up to 325 milligrams per kilogram (mg/kg). These soil sample locations were excavated by the property owner and the soil was stored on-site in soil piles, managed to prevent potential releases (i.e., via fugitive dust and surface water runoff), until it could be properly disposed. **Figure 7** depicts the locations of the excavations in the southeast portion of the ECI property.

2.1.3 BACKGROUND

2.1.3.1 Site Location and Description

The overall EPA Study Area is located in Torrance, California, and includes portions of eight properties located along the historical stormwater pathway southeast of the former Montrose plant property. The eight properties include ECI, a commercial property located at 20846 Normandie Avenue, and seven residential properties located directly east of the ECI property along Torrance Boulevard, Raymond Avenue, and 209th Street. This FSP addresses only the ECI property. The residential properties are the subject of a separate FSP being concurrently prepared by EPA.

2.1.3.2 Operational History

In 1992, the ECI property owner, Mr. Ron Flury, purchased approximately 4.7 acres of Azko Coatings, Inc. (Azko) property. Several years later, Mr. Flury purchased an additional 2.7 acres of Azko's remaining property. The current size of the ECI property is approximately 7.5 acres.

During its ownership, Azko maintained two underground storage tank (UST) farms that stored petroleum-based solvents, in what is now the southern boundary of the ECI property. A release of toluene from one of the tanks required soil and groundwater investigations and the installation of a soil vapor extraction (SVE) system. As part of the installation of the SVE system, the southern area of the property was graded, and the western portion paved in concrete following installation of the SVE system. Azko operated the SVE system for several years after it sold the property to ECI. ECI occupied the property while the SVE system was in operation. On July 22, 1996, the California Regional Water Quality Control Board (RWQCB) issued a closure letter confirming the completion of the UST remedial action.

2.1.3.3 Physical Description

This section provides a brief description of the regional geology and hydrogeology, the historic stormwater pathway, and LACFCD drainage easement for the Project 685 buried stormwater drainage channel.

Geology and Hydrogeology

The EPA Study Area is located within the West Coast Basin of the Torrance Plain. The Ballona Escarpment bounds the basin to the north, the Newport-Inglewood Structural Zone to the east, Palos Verdes Hills to the southwest, and the Pacific Ocean to the west. There are four major structural features within the Torrance Plain, in the vicinity of the Montrose Chemical Superfund Site and the EPA Study Area: the Charnock Fault, the Palos Verdes Fault, the Torrance Anticline, and the Gardena Syncline (EPA, 1998; and California Department of Water Resources [CDWR], 1961).

The stratigraphy of the West Coast Basin includes Quarternary-age continental and marine deposits and Tertiary-age marine sediments overlying a basement complex of igneous and metamorphic rocks. The geologic units of hydrogeologic interest are (in order from oldest to youngest) the Pico Formation; the San Pedro Formation; the Lakewood Formation; and older dune sand, alluvium, and active dune sand (EPA, 1998; CDWR, 1961).

Hydrogeologic units in the West Coast Basin include aquitards and aquifers of varying compositions and water-yielding properties. These units, in order from first water encountered to deeper units, include the Bellflower Aquitard, the Gage Aquifer, an unnamed aquitard, the Lynwood Aquifer, another unnamed aquitard, and the Silverado Aquifer. A detailed discussion of the regional geologic, hydrogeologic, and physiographic setting is presented in the *Final Remedial Investigation Report for the Montrose Superfund Site* (EPA, 1998).

There are three generalized, unsaturated soil layers in the vicinity of the Montrose Plant property, described as follows:

- **Upper Layer – Playa Deposits (PD):** This layer is found near the surface to depths of approximately 25 feet below ground surface (bgs). According to grain-size analysis of soil samples collected in this layer, silt and clay comprise more than 65 percent of these soils.

- **Middle Layer – Palos Verdes Sand (PVS):** This layer is found between approximately 25 and 45 feet bgs and consists primarily of fine-grained sand. Based on grain-size analyses of soil samples collected in this layer, fine- and medium-grained sand comprises more than 70 percent of these soils.

- **Lower Layer – Upper Bellflower Aquitard (UBA):** This layer is found from approximately 45 to approximately 95 feet bgs and consists of multiple thin sand layers interbedded with layers of silt and clay. This layer becomes saturated at approximately 65 feet bgs. Grain-size analyses of soil samples collected in this layer ranged from more than 70 percent fine-grained sand to more than 60 percent silt. This soil layer varied from fine-grained sand to clay and silt with increasing depth.

The specific occurrence, depth, and thickness of these units in the vicinity of the ECI Property have not been well defined. The surface and near-surface sediments in and adjacent to the historical stormwater pathway of the Study Area are composed of unconsolidated sediments, reworked soil from grading operations, and undisturbed Playa Deposits. The first-encountered groundwater beneath the area is at approximately 65 feet bgs, in the Upper Bellflower Aquitard (EPA, 1998).

Historical Stormwater Pathway

From the Montrose property, the historical stormwater pathway existed as a series of unlined ditches and sloughs continuing ultimately to the swampy area where the Torrance Lateral was constructed. The historical stormwater pathway originating from the drainage ditch on the west side of Normandie Avenue, crossed Normandie Avenue and entered an "unimproved channel" that continued along 204th Street and the west side of Kenwood Avenue, to Torrance Boulevard (also known as the Kenwood Ditch). After crossing under Torrance Boulevard, into the current EPA Study Area, it became a slough or swale that extended eastward beyond the EPA Study Area.

During the late 1960s and early 1970s, the Los Angeles County Flood Control District (LACFCD) constructed a new underground stormwater conveyance system referred to as Project 685, or the Kenwood Avenue-Supplemental. Project 685, a concrete box culvert, replaced the historical stormwater drainage ditch from 204th Street, along Kenwood Avenue and through the EPA Study Area, connecting to the newly constructed Torrance Lateral. The Los Angeles County Flood Control District (LACFCD) maintains an easement for Project 685 within the properties it traverses, including the ECI Property (EPA, 2005b).

As-built construction drawings for the Project 685 segment through the EPA Study Area (Los Angeles County Department of Public Works [LACDPW], 1969) indicate a pre-construction ground elevation of approximately 16 feet mean sea level (msl). This is believed to be the lowest elevation of the historical stormwater pathway within the EPA Study Area. The Project 685 box drain (8 feet wide and 12.5 feet high) is shown on the as-built drawings as having an invert elevation (exterior bottom of the drain) at approximately 11 to 12 feet msl. Thus, installation of Project 685 required excavation of existing soil.

EPA Study Area Topography

In 1998, ECI graded and paved Lot 1, the northern portion of the full property (ECI, 2005). Pre-grading construction drawings of Lot 1 indicate surface elevations ranging from approximately 40 feet msl along its western boundary, to approximately 36 feet msl along its eastern boundary, with a low of 31 feet msl in the northeast corner along the LACFCD drainage easement and a high of over 50 feet msl where there was a large mound of soil generated from prior grading of the southern lot (EPA, 1993).

Soil from the large mound and an earthen embankment along Torrance Boulevard were used to level the property (ECI, 2005). After grading, the surface of the ECI property transitioned smoothly from approximately 40 feet msl at its western edge to approximately 36 feet msl along its eastern edge. Residential properties immediately east of the ECI property have lower elevations of approximately 32 feet msl (EPA, 2005b).

2.1.4 SITE HISTORY AND PAST INVESTIGATIONS

Recent investigation pertinent to the EPA Study Area are summarized below.

Previous Investigations

From 1999 to 2002, as part of its ongoing investigation of the Montrose Chemical Superfund Site, EPA conducted an investigation and evaluation of residential soils within approximately 4 miles of the Montrose property. One outcome of this work was the determination of regional total DDT background concentrations in residential surface soil. Background residential surface soil concentrations were determined to average between 1 parts per million (ppm) and 3 ppm total DDT, and ranged up to 10 ppm total DDT (EPA, 2001c).

Kenwood Stormwater Drainage Pathway

EPA's investigations of soil in residential areas surrounding the former Montrose Plant Property discovered some soils along the west side of Kenwood Avenue with total DDT concentrations above the residential background range. The historical stormwater pathway, which, as an open, unlined earthen ditch, had conveyed stormwater runoff through portions of residential properties along the west side of Kenwood Avenue, until the ditch was replaced with the Project 685 underground concrete box culvert.

In 2001 and 2002, EPA conducted a removal action (Kenwood Stormwater Drainage Pathway Removal Action) to remove DDT-contaminated soils along the historical stormwater pathway north of Torrance Boulevard, from Del Amo Alley to Torrance Boulevard (EPA, 2002). Removal of soil was recommended for properties having an average total DDT soil concentration exceeding 17 ppm (corresponding to a one-in-one-hundred-thousand [1 x 10^{-5}] cancer risk for a residential exposure scenario). Removal was ultimately conducted at 22 properties and in 2 alleys to remove soil with total DDT concentrations exceeding 10 ppm.

Regulatory Involvement

In early summer of 2005, EPA learned of the presence of DDT and the owner's excavation activities at the ECI property. This work was initiated without direction or oversight from EPA. EPA requested that the owner immediately stop excavation and implement best management practices for erosion control and protective measures to minimize water and wind erosion (i.e., fugitive dust) from the excavated soil piles. EPA requested ECI to provide all information related to its soil sampling activities (i.e., locations, laboratory data sheets, etc.).

In November of 2005, EPA authorized a Removal Action to address the excavated soil and open excavations (EPA, 2005b). On December 15, 2005, EPA issued a Unilateral Administrative Order (UAO, Docket No. 09-2006-02a) to ECI, its property owner, and Montrose Chemical Corporation of California. The UAO required the transport and disposal of the excavated soil at the ECI property, and the backfilling and covering of the open excavations. The soil piles were transported to a permitted hazardous waste landfill in January 2006 by the respondents. Earth Tech provided air monitoring of fugitive dust potentially containing DDT during the loading of soil into trucks by ECI (Earth Tech, 2006b). Backfilling of the excavations remains to be completed under the UAO.

2.1.4.1 Summary of Existing Data

This section provides a summary of recent soil analytical data for the ECI property. Results and conclusions from those analyses served as the basis for determining additional data needs presented in this QAPP.

Available Soil Quality Data

In June 2005, EPA learned that an environmental site assessment (ESA) and sampling had been performed at the ECI property in preparation for its sale and residential development (EPA, 2005b). Between February 7 and June 9, 2005, over 200 soil samples were collected and analyzed. The soil sampling and analyses activities included:

- Soil and soil gas sample collection and analysis for 15 locations across the ECI property (February 7 and 8, 2005).
- Soil sample collection using a 150- by 150-foot sampling grid, analyzed for pesticides, PCBs, total petroleum hydrocarbons (TPH)-gasoline (TPH-g), TPH-diesel (TPH-d), and TPH-oil (TPH-o), volatile organic compounds (VOCs), and metals. The locations of the soil borings are shown in **Figure 8.** Note that not all grid nodes were sampled for all analytes (March 23, 2005).
- Collection and analysis of an additional 24 soil borings to further delineate areas along the eastern portion of the ECI property where pesticides and PCBs had been detected (April 12, and 13, 2005).

- Excavation of soils with elevated chemical concentrations (March 17, 2005; May 17, 18, 26, and 27, 2005; and June 2, 3, 8, and 9, 2005) and collection of sidewall and floor samples.

Many of these soil samples were grab samples taken from within the walls of excavations along the eastern area of the ECI property. The final excavation footprints and excavation sample locations are shown in **Figure 7**. The depth of sample collection ranged from just below the ground surface to approximately 15 feet bgs.

Soil analytical results presented in **Tables 1 through 3**, identified elevated concentrations of several chemicals. Chemicals affecting soils at concentrations exceeding federal or state regulatory limits or the regional background include:

- Total DDT – Detected at a maximum reported concentration of 325 ppm total DDT. Samples containing elevated DDT concentrations were collected from the eastern area of the ECI property. Approximately 35 soil samples had total DDT concentrations above the upper end of the regional residential background range of 10 ppm.
- Chlordane – Detected at a maximum reported concentration of 3.5 ppm from soil collected along the easternmost portion of the property.
- PCBs – Detected along the southeast corner of the ECI property at a maximum concentration of 23.1 ppm (sum of Aroclors 1254 and 1260).

Other chemical constituents detected in soil samples from the ECI property include:

- Benzene hexachloride (BHC), a pesticide manufactured at the former Montrose plant (maximum concentration of 0.019 ppm as beta-BHC),
- Dieldrin
- Heptachlor and heptachlor epoxide
- Endrin aldehyde and endrin ketone
- Toxaphene
- TPH-d and TPH-o (maximum concentration of 21,000 ppm)

Available Groundwater Quality Data

Groundwater quality data are available from investigations proximal to the EPA Study Area (i.e., Montrose); however, these data are not related to the investigation of the Historical Stormwater Pathway.

Available Surface Water and Sediment Quality Data

Recent surface water and sediment quality data are available for the current stormwater pathway (e.g., within the LACFCD Project 685 stormwater drainage system, and other segments of that man-made conveyance), but are not related to this investigation of the historical stormwater pathway. EPA is separately conducting RI/FS activities for the Current Stormwater Pathway, as part of the Montrose Chemical Superfund Site.

2.1.5 DATA NEEDS AND USES

Using available information, EPA concluded that additional soil data from the surface and subsurface soils within the historical stormwater pathway are needed to characterize the lateral and vertical extent of pesticide/PCB chemicals in soil in the EPA Study Area. Additional findings of total DDT contamination in soil from this area are considered likely based on the total DDT concentrations found within the historical stormwater pathway north of Torrance Boulevard (during EPA's Kenwood Avenue Removal Action described in the following section) and at the ECI property. Data needs and uses for the project are identified through the DQO process presented in **Appendix A** (*Guidance for Data Quality Objectives Process*. EPA QA/G-4, EPA/600/ R-96/055; EPA 2000 and 1994). In accordance with the DQO process, for each media and/or task, the specific problems/principal study questions have been identified and evaluated individually through the DQO steps.

The data needs and uses resulting from the DQO process are summarized in **Table 4**. This table lists the analytes of concern and present regulatory criteria/action level requirements for the analytes. The tables present a listing of regulatory limits and action levels, and identify the most protective (i.e., lowest) regulatory criteria where there are multiple regulatory criteria/action levels for a given analyte. These regulatory limits were taken into consideration in selecting appropriate methods and laboratory reporting levels as described in Sections 2.3.2 and 3.4.

Tables C, D, E and **F** in **Appendix B** lists the analytical methods and laboratory reporting limits selected to meet these criteria. Some of the selected methods/analytes have higher reporting limits than regulatory criteria, due to practicable method limitations. The final sample detection levels may also be higher than initial reporting limits because of sample matrix effects. Detection levels for the individual samples will be reported in the final data. Laboratory-specific method detection limits (MDLs) are significantly below reporting levels. Where reporting limits are higher than regulatory limits, the project team will use MDLs as needed for project decisions. Project decisions are not expected to be significantly affected by the higher detection levels. The selected methods are state-of-the-art and practicable.

2.2 PROJECT DESCRIPTION AND SCHEDULE

2.2.1 DESCRIPTION OF WORK TO BE PERFORMED

The purpose of the soil sampling is to obtain additional information on the extent of pesticide/PCB chemicals within the eastern portion of the ECI property, to assess potential human health risks, and determine if further action is needed. Soil sampling will consist of collecting surface and subsurface soil samples from the following areas:

- EPA Study Area at the ECI property and within the historical stormwater pathway
- Northern sloped embankment of the ECI property

Surface and subsurface soil samples will be collected using direct push (Geoprobe) technologies, where possible. A continuous core will be collected from each borehole. Soil samples will be collected from specified depth intervals, composited, and analyzed at an offsite laboratory to provide an average contaminant concentration for each interval. Samples will be analyzed for pesticides/PCB.

2.2.2 SCHEDULE OF ACTIVITIES

Field reconnaissance activities are expected to take place from approximately July through August 2006. Mobilization and field activities will commence during July 2006 and continue through completion.

2.3 DATA QUALITY OBJECTIVES

2.3.1 PROJECT QUALITY OBJECTIVES

Project objectives and associated data needs were evaluated through the DQO process (EPA, 2000), which is described in **Appendix A**. The DQO process provides for the optimization of collected data and subsequent decisions.

2.3.2 MEASUREMENT PERFORMANCE CRITERIA

The QA objective of this plan is to develop implementation procedures that will provide data of known and appropriate quality for the needs identified in previous sections. Data quality is assessed by representativeness, comparability, accuracy, precision, and completeness. These terms, the applicable procedures, and level of effort are described below.

The applicable QC procedures, quantitative target limits, and level of effort for assessing data quality are dictated by the intended use of the data and the nature of the analytical methods. Analytical parameters and applicable detection levels, analytical precision, accuracy, and completeness will be in alignment with needs identified in Section 2.2.4 are presented in **Appendix B**.

Reporting limits/target detection limits listed in **Appendix B** are per method reporting limits. *Target* implies that final sample reporting limits may be higher because of sample matrix effects. Reporting limits for the individual samples will be reported in the final data. Laboratory-specific MDL are significantly below reporting levels. Where reporting limits are higher than regulatory limits, the project team will use MDLs as needed for project decisions. Project decisions are not expected to be significantly affected by the higher detection levels. The selected methods are state-of-the-art and practicable.

Representativeness is a measure of how closely the results reflect the actual concentration or distribution of the chemical compounds in the matrix samples. Sampling plan design, sampling techniques, and sample handing protocols (i.e., for storage, preservation, and transportation) have been developed and are discussed in subsequent sections of this document. The proposed documentation will establish that protocols have been followed and sample identification and integrity ensured.

Comparability expresses the confidence with which one data set can be compared to another. Data comparability will be maintained using defined procedures and the use of consistent methods and consistent units. Actual sample-specific reporting limits will depend on the sample matrix and will be reported for the individual samples.

Accuracy is an assessment of the closeness of the measured value to the true value. Spiking blank soil or reagent water samples with known standards and establishing the average recovery assesses accuracy of chemical test results. For a matrix spike, known amounts of a standard compound identical to the compounds being measured are added to the sample. A quantitative definition of average recovery accuracy is given in Section 4.3. Accuracy measurement will be carried out with a minimum frequency of 1 in 20 samples analyzed.

Precision of the data is a measure of the data spread when more than one measurement has been taken on the same sample. Precision can be expressed as the relative percent difference; a quantitative definition is given in Section 4.3. The level of effort for precision measurements will be a minimum of 1 in 20 samples.

Completeness is a measure of the amount of valid data obtained from the analytical measurement system and the complete implementation of defined field procedures. The quantitative definition of completeness is given in Section 4.3. The target completeness objective will be 90 percent; the actual completeness may vary depending on the intrinsic nature of the samples. The completeness of the data will be assessed during QC reviews.

2.4 SPECIAL TRAINING REQUIREMENTS/CERTIFICATION

All project staff working on the project will be health and safety trained, and will follow requirements specified in the amended HASP for this project (Earth Tech , 2006b). The HASP describes the specialized training required for personnel on this project and the documentation and tracking of this training.

2.5 DOCUMENTATION AND RECORDS

Field documentation and records will be as described in Section 2.0. Laboratory documentation will be in accordance with (1) methods and QA protocols listed in Section 2.0, and (2) laboratory-specific standard operating procedures.

3.0 MEASUREMENT DATA ACQUISITION

This section presents sampling process design and requirements for sampling methods, sample handling and custody, analytical methods, QC, and instrumentation for the sampling activities that will be conducted. Data acquisition requirements and data management for these sampling events are also addressed in this section.

3.1 SAMPLING PROCESS DESIGN

3.1.1 BACKGROUND

Background is discussed in Section 2.2.

3.1.2 SCHEDULE OF ANALYSES

Field reconnaissance activities (marking locations and geophysicl clearing of boring locations) will take place in early July 2006. Mobilization and field activities will commence during July 2006 and may potentially continue through about August 2006.

3.1.3 RATIONALE FOR SAMPLING DESIGN

The rationale for sampling design is described in DQO Step 7 in **Appendix A**.

3.2 SAMPLING METHODS REQUIREMENTS

Sampling method requirements are detailed in Section 5.0 of the companion FSP (Earth Tech 2006a).

3.3 SAMPLE HANDLING AND CUSTODY REQUIREMENTS

Field documents, including sample custody seals, COC records, and packing lists, will be obtained from in-house and laboratory sources. COC procedures will be used to maintain and document sample collection and possession. After sample packaging, one or more of the following COC paperwork forms will be completed, as necessary, for the appropriate samples:

- Earth Tech COC record
- Overnight shipping courier air bill (as needed)
- Copies of the above forms will be filled out and distributed per instructions for sample shipping.

3.3.1 CHAIN-OF-CUSTODY

COC procedures are followed to document sample possession.

3.3.1.1 Definition of Custody

A sample is under custody if one or more of the following criteria are met:

- It is in your possession.

- It is in your view, after being in your possession.
- It was in your possession and then you locked it up to prevent tampering.
- It is in a designated secure area.

3.3.1.2 Field Custody

In collecting samples for evidence, only enough material to provide a good representation of the media being sampled will be collected. To the extent possible, the quantity and types of samples and sample locations are determined before the actual fieldwork. As few people as possible should handle samples.

The field sampler is personally responsible for the care and custody of the samples collected until they are transferred or dispatched properly.

The SM, in coordination with EPA, determines whether proper custody procedures were followed during the fieldwork, and decides if additional samples are required.

3.3.1.3 Transfer of Custody and Shipment

Samples are accompanied by a COC record. When transferring samples, the individuals relinquishing and receiving the samples must sign, date, and note the time on the record. This record documents custody transfer from the sampler, often through another person, to the analyst at the laboratory.

Samples are packaged properly for shipment and dispatched to the appropriate laboratory for analysis, with a separate COC record accompanying each shipping container. Shipping containers will be sealed with custody seals for shipment to the laboratory. Courier names, and other pertinent information, are entered in the "Received by" section of the COC record.

Whenever samples are split with a facility owner or agency, it is noted in the remarks section of the COC record. The note indicates with whom the samples are being split, and is signed by both the sampler and recipient. If the split is refused, this will be noted and signed by both parties. If a representative is unavailable or refuses to sign, this is noted in the remarks section of the COC record. When appropriate, as in the case where the representative is unavailable, the COC record should contain a statement that the samples were delivered to the designated location at the designated time.

All shipments are accompanied by the COC record identifying its contents. The original record and yellow copy accompany the shipment to the laboratory; the pink copy is sent to be retained by the SM.

If sent by mail, the package is registered with return receipt requested. If sent by common carrier, a bill of lading is used. Freight bills, postal service receipts, and bills of lading are retained as part of the permanent documentation.

3.3.1.4 Laboratory Custody Procedures

A designated sample custodian accepts custody of the shipped samples, and verifies that the packing list sample numbers match those on the COC records. Pertinent information as to shipment, pickup, and courier is entered in the "Remarks" section. The custodian then enters the sample numbers into a bound notebook, which is arranged by project code and station number.

The laboratory custodian uses the sample identification number or assigns a unique laboratory number to each sample, and is responsible for seeing that all samples are transferred to the proper analyst or stored in the appropriate secure area.

The custodian distributes samples to the appropriate analysts. Laboratory personnel are responsible for the care and custody of samples from the time they are received, until the sample is exhausted or returned to the custodian. The data from sample analyses are recorded on the laboratory report form.

When sample analyses and necessary QA checks have been completed in the laboratory, the unused portion of the sample will be disposed of properly. All identifying stickers, data sheets, and laboratory records are retained as part of the documentation. Sample containers and remaining samples are disposed of in compliance with all federal, state, and local regulatory requirements.

3.3.2 CUSTODY SEALS

When samples are shipped to the laboratory, they must be placed in containers sealed with custody seals. One or more custody seals must be placed on each side of the shipping container (cooler).

3.3.3 FIELD NOTEBOOKS

Typical field information to be entered in the field notebook is included in the companion FSP (Section 6.8) (Earth Tech, 2006a). In addition to COC records, a bound field notebook must be maintained by each FTL to provide a daily record of significant events, observations, and measurements during field investigations. All entries should be signed and dated. It should be kept as a permanent record.

3.3.4 CORRECTIONS TO DOCUMENTATION

All original data recorded in field notebooks, sample identification tags, COC records, and receipts-for-sample forms will be written with waterproof ink, unless prohibited by weather conditions. None of these accountable serialized documents are to be destroyed or thrown away, even if they are illegible or contain inaccuracies that require a replacement document.

If an error is made on an accountable document assigned to one team, the team leader may make corrections simply by drawing a single line through the error and entering the correct information. The erroneous information should not be obliterated. Any subsequent error discovered on an accountable document should be corrected by the person who made the entry. All subsequent corrections must be initialed and dated.

3.4 ANALYTICAL METHOD REQUIREMENTS

Project analytes, methods and detection limits have been listed in Tables 5 and 6. Soil samples will be analyzed for pesticides in accordance with EPA Method 8081A, and for PCBs in accourdance with EPA Method 8082. Tables 5 and 6 show the project required reporting limits. Some regulatory or risk limits are lower than the standard reporting limits. Where the lowest regulatory limit is lower than the analytical reporting limit, the laboratory –specific MDLs are expected to be significantly below the listed reporting limit.

Soil analyses for pesticides will be performed using EPA SW846 Method 8081A, modified to include the 2,4- isomers listed in **Table 5**. All method analytes, as listed in **Tables C and D** in **Appendix B** will be reported by the laboratory. The method's standard operating procedures including calibration and QC procedural details, level of effort (frequency of QC runs), control limits, and corrective action requirements are provided in Section 2.5 and **Table 5**. The laboratories will report non-diluted and diluted results to ensure that the lowest detection is attained for all compounds.

Analysis of QA/QC water samples (equipment blanks and field blanks) collected during the project will be performed using EPA SW846 methods 8081A and 8082 as detailed in **Tables 5** and **6**, and **Tables C**, **D**, **E** and **F** in **Appendix B**.

IDW derived during the sampling under this project will be analyzed using standard waste characterization methods. Additional analyses as identified by the waste facility may be added to the list. As needed for waste characterization, aqueous samples may be prepared using EPA Method 1311, prior to analysis of the leachate by EPA SW 846 methods and QC procedures. Waste analyses will also be consistent with California Title 22 specifications. **Tables A** and **B** in **Appendix B** list the respective analytes that will be reported with their associated reporting limits.

3.5 QUALITY CONTROL REQUIREMENTS

QC requirements are detailed in the subsections below.

3.5.1 FIELD QC PROCEDURES

A field QC program will be implemented to help maintain the required level of confidence in the field data and to provide cross-checks on the laboratory performing the analyses. QC requirements related to the sampling process (i.e., design, methods, and handling and custody) are discussed in the previous sections of this document. The following types of field QC samples will be collected:

- Duplicate samples for pesticides and PCBs (10 percent)
- Equipment rinsate samples using Type II reagent water (each day of sampling)
- Matrix spike/matrix spike duplicate samples (5 percent)

Field QC samples include field duplicates, equipment blanks, and laboratory QC samples (for example, matrix spike and matrix spike duplicates [MS/MSDs]). QC samples will be collected immediately following collection of target samples, and using the same procedures as the collection of the target sample. These procedures are presented in the companion FSP.

3.5.2 LABORATORY PROCEDURES

Laboratory QC procedures will be conducted according to the following specifications:

- Analytical methodology according to the specific methods listed in **Appendix B**
- Instrument calibrations and standards as defined in specific methods listed in **Appendix B**
- Laboratory blank measurements at a minimum of 5 percent or 1-per-batch frequency
- Accuracy and precision measurements at a minimum of 1 in 20
- Data reduction and reporting according to the specific methods listed in **Tables 5** and **6**
- Laboratory documentation equivalent to the specifications in **Appendix B**

3.6 INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE REQUIREMENTS

Instrument maintenance logbooks are to be maintained in laboratories at all times. The logbooks, in general, shall contain a schedule of maintenance, as well as a complete history of past maintenance, both routine and nonroutine.

Preventive maintenance is to be performed according to the procedures described in the manufacturer's instrument manuals, including lubrication, source cleaning, detector cleaning, and the frequency of such maintenance. Chromatographic carrier gas-purification traps, injector liners, and injector septa are cleaned or replaced on a regular basis. Precision and accuracy data are examined for trends and excursions beyond control limits to determine evidence of instrument malfunction. Maintenance will be performed when an instrument begins to degrade as evidenced by the degradation of peak resolution, shift in calibration curves, decrease in sensitivity, or failure to meet one or another of the QC criteria.

Instrument downtime shall be minimized by keeping adequate supplies of all expendable items, where expendable means an expected lifetime of less than 1 year. These items include gas tanks, gasoline filters, syringes, septa, gas chromatography (GC) columns and packing, ferrules, printer paper and ribbons, pump oil, jet separators, open-split interfaces, and mass spectroscopy filaments.

Preventive maintenance for field equipment (i.e., photo-ionization detector) will be carried out in accordance with procedures and schedules outlined in the operation and maintenance handbook for the particular model.

3.7 INSTRUMENT CALIBRATION AND FREQUENCY

The following subsections review instrument calibration and frequency information.

3.7.1 FIELD CALIBRATION PROCEDURES

Field equipment requiring calibration will be calibrated before the start of work and at the end of the sampling day. Any instrument "drift" from prior calibration should be recorded in a field notebook. Calibration will be in accordance with procedures and schedules outlined in the operation and maintenance manual for the particular instrument.

Calibrated equipment will be uniquely identified either by using the manufacturer's serial number or by other means. A label with the identification number and the date when the next calibration is due will be physically attached to the equipment. If this is not possible, records traceable to the equipment will be readily available for reference. In addition, the results of calibrations and records of repairs will be recorded in a logbook.

Scheduled periodic calibration of testing equipment does not relieve field personnel of the responsibility of employing properly functioning equipment. If an individual suspects an equipment malfunction, the device must be removed from service, it must be tagged so that it is not inadvertently used, and the appropriate personnel must be notified so that a recalibration can be performed or a substitute piece of equipment can be obtained.

Equipment that fails calibration or becomes inoperable during use will be removed from service and either segregated to prevent inadvertent use, or tagged to indicate it is out of calibration. Such equipment will be repaired and satisfactorily recalibrated. Equipment that cannot be repaired will be replaced.

Results of activities performed using equipment that has failed recalibration will be evaluated. If the activity results are adversely affected, the results of the evaluation will be documented and the task manager and QA/QC reviewer will be notified.

3.7.2 LABORATORY CALIBRATION PROCEDURES

Laboratory calibration procedures, both initial and continuing calibrations, are specified for each analytical methodology and parameter in **Tables 5** and **6**. The calibration procedures vary slightly for each method or parameter.

3.8 DATA ACQUISITION REQUIREMENTS (NONDIRECT MEASUREMENTS)

Previously collected data and other information will be used to assist decisionmaking regarding activities during the soil investigation. The data have been tabulated and are shown in Section 2.0 above.

3.9 DATA MANAGEMENT

All data will undergo two levels of review and validation: (1) at the laboratory, and (2) outside the laboratory.

Data management can be defined as comprising the functions of creating and accessing stored data, enforcing data storage conventions, and regulating data input and output. The stored data will include parameters measured in soils at the site.

For this project, data management will involve the use of a computerized data management system. The system will provide a centralized, secure location for data of known quality that can be shared and used for multiple purposes. The data management system will assist in the information flow for the project by providing a means of cataloging, organizing, archiving, and accessing information.

The data management system will include three main elements:

1. The database: An organized and structured storehouse of data used for multiple purposes. Initially, a spreadsheet program will be used; if justified by project needs, a relational database will be used later.

2. Data management procedures: The steps involved in the data management process.

3. Personnel: The project staff who develop, implement, and administer the database and procedures.

These elements are briefly described in the following subsections.

3.9.1 THE DATABASE

A spreadsheet or database will be created to store data collected as part of this effort. Software to be used in support of the spreadsheet or relational database may be Microsoft Excel or Microsoft Access, respectively.

3.9.2 DATA MANAGEMENT PROCEDURES

Data management procedures are a crucial part of the data management system. Established procedures are necessary to ensure consistency among data sets; internal database integrity; and a verified, usable data set. The tasks and procedures that will be performed for all project data before they are entered include:

- Data mapping. The process by which the collected environmental data are selected, marked, and correctly named for entry into the database.

- Electronic data interchange. To facilitate data interchange between the analytical laboratory and the data user, detailed specifications will be developed for both receipt and delivery of electronic data, including data importing and data exporting.

- Data entry and verification. The process by which data are correctly entered into the database, including data preparation, data import and entry, and data verification.

- Data presentation and analysis. Data from the database may be presented in two types of reports: (1) appendix-style reports (tabular listings sorted by station and sample identification), and (2) summary statistics (i.e., frequency of detection, mean, minimum values, maximum values, standard deviation, and variance) sorted by station, depth, and parameter.

- Data administration. Effective administration of the data management system will reduce the likelihood of errors and ensure the integrity of the database. Data administration tasks include data redundancy control, operation and maintenance of the database, documentation of the data management process, and closing out the data management task in both interim and final stages of completion.

3.9.3 PERSONNEL

Successful implementation of a data management system requires a clear definition of responsibilities. The project data coordinator and a database technician will carry out the data management system. The project data coordinator has an overall view of the project. Responsibilities include database integrity, redundancy control, data sharing and version control, performance, security, and backup. The database technician has a comprehensive understanding of the database structure, software, and associated analysis tools. Responsibilities include data logging and tracking, data preparation, data entry and verification, data archiving, data requests, and report generation.

4.0 ASSESSMENT/OVERSIGHT

4.1 ASSESSMENT AND RESPONSE ACTIONS

The SM, QAO, and RTL will monitor and audit the performance of the QA procedures.

The QAO or RTL will conduct at a minimum, one comprehensive field audit at the beginning of the sampling program. If problems arise, additional field audits may be scheduled. The audit will evaluate (1) the execution of sample identification, COC procedures, field notebooks, sampling procedures, and field measurements; (2) whether trained personnel staffed the sample event; (3) whether equipment was in proper working order; (4) availability of proper sampling equipment; (5) whether appropriate sample containers, sample preservatives, and techniques were used; (6) whether sample packaging and shipment were appropriate; and (7) whether QC samples were properly collected.

The laboratories may be audited, prior to the start of analyses, by a project chemist/QAO not assigned to the laboratory. Severn Trent Laboratories in West Sacramento, California has been selected as the analytical laboratory for the soil sampling program. This analytical laboratory has previously been contracted for soil and groundwater work for Earth Tech projects and has previously been audited by Earth Tech in advance of and during that work. Throughout the duration of this project, EPA may submit, at its discretion, performance evaluation samples along with the routine project samples to monitor laboratory performance. A paper audit has been scheduled prior to using the laboratory for this investigation program.

Audits, if necessary, will be followed up with an audit report prepared by the reviewer. The auditor will also debrief the laboratory or the field team at the end of the audit and request that the laboratory or field team comply with the corrective action request, if any.

4.1.1 REPORTING AND RESOLUTION OF ISSUES

If QA/QC audits result in detection of unacceptable conditions or data, the SM will be responsible for developing and initiating corrective action. The EPA RPM will be notified if nonconformance is of program significance or requires special expertise not normally available to the project team. Corrective action may include:

- Reanalyzing samples if holding time criteria permits
- Resampling and analyzing
- Evaluating and amending sampling and analytical procedures
- Accepting data acknowledging a level of uncertainty

4.2 REPORTS TO MANAGEMENT

The SM may request that a QA report be prepared for the RPM on the performance of sample collection and data quality. The report will include:

- Assessment of measurement data quality
- Results of performance audits
- Results of systems audits
- Significant QA problems and recommended solutions

QA reports generated on sample collection and data quality will focus on specific problems encountered and solutions implemented. The project objectives, activities performed for overall results, sampling, and field measurement data quality information will be summarized and included in the final report along with all QA reports.

5.0 DATA VALIDATION AND USABILITY

5.1 DATA REVIEW, VALIDATION, AND VERIFICATION REQUIREMENTS

Data for all parameters will undergo two levels of review and validation: (1) at the laboratory, and (2) outside the laboratory by the QAO or their designee. A minimum of 10 percent of the data will undergo validation of full raw data packages, i.e., EPA Region 9 Tier 3 (EPA, 2001b), and the remaining 90 percent will be validated per EPA Region 9 Tier 2 (EPA, 2001b), as described in Section 4.2.1.

5.2 VALIDATION AND VERIFICATION METHODS

Initial data reduction, validation, and reporting at the laboratory will be carried out as described in the laboratory standard operating procedures.

Independent data validation outside the laboratory will follow EPA National Functional Guidelines for Data Review (EPA, 1994a; revised 1999, respectively) as applicable to SW 846 methods used for the project.

5.2.1 VERIFICATION AND VALIDATION OF LABORATORY DATA

Earth Tech will verify all project laboratory data packages. Verification will consist of reviewing data packages for completeness and compliance with respect to the methods, requirements, and objectives stated in this QAPP. Verification will be performed by the Earth Tech QAO or their designee, and will be documented in permanent worksheets to be maintained in the project files and summarized in the Quality Assurance Summary Reports (QASRs).

Earth Tech will validate the project laboratory data in accordance with the QA requirements and control limits specified in this Revised QAPP, and the following USEPA guidance, as appropriate:

- USEPA *National Functional Guidelines for Organic Data Review,* EPA/540/R-99/008 (October 1999)

The reviewer's professional judgment will be used to evaluate data quality when called for in the Functional Guidelines.

Tier 3 Data Validation

Earth Tech will request that the project analytical laboratory provide all reports as full raw data packages. Earth Tech will select a minimum of 10 percent of the samples using a random selection process over the time period of sample collection, and review and validate the full raw data packages for these selected samples per Tier 3 (as defined by EPA guidance [EPA, 2001b]). Critical samples or other samples determined to be of decision-making significance will be included in the 10 percent. In advance of conducting the Tier 3 data validations, Earth Tech will provide EPA with the list of the selected samples for review and approval. Validation of raw data packages will consist of review of all summary forms, as well as review of raw data for acceptable calibration criteria and frequency, spot checks of calculations, use of proper procedures as documented in the laboratory notebooks, etc. Data validation will include checking that required QC samples (e.g., method blanks, laboratory control samples [LCS], matrix spikes/matrix spike duplicates [MS/MSD]) have been performed at the required frequency and the QC acceptance criteria have been met. Surrogate spikes will be checked to verify that they were performed where required and that recovery acceptance criteria have been met. Initial and continuing calibration data will be reviewed for completeness and conformance to acceptance criteria. Quantitation limits will be verified. Sample data will checked to confirm that sample preparation and analysis were performed within holding times, and that second chromatographic column or mass spectrometer confirmation was performed where required. All laboratory blanks and field blanks will be checked for blank contamination.

Tier 2 Data Validation

Approximately 90 percent of the data will be validated based on summary QC data (including all QC data). This review/validation is designated as EPA Region 9 Tier 2. QC data to be reviewed for Tier 2 will include calibrations (initial and continuing), holding times, LCS, MS/MSD, surrogate recovery, blank contamination, tuning, internal standards areas/retention times, interference checks, and second column confirmation. If findings from the Tier 2 review indicate problems, EPA may require additional data to be reviewed per Tier 3.

Results from field duplicates will be compared and relative percent difference (RPD) values will be calculated, where possible. Data are evaluated but no qualifiers will be assigned based on duplicate results. Blank evaluation will be based on contamination in both laboratory blanks and field blanks. Sample results less than five times the maximum level found in the associated blanks (or less than 10 times for common laboratory contaminants) will be qualified according to the blank qualification rules.

All deviations listed in the functional guidelines will be flagged as applicable to SW846 methods, what are used for the project.

5.3 RECONCILIATION WITH DATA QUALITY OBJECTIVES

Results obtained from the project will be reconciled with the requirements specified in **Table 2**. Assessment of data for precision, accuracy, and completeness will be per the following quantitative definitions.

Precision

If calculated from duplicate measurements:

$$RPD = \frac{(C_1 - C_2) \times 100\%}{(C_1 + C_2) / 2}$$

RPD = relative percent difference

C_1 = larger of the two observed values

C_2 = smaller of the two observed values

If calculated from three or more replicates, use relative standard deviation (RSD) rather than RPD:

$$RSD = (s / \bar{y}) \times 100\%$$

RSD = relative standard deviation

s = standard deviation

$\bar{y}$ = mean of replicate analyses

Standard deviation, s, is defined as follows:

$$S = \sqrt{\frac{\sum_{i=1}^{n}\left(y_i - \bar{y}\right)^2}{n-1}}$$

s = standard deviation

y_i = measured value of the i^{th} replicate

$\bar{y}$ = mean of replicate analyses

n = number of replicates

Accuracy

For measurements where matrix spikes are used:

$$\%R = 100\% \times \left[\frac{S - U}{C_{sa}}\right]$$

%R = percent recovery

S = measured concentration in spiked aliquot

U = measured concentration in unspiked aliquot

C_{sa} = actual concentration of spike added

For situations where a standard reference material (SRM) is used instead of or in addition to matrix spikes:

$$\%R = 100\% \times \left[\frac{C_m}{C_{sm}}\right]$$

%R = percent recovery

C_m = measured concentration of SRM

C_{sm} = actual concentration of SRM

Completeness (Statistical)

Defined as follows for all measurements:

$$\%C = 100\% \times \left[\frac{V}{T}\right]$$

%C = percent completeness

V = number of measurements judged valid

T = total number of measurements

Representativeness

Representativeness is a measure of how closely the results reflect the actual concentration or distribution of the chemical compounds in the matrix samples. Sampling plan design, sampling techniques, and sample-handling protocols (for example, for storage, preservation, and transportation) have been developed, and are discussed in previous sections of this document. The proposed documentation will be reviewed to establish that protocols have been followed, that the number and location of samples are per plans, and that sample identification and integrity have been ensured.

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TABLES

Table 1. Summary of Detected Pesticides/PCBs and TPH in Soil Samples
ECI Property, 20846 Normandie Avenue, Torrance, CA

SOIL INVESTIGATION FOR HISTORICAL STORMWATER PATHWAY - SOUTH
MONTROSE CHEMICAL SUPERFUND SITE, LOS ANGELES COUNTY, CALIFORNIA

Boring ID	Sample Number	Sample Date	Depth (feet)	Total DDT	4,4'-DDD	4,4'-DDE	4,4'-DDT	Chlordane	cis-Chlordane	gamma-Chlordane	Dieldrin	Alpha-BHC	Beta-BHC	Delta-BHC	Gamma-BHC	Aroclor 1254	Aroclor 1260	TPH-Gas	TPH-Diesel	TPH-Oil
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
UNK	DUP-01-060205	06/02/05	NA	3.0	1.4	1.2	0.4	0.0085 U	--	0.001 U	0.002 U	0.001 U	0.001 U	0.001 U	0.001 U	0.072	0.043			
EX-SB03-BE1-02	EX-SB03-BE1-02	03/17/05	2	0.0	0.0065	0.0036	0.0077	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.028	0.081			
EX-SB03-BE2-02	EX-SB03-BE2-02	03/17/05	2	0.0	0.01	0.014	0.024	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.024	0.057			
EX-SB03-BEA-04	EX-SB03-BEA-04	05/17/05	4	0.1	0.0051	0.0089	0.091	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.01 J	0.044			
EX-SB03-BTH-05	EX-SB03-BTH-05	05/27/05	5	0.0	0.0081	0.0032	0.0053	0.005 U	0.001	0.0013	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.009 J			
EX-SB03-BTCC-06	EX-SB03-BTCC-06	06/09/05	6	0.0	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB03-BTJ-05	EX-SB03-BTJ-05	06/02/05	5	0.0	0.0005 U	0.0005 U	0.0008 J	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.001 U	0.001 U	0.001 U	0.001 U	0.016 U	0.016 U			
EX-SB03-BW1-02	EX-SB03-BW1-02	03/17/05	2	0.0	0.0064	0.0095	0.017	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.018	0.005 U			
EX-SB03-BW2-02	EX-SB03-BW2-02	03/17/05	2	0.0	0.0055	0.0055	0.0083	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.023	0.03			
EX-SB03-SE-01	EX-SB03-SE-01	03/17/05	1	0.1	0.01 U	0.01 U	0.059	0.1 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.25	1.3			
EX-SB03-SEF-03	EX-SB03-SEF-03	05/27/05	3	0.0	0.0066	0.0032	0.0093	0.015	0.0006 J	0.0019	0.001 J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.031			
EX-SB03-SN-01	EX-SB03-SN-01	03/17/05	1	0.3	0.054	0.05	0.21	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.031	0.075			
EX-SB03-SNB-03	EX-SB03-SNB-03	05/17/05	3	0.0	0.011	0.0044	0.0005 U	0.026	0.0034	0.0033	0.0066	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB03-SNBB-03	EX-SB03-SNBB-03	06/09/05	3	0.0	0.0033	0.002 J	0.014	0.007 J	0.0005 U	0.0005 U	0.0005 J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.01 J			
EX-SB03-SNC-03	EX-SB03-SNC-03	05/17/05	3	0.0	0.006	0.0046	0.006	0.005 U	0.0005 U	0.0005 U	0.001 J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.019	0.037			
EX-SB03-SNE-03	EX-SB03-SNE-03	05/27/05	3	0.0	0.0094	0.0051	0.014	0.015	0.0014	0.0018	0.002 J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.052			
EX-SB03-SNR-05	EX-SB03-SNR-05	06/02/05	5	0.0	0.01	0.01	0.023	0.016	0.0015	0.0017	0.0023	0.001 U	0.001 U	0.001 U	0.001 U	0.031	0.083			
EX-SB03-SS-01	EX-SB03-SS-01	03/17/05	1	0.0	0.0082	0.0043	0.022	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.017	0.005 U			
EX-SB03-SW-01	EX-SB03-SW-01	03/17/05	1	0.0	0.014	0.0095	0.021	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.046	0.005 U			
EX-SB03-SWAA-03	EX-SB03-SWAA-03	06/09/05	3	0.0	0.0029	0.001 J	0.02	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.007 J			
EX-SB03-SWG-03	EX-SB03-SWG-03	05/27/05	3	0.0	0.0044	0.0074	0.0066	0.012	0.0013	0.0017	0.0045	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.029			
EX-SB03-SWI-03	EX-SB03-SWI-03	06/02/05	3	0.0	0.0066	0.0028	0.0054	0.005 U	0.001 J	0.0007 J	0.0005 U	0.001 U	0.001 U	0.001 U	0.001 U	0.026	0.057			
EX-SB05-BN-12	EX-SB05-BN-12	03/17/05	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 U	33	66
EX-SB05-BS-12	EX-SB05-BS-12	03/17/05	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 U	60	150
EX-SB05-BTAA-15	EX-SB05-BTAA-15	06/03/05	15	9.1	3.5	0.36	5.2	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.005 U	0.022			
EX-SB05-BTBB-15	EX-SB05-BTBB-15	06/03/05	15	9.2	3.3	0.78	5.1	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.005 U	0.029			
EX-SB05-BTFF-09	EX-SB05-BTFF-09	06/03/05	9	5.4	1.4	0.42	3.6	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.021	0.017			
EX-SB05-BTI-07	EX-SB05-BTI-07	05/18/05	7	0.0	0.026	0.005 J	0.011	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.005 U			
EX-SB05-BTII-09	EX-SB05-BTII-09	06/08/05	9	0.8	0.55	0.086	0.15	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0023	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB05-BTJ-12	EX-SB05-BTJ-12	05/18/05	12	17.7	10	0.9	6.8	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.063			
EX-SB05-BTN-09	EX-SB05-BTN-09	05/26/05	9	0.3	0.21	0.025	0.049	0.025 U	0.0025 U	0.0005 U	0.0005 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.005 U			
EX-SB05-BTO-09	EX-SB05-BTO-09	05/26/05	9	1.2	0.44	0.11	0.63	0.1 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.005 U	0.005 U			
EX-SB05-BTS-12	EX-SB05-BTS-12	03/17/05	12	33.3	19	1.3	13	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.11	0.071			
EX-SB05-BTW-07	EX-SB05-BTW-07	06/02/05	7	3.5	1.6	0.3	1.6	0.5 U	0.05 U	0.05 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U	0.022	0.01J			
EX-SB05-BTX-07	EX-SB05-BTX-07	06/02/05	7	0.0	0.0084	0.001 J	0.011	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.001 U	0.001 U	0.001 U	0.001 U	0.016 U	0.016 U			
EX-SB05-SE-05	EX-SB05-SE-05	03/17/05	5	325.1	12	3.1	310	0.005 U	0.0005 U	0.0005 U	0.012	0.0005 U	0.0023	0.0005 U	0.0005 U	0.005 U	0.005 U	1 U	18	37
EX-SB05-SE-10	EX-SB05-SE-10	03/17/05	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 U	160	440
EX-SB05-SECC-05	EX-SB05-SECC-05	06/03/05	5	10.5	0.97	0.87	8.7	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U			
EX-SB05-SED-05	EX-SB05-SED-05	05/18/05	5	11.5	0.92	1.1	9.5	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB05-SEE-05	EX-SB05-SEE-05	05/18/05	5	13.7	3.3	1.6	8.8	0.005 U	0.0005 U	0.0005 U	0.003	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.045	0.005 U			
EX-SB05-SEHH-05	EX-SB05-SEHH-05	06/08/05	5	69.0	13	2 J	54	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.005 U			
EX-SB05-SEL-05	EX-SB05-SEL-05	05/26/05	5	6.5	0.62	0.7	5.2	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.063	0.032			
EX-SB05-SER-05	EX-SB05-SER-05	05/26/05	5	1.7	0.19	0.32	1.2	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.041	0.029			
EX-SB05-SEV-05	EX-SB05-SEV-05	06/02/05	5	3.4	0.85	0.26	2.3	0.5 U	0.05 U	0.05 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01J	0.01J			
EX-SB05-SN-05	EX-SB05-SN-05	03/17/05	5	1.1	0.33	0.21	0.6	0.05 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.033	1 U	180	610
EX-SB05-SN-10	EX-SB05-SN-10	03/17/05	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 U	74	200
EX-SB05-SNDD-05	EX-SB05-SNDD-05	06/03/05	5	50.9	4.8	2.1	44	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.005 U	0.005 U			
EX-SB05-SNF-05	EX-SB05-SNF-05	05/18/05	5	2.6	0.79	0.35	1.5	0.005 U	0.0005 U	0.0005 U	0.0021	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.042	0.023			
EX-SB05-SNG-05	EX-SB05-SNG-05	05/18/05	5	9.2	2.2	0.58	6.4	0.005 U	0.0005 U	0.0005 U	0.002J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.033	0.021			
EX-SB05-SNGG-05	EX-SB05-SNGG-05	06/08/05	5	6.3	1	0.35	4.9	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.098	0.033			
EX-SB05-SNK-05	EX-SB05-SNK-05	05/26/05	5	10.3	1.8	1.4	7.1	1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.005 U	0.005 U			
EX-SB05-SS-05	EX-SB05-SS-05	03/17/05	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 U	10 U	15
EX-SB05-SS-10	EX-SB05-SS-10	03/17/05	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 U	110	270
EX-SB05-SSA-05	EX-SB05-SSA-05	05/18/05	5	1.9	0.91	0.16	0.83	0.005 U	0.0005 U	0.0005 U	0.0046	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.13	0.024			
EX-SB05-SSB-05	EX-SB05-SSB-05	05/18/05	5	1.1	0.27	0.18	0.67	0.005 U	0.0005 U	0.0005 U	0.002 J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.01 J			
EX-SB05-SSC-05	EX-SB05-SSC-05	05/18/05	5	10.0	2.8	1.2	6	0.005 U	0.0005 U	0.0005 U	0.0032	0.0011	0.0009 J	0.0005 U	0.0005 U	0.005 U	0.034			

Table 1. Summary of Detected Pesticides/PCBs and TPH in Soil Samples
ECI Property, 20846 Normandie Avenue, Torrance, CA

SOIL INVESTIGATION FOR HISTORICAL STORMWATER PATHWAY - SOUTH
MONTROSE CHEMICAL SUPERFUND SITE, LOS ANGELES COUNTY, CALIFORNIA

Boring ID	Sample Number	Sample Date	Depth (feet)	Total DDT	4,4'-DDD	4,4'-DDE	4,4'-DDT	Chlordane	cis-Chlordane	gamma-Chlordane	Dieldrin	Alpha-BHC	Beta-BHC	Delta-BHC	Gamma-BHC	Aroclor 1254	Aroclor 1260	TPH-Gas	TPH-Diesel	TPH-Oil
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EX-SB05-SSM-05	EX-SB05-SSM-05	05/26/05	5	9.5	1.1	0.63	7.8	1 U	0.01 U	0.01 U	0.01 U	0.1 U	0.1 U	0.1 U	0.1 U	0.005 U	0.029			
EX-SB05-SSQ-05	EX-SB05-SSQ-05	05/26/05	5	0.9	0.43	0.11	0.31	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB05-SSU-05	EX-SB05-SSU-05	06/02/05	5	0.8	0.25	0.15	0.36	0.1 U	0.01 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.02 U	0.051	0.017			
EX-SB05-SW-05	EX-SB05-SW-05	03/17/05	5	3.3	1.3	0.34	1.7	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.038	1 U	170	480
EX-SB05-SW-10	EX-SB05-SW-10	03/17/05	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 U	97	230
EX-SB05-SWEE-05	EX-SB05-SWEE-05	06/03/05	5	53.9	6.1	1.8	46	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.005 U	0.005 U			
EX-SB05-SWFF-05	EX-SB05-SWFF-05	06/08/05	5	0.5	0.2	0.13	0.15	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.037	0.018			
EX-SB05-SWH-05	EX-SB05-SWH-05	05/18/05	5	1.7	0.56	0.26	0.91	0.005 U	0.0005 U	0.0005 U	0.002J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.038	0.02			
EX-SB05-SWP-05	EX-SB05-SWP-05	05/26/05	5	1.4	0.86	0.11	0.43	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB05-SWT-05	EX-SB05-SWT-05	06/02/05	5	4.0	0.26	0.49	3.2	0.5 U	0.05 U	0.05 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U	0.005 U	0.026			
EX-SB09-BE-035	EX-SB09-BE-035	03/17/05	3.5	10.8	0.82	0.73	9.2	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB09-BTE-05	EX-SB09-BTE-05	05/18/05	5	0.3	0.077	0.047	0.14	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB09-BTF-05	EX-SB09-BTF-05	05/18/05	5	2.4	0.45	0.34	1.6	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.01 J			
EX-SB09-BTI-05	EX-SB09-BTI-05	05/26/05	5	0.0	0.0026	0.0025	0.011	0.0091	0.001 J	0.0016	0.002 J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB09-BTO-05	EX-SB09-BTO-05	06/02/05	5	0.1	0.099	0.006	0.015	0.016	0.0028	0.003	0.0033	0.001 U	0.001 U	0.001 U	0.001 U	0.005 U	0.007 J			
EX-SB09-BTT-06	EX-SB09-BTT-06	06/09/05	6	3.1	1	0.19	1.9	0.05 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U			
EX-SB09-BW-035	EX-SB09-BW-035	03/17/05	3.5	0.9	0.07	0.04	0.74	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB09-SE-02	EX-SB09-SE-02	03/17/05	2	2.3	0.39	0.61	1.3	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.076	0.034			
EX-SB09-SEC-03	EX-SB09-SEC-03	05/18/05	3	2.4	0.5	0.73	1.2	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.081	0.046			
EX-SB09-SED-03	EX-SB09-SED-03	05/18/05	3	18.1	2.6	2.5	13	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.073	0.042			
EX-SB09-SEG-03	EX-SB09-SEG-03	05/26/05	3	6.9	1	0.63	5.3	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.005 U	0.005 U			
EX-SB09-SEH-03	EX-SB09-SEH-03	05/26/05	2	12.3	1.9	1.3	9.1	1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.005 U	0.055			
EX-SB09-SEL-03	EX-SB09-SEL-03	06/02/05	3	2.4	0.94	0.75	0.69	0.5 U	0.05 U	0.05 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U	0.045	0.024			
EX-SB09-SEP-03	EX-SB09-SEP-03	06/03/05	3	5.7	2.4	2.3	1	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.095	0.054			
EX-SB09-SER-03	EX-SB09-SER-03	06/09/05	3	2.7	0.64	0.28	1.8	0.005 U	0.0027	0.0005 U	0.0024	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.02	0.022			
EX-SB09-SN-02	EX-SB09-SN-02	03/17/05	2	5.9	0.91	1.2	3.8	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.08	0.042			
EX-SB09-SNA-03	EX-SB09-SNA-03	05/18/05	3	0.7	0.075	0.22	0.43	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.008 J			
EX-SB09-SNB-03	EX-SB09-SNB-03	05/18/05	3	2.9	0.66	0.73	1.5	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.019			
EX-SB09-SNJ-03	EX-SB09-SNJ-03	05/26/05	3	8.2	1.4	1.1	5.7	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.075	0.026			
EX-SB09-SNQ-03	EX-SB09-SNQ-03	06/09/05	3	1.4	0.66	0.44	0.31	0.05 U	0.006 J	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.042	0.025			
EX-SB09-SS-02	EX-SB09-SS-02	03/17/05	2	0.2	0.055	0.065	0.067	0.096	0.009	0.018	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB09-SSK-03	EX-SB09-SSK-03	05/26/05	3	8.4	1.8	0.78	5.8	1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.005 U	0.005 U			
EX-SB09-SSM-03	EX-SB09-SSM-03	06/02/05	3	2.3	0.63	0.27	1.4	0.5 U	0.05 U	0.05 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U	0.027	0.017			
EX-SB09-SSS-03	EX-SB09-SSS-03	06/09/05	3	2.0	0.65	0.32	1	0.05 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.031	0.023			
EX-SB09-SW-02	EX-SB09-SW-02	03/17/05	2	0.0	0.001 J	0.0006 J	0.0027	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB09-SWN-03	EX-SB09-SWN-03	06/02/05	3	1.2	0.62	0.2 J	0.37	0.5 U	0.05 U	0.05 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U	0.023	0.019			
EX-SB20-BE-09	EX-SB20-BE-09	05/17/05	9	4.2	2.7	0.8	0.68	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.005 U			
EX-SB20-BTCC-11	EX-SB20-BTCC-11	06/08/05	11	17.9	12	1.5	4.4	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.001 J	0.018	0.0041	0.0005 U	0.005 U	0.005 U			
EX-SB20-BTCC-12	EX-SB20-BTCC-12	06/09/05	12	21.4	8.5	3.2	9.7	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.019	0.0025 U	0.0062	0.005 U	0.005 U			
EX-SB20-BTGG-11	EX-SB20-BTGG-11	06/09/05	11	21.8	16	1	4.8	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.085	0.056			
EX-SB20-BTI-11	EX-SB20-BTI-11	05/26/05	11	2.4	1.3	0.65	0.4	0.25 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.005 U	0.005 U			
EX-SB20-BTJ-11	EX-SB20-BTJ-11	05/26/05	11	4.8	2.6	1	1.2	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.005 U	0.005 U			
EX-SB20-BTU-11	EX-SB20-BTU-11	06/03/05	11	0.1	0.067	0.015	0.057	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.007 J			
EX-SB20-SE-01	EX-SB20-SE-01	05/18/05	1	-	--	--	--	--	--	--	--	--	--	--	--	0.033	0.025			
EX-SB20-SE-03	EX-SB20-SE-03	05/17/05	3	7.2	0.53	2.1	4.6	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB20-SE-07	EX-SB20-SE-07	05/17/05	7	32.4	4.1	4.3	24	0.005 U	0.0005 U	0.0005 U	0.015	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB20-SEAA-03	EX-SB20-SEAA-03	06/09/05	3	4.5	0.98	0.88	2.6	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	6.1	1.8			
EX-SB20-SEB-07	EX-SB20-SEB-07	05/26/05	7	0.0	0.0021	0.0079	0.028	0.061	0.015	0.017	0.0032	0.0005 U	0.0005	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB20-SEQ-03	EX-SB20-SEQ-03	06/02/05	3	0.1	0.015	0.028	0.058	0.12	0.029	0.028	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.005 U	0.005 U			
EX-SB20-SES-07	EX-SB20-SES-07	06/03/05	7	1.3	0.2 J	0.26	0.88	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.005 U	0.007 J			
EX-SB20-SN-01	EX-SB20-SN-01	05/18/05	1	-	--	--	--	--	--	--	--	--	--	--	--	0.005 U	0.025			
EX-SB20-SN-03	EX-SB20-SN-03	05/17/05	3	1.4	0.11	0.15	1.1	0.1 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.005 U	0.005 U			
EX-SB20-SN-07	EX-SB20-SN-07	05/17/05	7	3.4	0.26	0.099	3	0.35	0.031	0.05	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U			
EX-SB20-SNA-07	EX-SB20-SNA-07	05/26/05	7	24.7	1.3	2.4	21	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB20-SNBB-07	EX-SB20-SNBB-07	06/08/05	7	0.0	0.001 J	0.0058	0.013	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB20-SNDD-03	EX-SB20-SNDD-03	06/09/05	3	0.4	0.1	0.087	0.17	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.017	0.005 U			

Table 1. Summary of Detected Pesticides/PCBs and TPH in Soil Samples
ECI Property, 20846 Normandie Avenue, Torrance, CA

SOIL INVESTIGATION FOR HISTORICAL STORMWATER PATHWAY - SOUTH
MONTROSE CHEMICAL SUPERFUND SITE, LOS ANGELES COUNTY, CALIFORNIA

Boring ID	Sample Number	Sample Date	Depth (feet)	Total DDT	4,4'-DDD	4,4'-DDE	4,4'-DDT	Chlordane	cis-Chlordane	gamma-Chlordane	Dieldrin	Alpha-BHC	Beta-BHC	Delta-BHC	Gamma-BHC	Aroclor 1254	Aroclor 1260	TPH-Gas	TPH-Diesel	TPH-Oil
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EX-SB20-SNR-03	EX-SB20-SNR-03	06/02/05	3	7.1	1.1	1.2	4.8	0.5 U	0.05 U	0.05 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U	0.005 U	0.021			
EX-SB20-SNR-07	EX-SB20-SNR-07	06/03/05	7	1.1	0.2 J	0.23	0.65	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.044	0.02			
EX-SB20-SS-01	EX-SB20-SS-01	05/18/05	1	-	--	--	--	--	--	--	--	--	--	--	--	0.025	0.032			
EX-SB20-SS-03	EX-SB20-SS-03	05/17/05	3	21.3	3.4	1.9	16	0.005 U	0.0005 U	0.0005 U	0.0096	0.0005 U	0.0025	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB20-SS-07	EX-SB20-SS-07	05/17/05	7	23.7	8.4	2.3	13	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB20-SSC-03	EX-SB20-SSC-03	05/26/05	3	11.7	1.1	3.3	7.3	1.2 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.005 U	0.005 U			
EX-SB20-SSD-07	EX-SB20-SSD-07	05/26/05	7	2.6	0.21	0.2	2.2	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB20-SSE-03	EX-SB20-SSE-03	05/26/05	3	0.8	0.2	0.12	0.49	0.12 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.043	0.023			
EX-SB20-SSF-07	EX-SB20-SSF-07	05/25/05	7	1.5	0.39	0.16	0.95	0.25 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025	0.005 U			
EX-SB20-SSFF-03	EX-SB20-SSFF-03	06/09/05	3	1.0	0.53	0.14	0.34	0.05 U	0.005 J	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.055	0.035			
EX-SB20-SSM-03	EX-SB20-SSM-03	06/02/05	3	0.1	0.02	0.012	0.057	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.001 U	0.001 U	0.001 U	0.001 U	0.005 U	0.009 J			
EX-SB20-SSO-03	EX-SB20-SSO-03	06/02/05	3	12.9	1.2	1.9	9.8	0.5 U	0.05 U	0.05 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U	0.005 U	0.005 U			
EX-SB20-SW-01	EX-SB20-SW-01	05/18/05	1	-	--	--	--	--	--	--	--	--	--	--	--	0.005 U	0.028			
EX-SB20-SW-03	EX-SB20-SW-03	05/17/05	3	7.0	0.87	1.4	4.7	0.005 U	0.0005 U	0.0005 U	0.0009J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB20-SW-07	EX-SB20-SW-07	05/17/05	7	0.3	0.096	0.044	0.13	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB20-SWAA-07	EX-SB20-SWAA-07	06/08/05	7	27.7	2.8	0.88	24	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0069	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB20-SWBB-03	EX-SB20-SWBB-03	06/09/05	3	12.3	4	1.8	6.5	0.025 U	0.0025 U	0.0025 U	0.006 J	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.005 U			
EX-SB20-SWEE-03	EX-SB20-SWEE-03	06/09/05	3	1.7	0.31	0.32	1.1	0.096	0.011	0.021	0.008 J	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.005 U			
EX-SB20-SWG-03	EX-SB20-SWG-03	05/26/05	3	36.6	6.2	2.4	28 E	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.005 U	0.005 U			
EX-SB20-SWH-07	EX-SB20-SWH-07	05/26/05	7	0.4	0.11	0.021	0.25	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.01 J			
EX-SB20-SWL-03	EX-SB20-SWL-03	06/02/05	3	6.4	0.92	1.4	4.1	0.5 U	0.05 U	0.05 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U	0.005 U	0.024 U			
EX-SB20-SWN-03	EX-SB20-SWN-03	06/02/05	3	10.4	0.96	1.7	7.7	0.5 U	0.05 U	0.05 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U	0.005 U	0.005 U			
EX-SB20-SWP-07	EX-SB20-SWP-07	06/03/05	7	10.6	2.4	1.3	6.9	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.005 U	0.026			
EX-SB20-SWT-03	EX-SB20-SWT-03	06/02/05	3	7.1	1.1	1.2	4.8													
EX-SB32-BT-12	EX-SB32-BT-12	05/18/05	12	0.5	0.041	0.072	0.37	0.05 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.026			
EX-SB32-BTC-10	EX-SB32-BTC-10	06/02/05	10	7.1	0.24	0.49	6.4	0.11	0.022	0.028	0.014	0.001 U	0.001 U	0.001 U	0.001 U	0.045	0.079			
EX-SB32-BTH-12	EX-SB32-BTH-12	06/09/05	12	10.3	0.51	0.84	8.9	0.025 U	0.0025 U	0.0025 U	0.004 J	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.087	0.038			
EX-SB32-NA-09	EX-SB32-NA-09	06/02/05	9	3.6	0.2	0.87	2.5	0.2	0.04	0.044	0.0025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.031	0.054			
EX-SB32-SE-09	EX-SB32-SE-09	05/18/05	9	4.8	0.46	1.8	2.5	3.5	0.49	0.46	0.08J	0.025 U	0.025 U	0.025 U	0.025 U	0.005 U	0.005 U			
EX-SB32-SEB-09	EX-SB32-SEB-09	06/02/05	9	3.2	0.17	2.5	0.57	0.43	0.053	0.048	0.18	0.005 U	0.005 U	0.005 U	0.005 U	0.052	0.005 U			
EX-SB32-SEF-09	EX-SB32-SEF-09	06/09/05	9	0.8	0.036	0.31	0.5	0.2	0.038	0.043	0.024	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.068	0.046			
EX-SB32-SN-09	EX-SB32-SN-09	05/18/05	9	0.8	0.087	0.47	0.26	0.17	0.02	0.021	0.02 J	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.062			
EX-SB32-SNE-09	EX-SB32-SNE-09	06/09/05	9	1.1	0.062	0.69	0.33	0.2	0.036	0.037	0.1	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.029	0.06			
EX-SB32-SS-09	EX-SB32-SS-09	05/18/05	9	0.1	0.01	0.1	0.037	0.03 J	0.003 J	0.0086	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.018			
EX-SB32-SSD-09	EX-SB32-SSD-09	06/02/05	9	0.6	0.01 J	0.42	0.13	0.05 U	0.005 U	0.005 U	0.065	0.01 U	0.01 U	0.01 U	0.01 U	0.005 U	0.018			
EX-SB32-SSG-09	EX-SB32-SSG-09	06/09/05	9	0.6	0.023	0.52	0.078	0.011	0.0025	0.0024	0.026	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.021			
EX-SB32-SW-09	EX-SB32-SW-09	05/18/05	9	0.2	0.025	0.13	0.046	0.025 U	0.0025 U	0.0025 U	0.004 J	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.009 J			
EX-SB35-BTI-09	EX-SB35-BTI-09	05/17/05	9	1.7	0.15	0.21	1.3	0.1 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.005 U	0.005 U			
EX-SB35-BTM-09	EX-SB35-BTM-09	05/26/05	9	2.9	1.8	0.37	0.72	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB35-BTO-09	EX-SB35-BTO-09	06/03/05	9	7.5	1.8	1.5	4.2	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.11	0.067			
EX-SB35-BTV-12	EX-SB35-BTV-12	06/09/05	12	11.4	8.9	0.58	1.9	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.059	0.096			
EX-SB35-SEG-03	EX-SB35-SEG-03	05/17/05	3	0.7	0.034	0.11	0.52	0.043	0.0099	0.01	0.0029	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB35-SEH-07	EX-SB35-SEH-07	05/17/05	7	0.6	0.032	0.093	0.5	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.005 U			
EX-SB35-SEL-07	EX-SB35-SEL-07	05/26/05	7	4.0	0.2	0.5	3.3	0.005 U	0.0005 U	0.0005 U	0.02	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB35-SEQ-07	EX-SB35-SEQ-07	06/03/05	7	0.4	0.17	0.044	0.16	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.01 J	0.01 J			
EX-SB35-SNE-03	EX-SB35-SNE-03	05/17/05	3	2.3	0.19	0.56	1.5	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB35-SNF-07	EX-SB35-SNF-07	05/17/05	7	0.7	0.033	0.095	0.62	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB35-SNN-07	EX-SB35-SNN-07	06/03/05	7	4.1	1.6	0.16	2.3	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.034	0.024			
EX-SB35-SNS-07	EX-SB35-SNS-07	06/09/05	7	0.2	0.13	0.014	0.066	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.007 J			
EX-SB35-SSC-03	EX-SB35-SSC-03	05/17/05	3	2.5	0.19	0.44	1.9	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB35-SSD-07	EX-SB35-SSD-07	05/17/05	7	9.2	0.83	0.79	7.6	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB35-SSK-07	EX-SB35-SSK-07	05/26/05	7	7.8	0.57	0.9	6.3	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			
EX-SB35-SSP-07	EX-SB35-SSP-07	06/03/05	7	2.5	1.4	0.17	0.92	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.02	0.02 J			
EX-SB35-SSU-07	EX-SB35-SSU-07	06/09/05	7	2.0	1.2	0.32	0.47	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.022			
EX-SB35-SWA-03	EX-SB35-SWA-03	05/17/05	3	7.8	0.63	1.2	6	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.005 U			
EX-SB35-SWB-07	EX-SB35-SWB-07	05/17/05	7	5.6	1	1.2	3.4	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U			

Table 1. Summary of Detected Pesticides/PCBs and TPH in Soil Samples
ECI Property, 20846 Normandie Avenue, Torrance, CA

SOIL INVESTIGATION FOR HISTORICAL STORMWATER PATHWAY - SOUTH
MONTROSE CHEMICAL SUPERFUND SITE, LOS ANGELES COUNTY, CALIFORNIA

Boring ID	Sample Number	Sample Date	Depth (feet)	Total DDT	4,4'-DDD	4,4'-DDE	4,4'-DDT	Chlordane	cis-Chlordane	gamma-Chlordane	Dieldrin	Alpha-BHC	Beta-BHC	Delta-BHC	Gamma-BHC	Aroclor 1254	Aroclor 1260	TPH-Gas	TPH-Diesel	TPH-Oil
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EX-SB35-SWJ-07	EX-SB35-SWJ-07	05/26/05	7	5.6	0.73	1	3.9	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.081	0.039			
EX-SB35-SWR-07	EX-SB35-SWR-07	06/03/05	7	9.2	1	1.7	6.5	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.16	0.092			
EX-SB35-SWT-07	EX-SB35-SWT-07	06/09/05	7	0.9	0.28	0.11	0.48	0.05 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U			
SB-01	SB-01-020805-05	02/08/05	4-5	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	300	1000
SB-01	SB-01-020805-10	02/08/05	9-10	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	5 J	7 J
SB-02	SB-02-020805-05	02/08/05	4-5	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	6 J	4 J
SB-02	SB-02-020805-10	02/08/05	9-10	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	10 J	4 J
SB-03	SB-03-020805-01	02/08/05	0-1	0.0	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	2.4	0.31	--	--	--
SB-03	SB-03-020805-03	02/08/05	2-3	0.0	0.002 J	0.0005 U	0.001 J	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-03	SB-03-020805-05	02/08/05	4-5	0.0	0.0022	0.0007 J	0.0028	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	--	--	0.37 U	300	980
SB-03	SB-03-020805-10	02/08/05	9-10	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	9 J	6 J
SB-03	SB03A-041205-01	04/12/05	0-1	0.1	0.004	0.019	0.044	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.021	0.01 J	--	--	--
SB-03	SB03A-041205-03	04/12/05	2-3	0.1	0.021	0.022	0.055	0.05 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.022	0.01 J	--	--	--
SB-03	SB03B-041205-01	04/12/05	0-1	0.1	0.02 U	0.02 U	0.02 U	0.2 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	--	--	--
SB-03	SB03B-041205-03	04/12/05	2-3	0.0	0.0005 U	0.0005 U	0.002 J	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-04	SB-04-020805-05	02/08/05	4-5	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	170	380
SB-04	SB-04-020805-10	02/08/05	9-10	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	64	150
SB-05	DUP-02-020805	02/08/05	4-5	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	970	3600
SB-05	SB-05-020805-05	02/08/05	4-5	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	11	17
SB-05	SB-05-020805-10	02/08/05	9-10	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	7900	21000
SB-05	SB-05-020805-15	02/08/05	14-15	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	31	79
SB-06	SB-06-020805-05	02/08/05	4-5	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	5 J	6 J
SB-06	SB-06-020805-10	02/08/05	9-10	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	8 J	4 J
SB-07	SB-07-020805-05	02/08/05	4-5	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	9 J	7 J
SB-07	SB-07-020805-10	02/08/05	9-10	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	9 J	5 J
SB-08	SB-08-020805-05	02/08/05	4-5	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	11	16
SB-08	SB-08-020805-10	02/08/05	9-10	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	7 J	5 J
SB-09	SB-09-020805-01	02/08/05	0-1	0.0	0.0005 U	0.032	0.0031	0.005 U	0.011	0.015	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.029	0.005 U	--	--	--
SB-09	SB-09-020805-03	02/08/05	2-3	1.3	0.39	0.49	0.42	0.045	0.0039	0.0036	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-09	SB-09-020805-05	02/08/05	4-5	0.0	0.0005 U	0.0005 U	0.0005 J	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	--	--	0.37 U	12	28
SB-09	DUP-01-020805	02/08/05	9-10	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	9 J	10
SB-09	SB-09-020805-10	02/08/05	9-10	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	9 J	14
SB-09	SB09A-041205-03	04/12/05	2-3	0.5	0.29	0.13	0.084	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.018	--	--	--
SB-09	SB09A-041205-05	04/12/05	4-5	0.0	0.001 J	0.0071	0.0032	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.008 J	--	--	--
SB-09	SB09B-041205-03	04/12/05	2-3	0.0	0.002 J	0.0062	0.0031	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-09	SB09B-041205-05	04/12/05	4-5	1.9	0.42	0.32	1.2	0.026	0.005 U	0.005 U	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-09	SB09C-041205-03	04/12/05	2-3	10.1	2	1.1	7	0.005 U	0.005 U	0.005 U	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-09	SB09C-041205-05	04/12/05	4-5	0.4	0.18	0.057	0.18	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.005 U	--	--	--
SB-10	SB-10-020805-01	02/08/05	0-1	0.0	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-10	SB-10-020805-05	02/08/05	4-5	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	6 J	6 J
SB-10	SB-10-020805-10	02/08/05	9-10	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	5 J	7 J
SB-11	SB-11-020805-05	02/08/05	4-5	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	550	1500
SB-11	SB-11-020805-10	02/08/05	9-10	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	9 J	4 J
SB-12	SB-12-020805-01	02/08/05	0-1	0.0	0.0005 U	0.001 J	0.0005 U	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.029	0.009 J	--	--	--
SB-12	SB-12-020805-03	02/08/05	2-3	0.0	0.0044	0.039	0.0034	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-12	SB-12-020805-05	02/08/05	4-5	0.0	0.01	0.0055	0.002 J	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0008 J	--	--	0.37 U	30	36
SB-12	SB-12-020805-10	02/08/05	9-10	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	9 J	4 J
SB-13	SB-13-020805-05	02/08/05	4-5	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	140	310
SB-13	SB-13-020805-10	02/08/05	9-10	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	40	96
SB-14	SB-14-020805-05	02/08/05	4-5	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	120	280
SB-14	DUP-03-020805	02/08/05	9-10	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	34	46
SB-14	SB-14-020805-10	02/08/05	9-10	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	190	420
SB-15	SB-15-020805-05	02/08/05	4-5	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	7 J	4 J
SB-15	SB-15-020805-10	02/08/05	9-10	-	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37 U	6 J	4 J
SB-16	SB-16-032305-01	03/23/05	0-1	0.0	0.002 J	0.03	0.014	0.01	0.0005 U	0.0016	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.024	0.01 J	--	--	--
SB-16	SB-16-032305-03	03/23/05	2-3	0.1	0.027	0.025	0.016	0.005 U	0.0005 U	0.0005 U	0.0005 U	-	-	-	-	0.018	0.018	--	--	--

Table 1. Summary of Detected Pesticides/PCBs and TPH in Soil Samples
ECI Property, 20846 Normandie Avenue, Torrance, CA

SOIL INVESTIGATION FOR HISTORICAL STORMWATER PATHWAY - SOUTH
MONTROSE CHEMICAL SUPERFUND SITE, LOS ANGELES COUNTY, CALIFORNIA

Boring ID	Sample Number	Sample Date	Depth (feet)	Total DDT	4,4'-DDD	4,4'-DDE	4,4'-DDT	Chlordane	cis-Chlordane	gamma-Chlordane	Dieldrin	Alpha-BHC	Beta-BHC	Delta-BHC	Gamma-BHC	Aroclor 1254	Aroclor 1260	TPH-Gas	TPH-Diesel	TPH-Oil
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SB-16	SB-16-032305-05	03/23/05	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 U	41	75.9
SB-17	SB-17-032305-01	03/23/05	0-1	0.0	0.0005 U	0.0005 U	0.001 J	0.005 U	0.0008 J	0.001	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-17	SB-17-032305-03	03/23/05	2-3	0.0	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-18	SB-18-032305-01	03/23/05	0-1	0.2	0.0095	0.039	0.11	0.013	0.0007 J	0.0019	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.01 J	0.01 J	--	--	--
SB-18	SB-18-032305-03	03/23/05	2-3	0.0	0.001 J	0.016	0.0075	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-18	SB18A-041205-01	04/12/05	0-1	0.1	0.02 U	0.02 U	0.02 U	0.2 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	--	--	--
SB-18	SB18A-041205-03	04/12/05	2-3	0.0	0.002 J	0.018	0.0033	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-18	SB18B-041205-01	04/12/05	0-1	0.1	0.03 J	0.02 J	0.01 J	0.1 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.005 U	0.02	--	--	--
SB-18	SB18B-041205-03	04/12/05	2-3	0.0	0.002 J	0.0073	0.01	0.023	0.0044	0.0046	0.013	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.01 J	--	--	--
SB-18	SB18C-041205-01	04/12/05	0-1	0.1	0.023	0.01 J	0.047	0.05 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.025	--	--	--
SB-18	SB18C-041205-03	04/12/05	2-3	0.0	0.001 J	0.0074	0.012	0.005 U	0.0005 U	0.0006 J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-18	SB18C-041205-05	04/12/05	4-5	0.0	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-19	SB-19-032305-01	03/23/05	0-1	0.1	0.021	0.015	0.092	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.01 J	--	--	--
SB-19	SB-19-032305-03	03/23/05	2-3	5.7	0.31	0.87	4.5	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.005 U	--	--	--
SB-19	SB-19-032305-05	03/23/05	4-5	0.0	0.012	0.0025 U	0.003 J	0.025 U	0.004 J	0.0025 U	0.009 J	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.005 U	--	--	--
SB-19	SB-19-032305-07	03/23/05	6-7	0.0	0.007 J	0.005 U	0.005 U	0.05 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.008 J	--	--	--
SB-19	SB19A-041205-03	04/12/05	2-3	0.1	0.005 J	0.029	0.11	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.019	0.02	--	--	--
SB-19	SB19A-041205-05	04/12/05	4-5	0.3	0.035	0.059	0.23	0.05 U	0.009 J	0.01 J	0.008 J	0.005 U	0.005 U	0.005 U	0.005 U	0.025	0.01 J	--	--	--
SB-19	SB19A-041205-07	04/12/05	6-7	0.0	0.002 J	0.0052	0.029	0.018	0.0026	0.0033	0.0093	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.007 J	--	--	--
SB-19	SB19B-041205-03	04/12/05	2-3	2.6	0.1 J	0.1 J	2.4	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.005 U	0.005 U	--	--	--
SB-19	SB19B-041205-05	04/12/05	4-5	0.2	0.01	0.016	0.18	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.018	--	--	--
SB-19	SB19B-041205-07	04/12/05	6-7	0.0	0.01 J	0.01 U	0.01 U	0.1 U	0.01 U	0.01 U	0.01 J	0.01 U	0.01 U	0.01 U	0.01 U	0.005 U	0.01 J	--	--	--
SB-19	SB19C-041205-03	04/12/05	2-3	0.7	0.02 J	0.22	0.42	0.05 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	--	--	--
SB-19	SB19C-041205-05	04/12/05	4-5	0.9	0.056	0.33	0.52	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.037	0.027	--	--	--
SB-19	SB19C-041205-07	04/12/05	6-7	0.1	0.0088	0.01	0.056	0.016	0.0019	0.0026	0.001 J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.037	--	--	--
SB-20	SB-20-032305-01	03/23/05	0-1	0.2	0.022	0.063	0.16	0.05 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.22	0.07	--	--	--
SB-20	SB-20-032305-03	03/23/05	2-3	6.4	0.68	0.64	5.1	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0025	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-20	SB-20-032305-07	03/23/05	6-7	0.4	0.054	0.055	0.34	0.005 U	0.0009 J	0.0031	0.0005 J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-20	SB-20-032305-10	03/23/05	9-10	0.0	0.019	0.008 J	0.009 J	0.025 U	0.003 J	0.003 J	0.0025 J	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.005 U	--	--	--
SB-20	SB20A-041305-03	04/13/05	2-3	22.5	0.73	1.8	20	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-20	SB20A-041305-07	04/13/05	6-7	15.7	4.9	1.7	9.1	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.003 J	0.0025 U	0.0025 U	0.005 U	0.005 U	--	--	--
SB-20	SB20A-041305-10	04/13/05	9-10	0.4	0.21	0.036	0.14	0.05 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	--	--	--
SB-20	SB20B-041305-03	04/13/05	2-3	52.7	4	8.7	40	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.01	0.0025 U	0.0025 U	0.005 U	0.005 U	--	--	--
SB-20	SB20B-041305-07	04/13/05	6-7	0.3	0.024	0.028	0.2	0.005 U	0.0005 U	0.002	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-20	SB20B-041305-10	04/13/05	9-10	0.0	0.002 J	0.0006 J	0.0005 U	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-20	SB20C-041305-03	04/13/05	2-3	0.3	0.03 J	0.04 J	0.2	0.1 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.005 U	0.01 J	--	--	--
SB-20	SB20C-041305-07	04/13/05	6-7	0.1	0.0055	0.011	0.049	0.005 U	0.0005 U	0.0009 J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 J	--	--	--
SB-21	SB-21-032305-01	03/23/05	0-1	0.0	0.0005 U	0.004	0.001 J	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-21	SB-21-032305-03	03/23/05	2-3	0.0	0.001 J	0.0065	0.002 J	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-22	SB-22-032305-01	03/23/05	0-1	0.1	0.015	0.065	0.0041	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.01 J	0.008 J	--	--	--
SB-22	SB-22-032305-03	03/23/05	2-3	0.1	0.0074	0.058	0.0005 U	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.006 J	0.005 U	--	--	--
SB-23	SB-23-032305-01	03/23/05	0-1	0.3	0.1 U	0.1 U	0.1 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U	0.01 U	--	--	--
SB-23	SB-23-032305-03	03/23/05	2-3	0.0	0.001 U	0.001 U	0.001 U	0.01 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.01 U	--	--	--
SB-24	SB-24-032505-01	03/23/05	0-1	0.0	0.0092	0.012	0.028	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.01 J	0.005 U	--	--	--
SB-24	SB-24-032505-03	03/23/05	2-3	0.0	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-25	SB-25-032305-01	03/23/05	0-1	0.0	0.0062	0.019	0.02	0.041	0.0033	0.0044	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.019	0.018	--	--	--
SB-25	SB-25-032305-03	03/23/05	2-3	0.0	0.007 J	0.021	0.02 J	0.1	0.017	0.014	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.01 J	--	--	--
SB-26	SB-26-032305-01	03/23/05	0-1	0.0	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-26	SB-26-032305-03	03/23/05	2-3	0.0	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-27	SB-27-032305-01	03/23/05	0-1	0.0	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-27	SB-27-032305-03	03/23/05	2-3	0.0	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-27	SB-27-032305-05	03/23/05	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 U	3.8	--
SB-28	SB-28-032305-01	03/23/05	0-1	0.5	0.095	0.17	0.25	0.025 U	0.0025 U	0.0052	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.028	0.019	--	--	--
SB-28	SB-28-032305-03	03/23/05	2-3	0.6	0.063	0.23	0.33	0.03	0.0019	0.0031	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.034	0.023	--	--	--
SB-28	SB-28-032305-05	03/23/05	4-5	0.2	0.03	0.096	0.032	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-28	SB-28-032305-07	03/23/05	6-7	0.1	0.02 U	0.02 U	0.02 U	0.2 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	--	--	--

Table 1. Summary of Detected Pesticides/PCBs and TPH in Soil Samples
ECI Property, 20846 Normandie Avenue, Torrance, CA

SOIL INVESTIGATION FOR HISTORICAL STORMWATER PATHWAY - SOUTH
MONTROSE CHEMICAL SUPERFUND SITE, LOS ANGELES COUNTY, CALIFORNIA

Boring ID	Sample Number	Sample Date	Depth (feet)	Total DDT	4,4'-DDD	4,4'-DDE	4,4'-DDT	Chlordane	cis-Chlordane	gamma-Chlordane	Dieldrin	Alpha-BHC	Beta-BHC	Delta-BHC	Gamma-BHC	Aroclor 1254	Aroclor 1260	TPH-Gas	TPH-Diesel	TPH-Oil
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SB-28	SB28A-041305-03	04/13/05	2-3	0.2	0.033	0.04	0.08	0.05 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.026	--	--	--
SB-28	SB28A-041305-05	04/13/05	4-5	0.0	0.0009 J	0.009	0.002 J	0.005 U	0.0005 U	0.0012	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-28	DUP04-041305-00	04/13/05	2-3	1.1	0.062	0.22	0.78	0.04 J	0.0082	0.0072	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.021	--	--	--
SB-28	SB28B-041305-03	04/13/05	2-3	0.2	0.012	0.028	0.15	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.01 J	--	--	--
SB-28	SB28B-041305-05	04/13/05	4-5	0.6	0.067	0.2	0.33	0.04 J	0.004 J	0.0079	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.016	--	--	--
SB-28	SB28B-041305-07	04/13/05	6-7	0.4	0.1	0.22	0.066	0.005 U	0.0005 U	0.0005 U	0.0044	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.022	--	--	--
SB-28	SB28B-041305-10	04/13/05	9-10	0.6	0.051	0.48	0.037	0.005 U	0.0005 U	0.0005 U	0.011	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.022	0.028	--	--	--
SB-28	DUP02-041305-00	04/13/05	2-3	0.1	0.023	0.037	0.079	0.025 U	0.0025 U	0.0064	0.009 J	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.021	--	--	--
SB-28	SB28C-041305-03	04/13/05	2-3	0.7	0.043	0.21	0.43	0.04 J	0.004 J	0.0051	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.018	--	--	--
SB-28	SB28C-041305-05	04/13/05	4-5	2.9	0.84	0.95	1.1	0.05 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.022	--	--	--
SB-28	SB28C-041305-07	04/13/05	6-7	0.9	0.4	0.34	0.13	0.12 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.005 U	0.01 J	--	--	--
SB-28	SB28C-041305-10	04/13/05	9-10	2.5	1.1	0.86	0.5	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-29	SB-29-041305-03	04/13/05	2-3	0.3	0.038	0.057	0.16	0.03 J	0.0058	0.004 J	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.024	--	--	--
SB-29	SB-29-041305-07	04/13/05	6-7	0.3	0.093	0.07	0.11	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.008 J	--	--	--
SB-29	SB-29-041305-10	04/13/05	9-10	0.3	0.15	0.1	0.063	0.025 U	0.0025 U	0.0051	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.006 J	--	--	--
SB-30	SB-30-041305-03	04/13/05	2-3	0.0	0.0006 J	0.0008 J	0.002 J	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-30	DUP01-041305-00	04/13/05	4-5	0.1	0.024	0.049	0.014	0.044	0.004 J	0.0081	0.006 J	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.01 J	--	--	--
SB-30	SB-30-041305-07	04/13/05	4-5	0.1	0.035	0.019	0.009 J	0.025 U	0.0025 U	0.003 J	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.01 J	--	--	--
SB-30	SB-30-041305-10	04/13/05	9-10	0.1	0.13	0.011	0.0025 U	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.005 U	--	--	--
SB-31	SB-31-041305-03	04/13/05	2-3	3.6	0.14	0.71	2.7	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.005 U	--	--	--
SB-31	SB-31-041305-05	04/13/05	4-5	0.4	0.059	0.12	0.19	0.025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.01 J	--	--	--
SB-31	SB-31-041305-07	04/13/05	6-7	0.0	0.0005 U	0.004	0.0073	0.006 J	0.0011	0.0013	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.007 J	--	--	--
SB-32	SB-32-041205-03	04/12/05	2-3	1.2	0.27	0.38	0.54	0.1 U	0.01 J	0.022	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--	--	--
SB-32	SB-32-041205-07	04/12/05	6-7	2.1	0.25	0.45 E	1.4 E	0.025 U	0.0025 U	0.0025 U	0.01	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.005 U	--	--	--
SB-32	SB-32-041205-10	04/12/05	9-10	9.1	1.3	1.2	6.6	0.025 U	0.003 J	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.005 U	0.005 U	--	--	--
SB-33	SB-33-041205-03	04/12/05	2-3	0.1	0.004	0.042	0.019	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-33	SB-33-041205-07	04/12/05	6-7	0.0	0.0062	0.0078	0.012	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 J	--	--	--
SB-34	SB-34-041205-03	04/12/05	2-3	0.0	0.0035	0.0041	0.022	0.005 U	0.0007 J	0.0025	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.01 J	--	--	--
SB-34	SB-34-041205-07	04/12/05	6-7	0.0	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--
SB-35	SB-35-041205-03	04/12/05	2-3	12.6	0.62	2.3	9.7	1.2 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.005 U	0.005 U	--	--	--
SB-35	SB-35-041205-07	04/12/05	6-7	7.9	5.8	0.71	1.4	0.25 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	22	1.1	--	--	--
SB-35	SB-35-041205-10	04/12/05	9-10	0.3	0.170	0.037	0.057	0.005 U	0.001 U	0.001 U	0.001 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	--	--	--

Notes:
mg/kg = milligrams per kilogram
Only results with total DDT > 1.0 mg/kg were tabulated
NA = not available
Only 4,4' isomers were analyzed for DDE, DDT and DDD.
-- = not analyzed
Data Source: ECI, 2005.
Hard copy of data not included in CD received from EPA.
J = Concentration is estimated because it falls between the method detection limit and the laboratory reporting limit.
U = Concentration is non-detect at the laboratory reporting limit.
E = Concentration exceeds the upper level of the calibration range.
TPH = Total petroleum hydrocarbons
BHC = benzene hexachloride
DDE = 4,4'-dichlorodiphenyldichloroethene
DDT = 4,4'-dichlorodiphenyltrichloroethane
DDD = 4,4'-dichlorodiphenyldichloroethane

Table 2. Metals in Soil Samples

ECI Property, 20846 Normandie Avenue, Torrance, CA

SOIL INVESTIGATION FOR HISTORICAL STORMWATER PATHWAY - SOUTH
MONTROSE CHEMICAL SUPERFUND SITE, LOS ANGELES COUNTY, CALIFORNIA

Boring ID		**SB-03**	**SB-09**	**SB-10**	**SB-12**	**SB-16**	**SB-27**	**EPA PRGs**		**CA-specific EPA PRGs [a]**		**DTSC Soil Screening Values**	
Sample ID		SB-03-020805-01	SB-09-020805-01	SB-10-020805-01	SB-12-020805-01	SB-16-032305-01	SB-27-032305-01						
Depth (ft)		0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1						
Sample Date		2/8/2005	2/8/2005	2/8/2005	2/8/2005	3/23/2005	3/23/2005	Industrial	Residential	Industrial	Residential	Industrial	Residential
Constituent	**Reporting Limit**			**Results**									
Antimony	1.2	ND	ND	ND	ND	ND	ND	410	31	NA	NA	380	30
Arsenic	0.48	ND	ND	ND	ND	**1.3**	ND	1.6	0.39	0.25	0.062	0.24	0.07
Barium		120	63	57	190	140	190	67000	5400	NA	NA	63000	5200
Beryllium	0.45	ND	ND	ND	ND	ND	ND	1900	150	NA	NA	1700	150
Cadmium	0.52	ND	ND	ND	ND	ND	ND	450	37	NA	NA	7.5	1.7
Chromium		18	9.4	14	18	19	24	100000	100000	NA	NA	NA	NA
Cobalt		6.9	4.7	8.8	17	8.1	12	1900	900	NA	NA	3200	660
Copper		22	8.3	25	13	19	22	41000	3100	NA	NA	38000	3000
Lead		23	8.7	3.7	6.5	11	6.3	800	400	NA	150	3500	150
Mercury		0.12	0.08 J	0.02 J	0.04 J	0.03 J	0.01 J	310	23	NA	NA	180	18
Molybdenum	0.46	1.6	1.8	1.1	0.9 J	ND	ND	5100	390	NA	NA	4800	380
Nickel		13	11	9.3	13	14	17	NA	NA	NA	NA	16000	1600
Selenium	0.82	ND	ND	ND	ND	1.5	1.9	5100	390	NA	NA	4800	380
Silver	0.45	ND	ND	ND	ND	ND	ND	5100	390	NA	NA	4800	380
Thallium	0.92	ND	ND	ND	ND	ND	ND	67	5.2	NA	NA	63	5
Vanadium		31	22	27	58	34	51	100	78	NA	NA	6700	530
Zinc		69	26	29	34	51	61	100000	23000	NA	NA	100000	23000

Notes:

All concentrations are in mg/kg

NA = Not available

ND = Not detected

J = Concentration is estimated because it falls between the method detection limit and the laboratory reporting limit.

Bold values indicate concentration exceeds the residential preliminary remediation goal (PRG).

[a] The California-Modified PRGs are provided for chemicals where the Calfiornia PRGs set by DTSC were significantly more protective than the EPA Region 9 PRG. The California-Modified PRGs were used as the screening levels for contaminated sites, because they are more stringent than the federal numbers (EPA, 2002c).

Table 3. VOCs in Soil Samples

ECI Property, 20846 Normandie Avenue, Torrance, CA

SOIL INVESTIGATION FOR HISTORICAL STORMWATER PATHWAY - SOUTH
MONTROSE CHEMICAL SUPERFUND SITE, LOS ANGELES COUNTY, CALIFORNIA

Boring ID		**SB-01**	**SB-02**	**SB-03**	**SB-04**	**SB-05**	**SB-06**	**SB-07**	**SB-08**	**SB-09**	**SB-10**
Sample ID		SB-01-020805-10	SB-02-020805-10	SB-03-020805-10	SB-04-020805-10	SB-05-020805-10	SB-06-020805-10	SB-07-020805-10	SB-08-020805-10	DUP-01-020805	SB-10-020805-10
Depth (ft)		9 to 10	9 to 10	9 to 10	9 to 10	9 to 10	9 to 10	9 to 10	9 to 10	9 to 10	9 to 10
Sample Date		2/8/2005	2/8/2005	2/8/2005	2/8/2005	2/8/2005	2/8/2005	2/8/2005	2/8/2005	2/8/2005	2/8/2005
Constituent	**Detection Limit**					**Results**					
Ethylbenzene	1.8	ND	82	ND	ND	ND	ND	ND	ND	ND	ND
Methylbenzene	2.1	ND	5 J	ND	ND	ND	ND	ND	ND	ND	ND
O-Xylene	2.1	ND	97	ND	ND	ND	ND	ND	ND	ND	ND
P/M -Xylene	4.9	ND	160	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes		NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tetrachloroethene	1.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Boring ID		**SB-11**	**SB-11**	**SB-12**	**SB-13**	**SB-14**	**SB-15**	**EPA Region 9 PRGs**		**DTSC Soil Screening Values**	
Sample ID		SB-11-020805-10	SB-11-020805-15	SB-12-020805-10	SB-13-020805-10	SB-14-020805-10	SB-15-020805-10				
Depth (ft)		9 to 10	14 to 15	9 to 10	9 to 10	9 to 10	9 to 10				
Sample Date		2/8/2005	2/8/2005	2/8/2005	2/8/2005	2/8/2005	2/8/2005	Industrial	Residential	Industrial	Residential
Ethylbenzene	1.8	ND	ND	ND	ND	ND	ND	400	400	NA	NA
Methylbenzene	2.1	ND	ND	ND	ND	ND	ND	520	520	NA	NA
O-Xylene	2.1	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA
P/M -Xylene	4.9	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA
Xylenes		NR	NR	NR	NR	NR	NR	420	270	NA	NA
Tetrachloroethene	1.7	**5.5**	ND	ND	ND	ND	ND	1.3	0.48	NA	NA

Notes:
All concentrations are in mg/kg
Only detected VOCs are shown
ft = feet
ND = Not detected
NR = Not reported
NA = Not available
J = Concentration is estimated because it falls between the method detection limit and the laboratory reporting limit.
Bold values indicate concentration exceeds the residential preliminary remediation goal (PRG).
O-Xylene = ortho-xylene
P/M -Xylene = para/meta-xylene
Xylenes = total of three xylene isomers

Table 4. Data Needs and Users - Soil Investigation
ECI Property, 20846 Normandie Avenue, Torrance, CA

SOIL INVESTIGATION FOR HISTORICAL STORMWATER PATHWAY - SOUTH
MONTROSE CHEMICAL SUPERFUND SITE, LOS ANGELES COUNTY, CALIFORNIA

Parameters/ Compounds	Data Use	Data Users	Rationale	Regulatory Limits/Action Level				
				California DTSC Soil Screening Numbers		EPA Region 9 Preliminary		Lowest Limit (mg/kg)
				Residential	Industrial	Residential Soil	Industrial Soil	
Soil Investigation Parameters								
Pesticides/PCBs	**Nature and Extent Regulatory Comparison Risk Assessment Fate and Transport**	**Hydrogeologists Regulatory Specialists Risk Assessors**						
Aroclor 1016			Other Aroclors detected on ECI Property					
Aroclor 1248			Other Aroclors detected on ECI Property					
Aroclor 1254			Detected on property					
Aroclor 1260			Detected on property					
Aroclor 1262			Other Aroclors detected on ECI Property					
Aroclor 1268			Other Aroclors detected on ECI Property	0.089	0.3	0.22	0.74	0.089
BHC, alpha-			Montrose-related, Detected on property	NA	NA	0.09	0.36	0.09
BHC, beta-			Montrose-related, Detected on property	NA	NA	0.32	1.3	0.32
BHC, gamma-			Montrose-related, Detected on property	NA	NA	0.44	1.7	0.44
BHC, delta-			Montrose-related, Detected on property	NA	NA	NA	NA	NA
Camphechlor			Detected on property	0.46	1.8	0.44	1.6	0.44
Chlordane			Detected on property	0.43	1.7	1.6	6.5	0.43
Chlordane, Cis-			Detected on property	NA	NA	NA	NA	NA
Chlordane, Gamma-			Detected on property	NA	NA	NA	NA	NA
DDT			Montrose-related, Detected on property	1.6	6.3	1.7	7	1.6
DDE			Montrose-related, Detected on property	1.6	6.3	1.7	7	1.6
DDD			Montrose-related, Detected on property	2.3	9	2.4	10	2.3
Dieldrin			Detected on property	0.035	0.13	0.03	0.11	0.03
Endrin				21	230	18	180	18
Endrin Aldehyde			Detected on property	NA	NA	NA	NA	NA
Endrin Ketone			Detected on property	NA	NA	NA	NA	NA
Ethylbenzene			Detected on property	NA	NA	400	400	400
Heptachlor			Detected on property	0.13	0.52	0.11	0.38	0.11
Heptachlor Epoxide			Detected on property	NA	NA	0.053	0.19	0.053

Notes:
mg/kg – milligrams per kilogram
NA – not available
DTSC – Department of Toxic Substances Control
Rationale – Organic compounds detected in ECI soil samples (ECI, 2005)
EPA Region 9 Preliminary Remediation Goals (mg/kg), October 2004
California DTSC Human Health Screening Levels (mg/kg), January 2005

TABLE 5
Calibration and Quality Control Procedures for Method SW8081A
Soil Investigation for Historical Stormwater Pathway - South
ECI property, Torrance, CA

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]
SW8081A	Organo-chlorine pesticides	Five-point initial calibration for all analytes	Initial calibration prior to sample analysis	Linear - mean RSD for all analytes ≤20% with no individual analyte RSD >30% Linear – least squares regression r> 0.995 Nonlinear – COD ≥ 0.990 (6 points shall be used for second order, 7 points shall be used for third order)	Correct problem then repeat initial calibration
		Second-source calibration verification for all analytes	Once per 5-point initial calibration	All analytes within ±15% of expected value	Correct problem then repeat initial calibration
		Retention time (RT) window calculated for each analyte	Every 6 months	± 3 times standard deviation for each analyte retention time from 72-hour study	None
		Initial calibration verification	Daily, before sample analysis	All analytes within ±15% of expected value	Correct problem then repeat initial calibration
		Calibration verification	After every 20 samples or 12 hour period and at the end of the analysis sequence	All analytes within ±15% of expected value and all compounds correctly identified by RT	Correct problem then repeat initial calibration verification and reanalyze all samples since last successful calibration verification
		Breakdown check (Endrin and DDT)	Daily prior to analysis of samples, and every 12 hour shift	Degradation ≤15%	Repeat breakdown check

TABLE 5
Calibration and Quality Control Procedures for Method SW8081A
Soil Investigation for Historical Stormwater Pathway - South
ECI property, Torrance, CA

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]
SW8081A	Organo-chlorine pesticides	Method blank	One per analytical batch	No analytes detected $\geq$ RL (Tables C and D in Appendix B)	Correct problem then reprep and analyze method blank and all samples processed with the contaminated blank unless samples are ND or >10x the blank value for the analyte
		LCS for all analytes	One LCS per analytical batch	QC acceptance criteria, per Tables C and D in Appendix B	Correct problem then re-prep and analyze the LCS and all samples in the affected analytical batch unless LCS is high and samples are ND for the affected analyte
		Surrogate spike	Every sample, spiked sample, standard, and method blank	QC acceptance criteria, per Tables C and D in Appendix B	Correct problem then re-extract and analyze sample
		MS/MSD	One MS/MSD per every 20 project samples per matrix	QC acceptance criteria per Appendix B	None
		Second-column confirmation (excluding toxaphene and chlordane)	100% for all positive results	Same as for initial or primary column analysis	Same as for initial or primary column analysis
		MDL study	One full MDL run originally. Verified every quarter	MDLs established per 40 CFR – Part 136	None
		Results reported between MDL and RL	None	None	None

Notes:

[a] – All corrective action shall be documented and all records shall be maintained by the laboratory

RSD – relative standard deviation

RL – reporting limit

MDL – method detection limit

LCS – laboratory control sample

MS/MSD – matrix spike/matrix spike duplicate

COD – coefficient of determination

ND – non detect

RT – retention time

r– correlation coefficient

TABLE 6
Calibration and Quality Control Procedures for Method SW8082
Soil Investigation for Historical Stormwater Pathway - South
ECI property, Torrance, CA

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]
SW8082	PCBs	Five-point initial calibration for Arochlors 1016 and 1260; all other Arochlors may be single point	Initial calibration prior to sample analysis	Linear - mean RSD for all analytes ≤20% with no individual analyte RSD >30% Linear – least squares regression r> 0.995 Nonlinear – COD ≥ 0.990 (6 points shall be used for second order, 7 points shall be used for third order)	Correct problem then repeat initial calibration
		Second-source calibration verification for all analytes	Once per 5-point initial calibration	All analytes within ±15% of expected value	Correct problem then repeat initial calibration
		Retention time (RT) window calculated for each analyte	Every 6 months	± 3 times standard deviation for each analyte retention time from 72-hour study	None
		Initial calibration verification	Daily, before sample analysis	All analytes within ±15% of expected value	Correct problem then repeat initial calibration
		Calibration verification	After every 20 samples or 12 hour period and at the end of the analysis sequence	All analytes within ±15% of expected value and all compounds correctly identified by RT	Correct problem then repeat initial calibration verification and reanalyze all samples since last successful calibration verification

TABLE 6
Calibration and Quality Control Procedures for Method SW8082
Soil Investigation for Historical Stormwater Pathway - South
ECI property, Torrance, CA

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]
SW8082	PCBs	Method blank	One per analytical batch	No analytes detected $\geq$ RL (Tables E and F in Appendix B)	Correct problem then reprep and analyze method blank and all samples processed with the contaminated blank unless samples are ND or >10x the blank value for the analyte
		LCS for all analytes	One LCS per analytical batch	QC acceptance criteria, per Tables E and F in Appendix B	Correct problem then re-prep and analyze the LCS and all samples in the affected analytical batch unless LCS is high and samples are ND for the affected analyte
		Surrogate spike	Every sample, spiked sample, standard, and method blank	QC acceptance criteria, per Tables E and F in Appendix B	Correct problem then re-extract and analyze sample
		MS/MSD	One MS/MSD per every 20 project samples per matrix	QC acceptance criteria per Appendix B	None
		Second-column confirmation	Not required		
		MDL study	One full MDL run originally. Verified every quarter	MDLs established per 40 CFR – Part 136	None
		Results reported between MDL and RL	None	None	None

Notes:

[a] – All corrective action shall be documented and all records shall be maintained by the laboratory

RSD – relative standard deviation

RL – reporting limit

MDL – method detection limit

LCS – laboratory control sample

MS/MSD – matrix spike/matrix spike duplicate

COD – coefficient of determination

ND – non detect

RT – retention time

r– correlation coefficient

FIGURES

APPENDIX A

Data Quality Objectives

Appendix A
Data Quality Objectives

This appendix details the data quality objectives (DQOs) for the investigation. The DQOs have been broadly described in Section 2.0 of the QAPP. This appendix documents the rationale and conclusions from completing the seven steps in the DQO process; the seven steps are as follows:

Step 1 State the Problem
Step 2 Identify the Decision
Step 3 Identify Inputs to the Decision
Step 4 Define the Boundaries for the Study
Step 5 Develop a Decision Rule
Step 6 Specify Tolerable Limits on Decision Errors
Step 7 Optimize the Design

The DQO process derives from detailed evaluation and interpretation of available Site information, which is included as a subsection in Step 6 below. The final product of the DQOs specifies design objectives, as discussed in Step 7 and as summarized in **Tables A-1 through A-2** at the end of this appendix.

Step 1. State the Problem

(1) Identify Members of the Planning Team

The members of the planning team are the EPA RPM, Montrose, and the Montrose designated consultant Earth Tech who will provide an SM, RTL, FTL and QAO.

(2) Identify the Primary Decisionmaker

EPA may conduct or oversee work conducted by others (i.e., representatives of Montrose), and has final approval authority for the work. Work conducted by others may be conducted under voluntary status and/or under an administrative order.

(3) Develop a Concise Description of the Problem

The following discussion is a general description of the primary problems. Specific problem statements are prepared in the DQO process and are presented in **Appendix A**. The area of initial investigation of the EPA Study Area includes a portion of the commercial property located at 20846 Normandie Avenue, southeast of the intersection of Normandie Avenue and Torrance Boulevard, in Los Angeles County, California. The commercial property is occupied by ECI. A Site location map is provided as **Figure 3**, and a Site Plan, ECI Property is provided as **Figure 4**. The historical stormwater pathway passed through a portion of the ECI property as shown on **Figure 5**.

The location of soils with total DDT concentrations exceeding residential background levels at the ECI property roughly coincides with the historical stormwater pathway, which crossed through what is now the eastern portion of the ECI property. EPA believes that the DDT-impacted soils at the ECI property are the result of contaminated storm-water runoff from the former Montrose technical-grade DDT manufacturing plant located at 20201 Normandie Avenue, in Los Angeles County, California (**Figure 1**). The ECI property is located "down stream" from the former Montrose plant property, by way of the historical stormwater drainage pathway. It is noted that Montrose disputes EPA's preliminary conclusion regarding the source of total DDT at the ECI property.

EPA understanding of the ECI property and the need for additional sampling are summarized below, and described in further detail in subsequent sections of this QAPP.

In the spring of 2005, soil sampling was conducted at 20846 Normandie Avenue, in Los Angeles County, California, a commercial property occupied by ECI, as part of due diligence activities prior to sale of the property. That sampling reported several chemical constituents present in soils exceeding regulatory action levels, including: 4,4′-dichloro-diphenyltrichloroethane (DDT), 4,4′-dichlorodiphenyldichloroethene (DDE), and 4,4′-dichlorodiphenyldichloroethane (DDD), as well as several other chemicals including chlordane, petroleum hydrocarbons, and polychlorinated biphenyls (PCBs). The sum of DDT, DDE, and DDD concentrations (referred to collectively as total DDT) were detected in subsurface soil samples from the eastern and southeastern portions of the ECI property at concentrations exceeding residential background levels and up to 325 milligrams per kilogram (mg/kg). These soil sample locations were excavated by the property owner and the soil was stored on-site in soil piles, managed to prevent potential releases (i.e., via fugitive dust and surface water runoff), until it could be properly disposed.

In November of 2005, EPA authorized a Removal Action to address the excavated soil and open excavations (EPA, 2005b). On December 15, 2005, EPA issued a Unilateral Administrative Order (UAO, Docket No. 09-2006-02a) to ECI, its property owner, and Montrose Chemical Corporation of California. The UAO required the transport and disposal of the excavated soil at the ECI property, and the backfilling and covering of the open excavations. The soil piles were transported to a permitted hazardous waste landfill in January 2006 by the respondents. Earth Tech provided air monitoring of fugitive dust potentially containing DDT during the loading of soil into trucks by ECI (Earth Tech, 2006b). Backfilling of the excavations remains to be completed under the UAO.

EPA's investigations of soil in residential areas surrounding the former Montrose Plant Property discovered some soils along the west side of Kenwood Avenue with total DDT concentrations above the residential background range. The historical stormwater pathway, which, as an open, unlined earthen ditch, had conveyed stormwater runoff through portions of residential properties along the west side of Kenwood Avenue, until the ditch was replaced with the Project 685 underground concrete box culvert.

In 2001 and 2002, EPA conducted a removal action (Kenwood Stormwater Drainage Pathway Removal Action) to remove DDT-contaminated soils along the historical stormwater pathway north of Torrance Boulevard, from Del Amo Alley to Torrance Boulevard (EPA, 2002). Removal of soil was recommended for properties having an average total DDT soil concentration exceeding 17 ppm (corresponding to a one-in-one-hundred-thousand [1×10^{-5}] cancer risk for a residential exposure scenario). Removal was ultimately conducted at 22 properties and in 2 alleys to remove soil with total DDT concentrations exceeding 10 ppm.

Problem Statement(s):

Based on the above, there is the need to:

(a) Characterize the nature and extent of Pesticides and PCBs in the historical stormwater pathway by sampling soil from 20846 Normandie Avenue, which may have been impacted by releases from the Montrose property at 20201 Normandie Avenue.

(b) Support a human health risk assessment (HHRA).

(c) Support a removal action, if necessary.

(d) Support a feasibility study (FS), if necessary.

(e) Support characterization of investigation-derived waste (IDW).

(4) Specify Available Resources and Relevant Deadlines for the Study

The soil sampling effort at the ECI property is expected to begin during July 2006.

Step 2. Identify the Decision

(1) Identify the Principal Study Question

(a) Characterize nature and extent of soil contamination: Are soils within (or impacted by) the historical stormwater pathway at the ECI property impacted by pesticide/PCB chemicals at levels of concern, and if so, what are the horizontal and vertical extents of that soil impact?

(b) Support an HHRA: What are the human health risks due to pesticide/PCB chemicals in soils within (or impacted by) the historical stormwater pathway at the ECI property, either individually or in combination?

(c) Support a removal action, if necessary: What is the extent of pesticide/PCB soil impact requiring a removal action, if any?

(d) Support an FS: What are the alternatives for remediation of pesticide/PCB chemicals in soil within the historical stormwater pathway at the ECI property, if needed?

(e) Support characterization of IDW: Do IDW soil concentrations meet the waste acceptance criteria for disposal at an offsite treatment, storage, or disposal facility (TSDF) for either nonhazardous waste or hazardous waste? Do IDW water constituent concentrations meet the acceptance criteria for disposal at a hazardous or nonhazardous offsite TSDF?

(2) Define Alternate Actions that Could Result from Resolution of the Principal Study Question

(a) Characterize nature and extent of soil contamination.

i) No further characterization of soil at the ECI Property would be necessary to define the extent of pesticide/PCB chemicals in soil, and data are adequate to carry out an HHRA.

ii) Additional characterization is necessary to define the extent of pesticide/PCB chemicals, or to support the completion of a risk assessment or removal action.

(b) Support an HHRA.

i) Propose no action based on calculated human health risks for soil within the historical stormwater pathway at the ECI property individually and in combination.

ii) Propose action (removal or remediation) based on calculated human health risks for soil within the historical stormwater pathway at the ECI property.

(c) Support a removal action, if necessary.

i) No removal action is necessary.

ii) Conduct a removal action in one or more areas, as needed based on calculated risks and soil criteria.

(d) Support an FS.

i) Do not conduct an FS to evaluate remedial needs and alternatives.

ii) Conduct an FS to evaluate remedial needs and alternatives, if current (or post-removal) human health risks exceed risk (or other soil) criteria.

(e) Support characterization of IDW.

i) IDW soil and liquid can be disposed of at an offsite TSDF for nonhazardous substances.

ii) IDW soil and liquid must be disposed of at an offsite TSDF as either hazardous soil or liquid (Resource Conservation and Recovery Act [RCRA] waste and/or Comprehensive Environmental Response, Compensation, and Liability Act of 1980 [CERCLA] waste).

(3) Combine the Principal Study Question and the Alternative Actions into a Decision Statement

(a) Characterize nature and extent of soil contamination: If data from soil sampling indicate the presence and extent of pesticide/PCB chemicals in soil at the ECI Property at concentrations exceeding EPA Region 9 Preliminary Remediation Goals (PRGs), California Environmental Protection Agency (Cal-EPA) Department of Toxic Substances Control (DTSC) soil screening numbers, and background DDT concentrations (EPA, 2001c), then these compounds will be identified as compounds of concern and additional sampling for the specific phase/area may be required. If, however, the concentrations of chemicals detected do not exceed these regulatory or background levels, then these compounds will not be identified as compounds of concern and no additional sampling for the specific area/phase may be required.

(b) Support an HHRA: If the calculated human health risks are acceptable and require no action for the ECI property, then a decision of No Further Action (NFA) will be proposed. If, however, the risks indicate that an action is required for the ECI property or a residential property, then EPA will determine if a removal or remedial action is appropriate for the specific area/phase.

(c) Support a removal action, if necessary: If the reported concentrations and calculated risks indicate unacceptable and/or short-term risks, a removal action will be warranted. If, however, concentrations and calculated risks do not indicate unacceptable or short-term risks, then evaluations will proceed for other alternatives as described below.

(d) Support an FS: If current (or post-removal action) concentrations indicate unacceptable long-term human health risks at the ECI property, then an FS will be conducted. If, however, current (or post-removal action) concentrations indicate long-term human health risks are at acceptable levels for the ECI property, then an NFA determination can be proposed.

(e) Support characterization of IDW: If data indicate IDW soil is nonhazardous, then it will be disposed at an offsite nonhazardous TSDF. If, however, data indicate that the IDW soil is hazardous, then it will be disposed at a TSDF as hazardous waste. If IDW water meets the TSDF acceptance criteria of nonhazardous waste, then it will be disposed at a TSDF as nonhazardous waste. If however, the IDW water exceeds the criteria of hazardous waste, then it will be disposed at the TSDF as hazardous waste.

(4) Organize Multiple Decisions

Based on the answer to the principal study questions, decisions about additional sampling and analysis or laboratory corrective action will be made by the planning team.

(a) Characterize nature and extent of soil contamination: The assessment of the nature and extent of soil impacts may indicate that the extent of soil impacts within the historical stormwater pathway is greater than originally anticipated, thus triggering the need for additional soil sampling at the ECI property.

(b) Support an HHRA: The HHRA may indicate that health risks due to pesticide/PCB chemicals in soil require that additional data be collected to further refine or support the conclusions of the HHRA.

(c) Support a removal action, if necessary: If soil sampling results or the HHRA indicate that a removal action is needed, then additional soil sampling and chemical analyses may be needed to refine the extent of remedial action that is needed.

(d) Support an FS: Additional soil chemical analyses may be needed to fully support an FS in order to develop and evaluate the remedial alternatives according to CERCLA FS guidance (EPA, 1988).

(e) Support characterization of IDW: If IDW exceeds hazardous waste criteria, and the TSDF would not be able to accept the waste because of land disposal restrictions (LDRs), then evaluations of appropriate treatment/disposal options will be completed; this evaluation may follow the above FS evaluation.

Step 3. Identify Inputs to the Decision

The purpose of this step is to identify the information and measurements needed to support the decision statement.

(1) Identify the Information that will be Required to Resolve the Decision Statement

Chemicals of concern for proposed sampling are listed in Section 2.0 of the QAPP and in **Tables 4** and **5**. Detected chemicals include organochlorine pesticides (DDT, DDE, DDD, chlordane, cis-chlordane, gamma-chlordane, dieldrin, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC), PCBs (Aroclor 1254, Aroclor 1260), volatile organic compounds (VOCs), and total petroleum hydrocarbons (TPH) as gasoline (TPH-g), as diesel (TPH-d), and as TPH-oil. However, evaluation of past data indicates that only pesticides and PCBs are of concern for this evaluation of soils within (or impacted by) the historical stormwater pathway.

(a) Characterize the nature and extent of soil contamination: To resolve the decision statement, soil concentration data will be needed for pesticides and PCBs (as summarized in Table 4, Data Needs and Uses). Soil concentrations will be evaluated against applicable regulatory criteria (EPA Region 9 PRGs for the residential and industrial scenarios, Cal-EPA DTSC soil screening values, and regional background residential soil concentrations of total DDT (EPA, 2001c). The PRGs and DTSC soil screening values are provided in **Table 4**.

(b) Support an HHRA: To resolve the decision statement, soil concentration data for pesticides and PCBs will be needed to determine whether human health risks are acceptable, pose a long-term risk, or represent a short-term human health risk.

(c) Support a removal action, if necessary: To resolve the decision statement, soil concentration data for pesticides and PCBs will be needed to assess whether a short-term human health risk is present. If the reported concentrations and/or associated screening risk assessment indicate possible exposures resulting in the potential for short-term toxicity, or other unacceptable risks, then EPA will consider the need for a removal action.

(d) Support an FS: To resolve the decision statement, data are needed to characterize the depth, lateral extent, and volume of soil within the historical stormwater pathway impacted by pesticides and PCBs that exceed criteria including the EPA PRGs, DTSC soil screening values, and calculated human health risks. Chemical analyses of pesticides and PCBs are needed with limits of detection to meet state and federal applicable or relevant and appropriate requirements (ARARs).

(e) Support characterization of IDW: To resolve the decision statement for IDW soil, soil concentrations will be needed for pesticides and PCBs, VOCs, CCR

Title 22 metals, TPH-g, and TPH-d. For IDW water, analytical results of pesticides and PCBs, VOCs, metals, and TPH, will be necessary to meet the waste acceptance criteria for offsite TSDFs. The analytical parameter list for IDW samples may be modified depending on specific waste facility requirements.

(2) Determine the Sources for Each Item of Information Identified

The following sources of the needed data will be supplied through the sampling and analysis of both field soil and any clean fill to be used with a removal action.

(a) Characterize nature and extent of soil contamination: Boring logs, visual inspection of existing open excavations at ECI, surveyed coordinates and elevations of soil borings, and the analysis of surface and subsurface soil samples from new borings.

(b) Support an HHRA: Laboratory analysis results of soil samples; and, to evaluate exposure points and pathways, visual inspection of ECI property open soil excavations, and where exposed, the underground Project 685 drain.

(c) Support a removal action, if necessary: Laboratory analysis results of soil samples, and visual inspection of the ECI property.

(d) Support an FS: Laboratory analysis of soil samples, and visual inspection of ECI property.

(e) Support characterization of IDW: Laboratory analysis results of IDW soil and water.

(3) Identify the Information that is Needed to Establish the Action Level

Tables 4 and 5 in the QAPP list the appropriate criteria and/or regulatory limits for constituents in soils.

(a) Characterize nature and extent of soil contamination: Action levels for soils will utilize the EPA Region 9 PRGs (industrial PRGS for current use and residential PRGs for potential future residential use), residential background levels for total DDT and the DTSC soil and screening level concentrations (**Table 4**).

(b) Support an HHRA: Information needed includes the EPA and Cal-EPA toxicity criteria (i.e., cancer slope factors and reference doses) for estimating cancer risks and hazards during the HHRA process. Additionally, action levels for the HHRA will utilize EPA's acceptable risk ranges for noncarcinogens (Hazard Index of 1) and for carcinogens (excess lifetime cancer risks of 10^{-6} to 10^{-4}), and Region 9 PRGs (industrial and residential) to support a baseline or screening level HHRA (**Table 4**).

(c) Support a removal action, if necessary: For removal action consideration, action levels of 10^{-5} human health excess lifetime residential cancer risk or a chronic Hazard Index of 10 will be used.

(d) Support an FS: An FS will be initiated based on the findings of those efforts listed in (a), (b), and (c) above.

(e) Support characterization of IDW:

The following summarizes the regulatory criteria with regard to waste disposal. The final list of parameters will depend on the input from the disposal facilities, and thus, the full list below will be pared down before the start of the work.

For IDW Soil:

(1) The IDW soil waste must be disposed based on characteristic and listed waste criteria. IDW soils generated during sampling may be considered listed hazardous wastes (e.g., U061 or U129), and thus would be regulated under state and federal hazardous waste laws (40 Code of Federal Regulations [CFR] 261.33 [a], [b], and [c]).

(2) DDT has been detected in soil within the historical vicinity of the stormwater pathway at the ECI Property at concentrations exceeding the RCRA universal treatment standard (UTS), which is 0.087 mg/kg in soil (40 CFR 268.48 and 268.49). Comparison to the UTS standard is needed to determine whether the IDW soil would need to be disposed under the RCRA LDRs.

(3) EPA has determined that offsite disposal of the excavated soil must comply with the CERCLA Offsite Rule (42 United States Code [USC] Section 9621[d][3]), which governs the offsite transportation and disposal of hazardous waste. Soil at the ECI property impacted with DDT and BHC must be disposed at a facility that meets the requirements of the Offsite Rule.

(4) Excavated soils may also be subject to regulation under (1) federal and California hazardous waste laws for RCRA characteristic waste, (2) 40 CFR Section 261.24, 22 (toxicity characteristic), and (3) CCR Section 66261.24 (characteristics of toxicity which include total threshold limit concentration [TTLC] and soluble threshold limit concentration [STLC] standards).

For IDW Water:

(1) Waste acceptance criteria for offsite TSDF are required, potentially including pesticides and PCBs, VOCs, TPH-g, TPH-d, and Title 22 metals.

(4) Confirm that Appropriate Measurement Methods Exist to Provide the Necessary Data

Standard EPA methods are available for the target analytes. The analytical methods are provided in **Tables 5 and 6** in Section 2.0 of the QAPP.

Step 4. Define the Boundaries for the Study

(1) Specify the Characteristics that Define the Population of Interest

For each of the four DQOs defined above as (a), (b), (c), and (d), the populations of interest include surficial and deeper soil collected from the extent of the historical stormwater pathway at the ECI property. The population of interest relevant to DQO (e) includes IDW soil containerized in drums, roll-off bins, and other storage containers; and IDW water containerized in drums and other storage tanks.

(2) Define the Spatial Boundary of the Decision Statement

(a) Define the geographical area to which the decision statement applies. For DQOs (a), (b), (c), and (d), the geographical boundaries are the areas that have been historically impacted by the stormwater pathway, such as within the ECI Property are shown in **Figure 4** in Section 2.0 of the QAPP. The initial soil investigation is limited to the ECI property and associated northern embacnkment. For DQO (e), the "geographical areas" are IDW soil generated during the drilling and sampling of soil borings, and contained in drums or roll-off bins; and IDW water generated from decontamination of drilling and sampling equipment.

(b) Divide the population into strata that have relatively homogeneous characteristics. Analysis of existing data, discussed in Step 6, establishes the homogeneous strata.

(3) Define the Temporal Boundary of the Decision Statement

(a) Determine the timeframe to which the decision statement applies – The decisions will apply until removal or remedial actions are planned and started, or determined by EPA to not be necessary.

(b) Determine when to collect data – The soil sampling results are not dependent on the time of year and can be taken any time. The investigation is expected to start in July 2006.

(4) Define the Scale of Decisionmaking

The scale of decisionmaking will be the areas of the historical stormwater pathway plus any soil that is impacted by the historical stormwater pathway, initially within the ECI Property and expanding to additional areas, if needed.

(5) Identify Practical Constraints on Data Collection

The sampling locations and schedule will depend on access and physical obstructions (i.e., structures, equipment, or utilities on the ECI property). For example, drilling equipment will not be able to approach the edge of the open excavations at the ECI property due to the potential for sidewall collapse, unless they are reinforced by shoring. Additionally, the capacity of sampling and analysis teams, as well as weather constraints, may limit the pace of work.

Step 5. Develop a Decision Rule

(1) Specify the Statistical Parameter that Characterizes the Population of Interest

(a) Characterize nature and extent of soil contamination: Statistical parameters to be used in decisionmaking will include the mean, the upper 95 percent confidence on the mean, the upper 90th percentile, and individual maximum concentrations per analyte. Data subsets may include property-specific areas and individual depth layers within the sampling strata defined by the evaluation of historical data.

(b) Support an HHRA: A screening level or baseline risk assessment will follow EPA guidance.

(c) Support a removal action, if necessary: Soil concentrations or the results of an HHRA will determine the need for a removal action based on short-term toxicity. Chemical data will be utilized based on professional judgment to perform preliminary evaluations of the need for a potential removal action.

(d) Support an FS: Site chemical data will be utilized based on professional judgment to perform preliminary feasibility evaluations and to assess further data collection and technical evaluations.

(e) Support characterization of IDW: Comparison to applicable criteria will be made on a point-by-point basis (i.e., IDW soil concentrations compared against background concentrations, STLC and TTLC values, and RCRA UTS values.

(2) Specify the Action Level for the Study

See Step 3, Item (3) for the action levels for each DQO. The action levels are also listed in **Table 4** in Section 2.0 of the QAPP.

(3) Develop a Decision Rule (an "if…then…" statement)

(a) Characterize nature and extent of soil contamination: All available chemical information will be tabulated, plotted, and/or statistically evaluated as described in Step 5, Subsection 1(a) above to assess the nature and extent of pesticide and PCB impacts to soil. If soil analyses indicate the presence of any pesticide/PCB chemicals at the ECI property that exceeding the action levels defined in Step 3 (EPA Region 9 PRGs [residential or industrial], the California DTSC soil screening numbers, DDT background concentrations, or the RCRA UTC values), then additional sampling and analysis may be required.

(b) Support an HHRA: If the data from the samples are less than the action levels described in **Table 4** (i.e., EPA Region 9 PRGs or DTSC soil screening numbers), then additional sampling to fill gaps or no action for the specific area may be decided. If the data results exceed the action levels, then additional sampling and/or analysis may be needed, such as a baseline risk assessment per EPA guidance.

(c) Support a removal action, if necessary: If the reported soil concentrations and/or their associated risks indicate the potential for short-term toxicity, or other unacceptable risks, a removal action may be warranted.

(d) Support an FS: If current (or post-removal action) concentrations indicate unacceptable long-term human health risks (e.g., greater than a 10^{-5} cancer risk) at the ECI Property, then an FS will be conducted per EPA guidance (EPA, 1988). Preliminary considerations will be based on professional evaluation of the chemical data obtained in this sampling.

(e) Support characterization of IDW:

Soil IDW:

The following is a comprehensive decision rule that takes into account all the regulations. Subsequent to input from the disposal facility, this decision rule may be modified.

(1) If IDW soil contains DDT or other Montrose-related constituents, EPA may determine that it must be disposed as a federal RCRA listed hazardous waste.

(2) If EPA determines that the soil is a federal RCRA-listed waste, IDW soil concentrations exceeding 10 times the corresponding federal RCRA UTS, which for DDT is 0.87 mg/kg, would require treatment to achieve concentrations below that value (10 times the UTS) prior to land disposal under the RCRA LDRs. (If the sampling results for soil IDW show that hazardous substances, including DDT and BHC, are not present at or above 10 times those RCRA UTS values, then EPA may determine that the soil no longer contains a RCRA-listed waste, with the result that the soil would no longer be considered a RCRA-listed waste.) If EPA makes the determination that the soil is not considered a federal RCRA-listed waste, then offsite treatment prior to land disposal at an appropriate offsite facility would not be required, and the soil could be transported as nonfederal RCRA waste to be land-disposed offsite at a non-RCRA facility without prior treatment.

(3) If Montrose-related waste constituents are detected in soil or IDW waste, then soils may be considered a CERCLA hazardous waste and would have to be handled according to the Offsite Rule.

(4) If the analytical data indicate that soil IDW exceeds toxicity characteristic leaching procedure (TCLP) criteria, then it would be considered a federal RCRA hazardous waste and would have to be disposed at a RCRA hazardous waste disposal facility. If the soil IDW exceeds the STLC or TTLC criteria, then it will be considered a California hazardous waste and California state treatment standards and disposal limitations would apply.

Step 6. Specify Tolerable Limits on Decision Errors

In accordance with EPA guidance, tolerable limits on decision errors, which are used to establish performance goals for the data collection design, are specified in this step. The following discussion is limited to problem statements (a) and (b) regarding the nature and extent of contamination and risk assessment. The other problems (treatment and waste disposal) will be addressed through a judgmental design, as detailed in the FSP.

For the nature and extent of soil impacts and risk assessment, performance specifications and design optimization (Step 7) have been developed based on review of historical data.

(1) Summary/Interpretation of Available Soil Boring Data

Between February and June 2005, Haley & Aldrich drilled 35 soil borings on the ECI Property, as shown in Figure 5 in the QAPP. Nearest-neighbor boring distances between borings were as close as 25.6 feet for borings SB-04 and SB-35, and as far as 132.2 feet for borings SB-23 and SB-24. Based on results from the original 35 locations, excavations were conducted at and around 6 of the 35 locations, with excavation wall grab samples collected at depths up to 15 feet below ground surface (bgs). Excavation wall sample locations were substantively closer, ranging from 0.5 feet (0.15 m) up to 3.2 feet (2.8 m) between samples.

Seventeen analytes quantified in soil samples included the organochlorine pesticides, PCBs, and TPH (**Table 1**). These 17 analytes were not consistently measured in all samples, resulting in an imbalance of the number of analytes reported from individual locations, which limited statistical evaluations.

A limited number of samples (16) were analyzed for VOCs; an additional 6 samples were analyzed for metals. The VOCs were rarely detected and, with one exception (tetrachloroethene in boring SB-11 at 9 to 10 feet bgs), did not exceed either EPA Region 9 residential and industrial PRGs or DTSC soil screening values. One metal, arsenic, exceeded both the EPA Region 9 residential PRG and DTSC soil screening values, in a soil sample from boring SB-16 at a depth of 0 to 1 feet bgs.

(2) Data Description/ Data Management Procedures

- Analytical results were manually transcribed from hardcopy datasheets and entered into an Excel spreadsheet (**Table 1** in the QAPP). Data were provided to EPA by Haley & Aldrich (ECI, 2005) in response to EPA's 104(e) Request for Information to ECI.
- Total DDT was calculated as the sum of the concentrations of the three primary DDT isomers: 4,4′-DDT, 4,4′-DDD, and 4,4′-DDE. For total DDT sums with one or more detected constituent isomers, a qualifier designated "D" for detect was indicated. In the 16 cases where none of the isomers in the total DDT calculation were detected, the qualifier of "U" for nondetected was used.
- Maps from Haley & Aldrich were used (digitized) to identify coordinates of sample boring locations.
- Soil sample results indicated that the total DDT concentrations exceeding 10 mg/kg (the upper end of the regional residential background range of DDT[EPA, 2001c]) were located along the eastern portion of the ECI property in the area of the historical stormwater pathway.
- Analytical and location data were matched into a single file using sample identification fields.

(3) Analyte Statistical Distributions

Table A-1 lists the 14 pesticide/PCB and 3 TPH analytes that were quantified in samples collected by Haley & Aldrich, and summarizes those results with conventional summary statistics, including: total counts of analyzed samples (267 samples analyzed for total DDT), counts of samples with detectable quantities of the analytes and the frequency of detection ratio (FD); ranges of reported nondetect results and reported positively detected results; mean, median, standard deviation, and coefficient of variations (ratio of standard deviation divided by mean); and comparison to a total DDT criterion of 10 ppm, the upper range of regional residential background total DDT values), with the counts for each of reported detects and nondetects exceeding that criterion. Concentrations reported as nondetects were used at the reporting limit in all calculations.

In **Table A-1**, the summary statistics are sorted by analytical groups (pesticide/PCB and TPH), then by decreasing frequency of detection of the analytical groups in soil samples collected from the ECI property by Haley & Aldrich.

The statistical evaluation results presented in Table A-1 show the following:

- Pesticides, including DDT isomers, PCBs, chlordane isomers, dieldrin, and BHC isomers were quantified in over 200 samples, with locations balanced across the ECI property, allowing these analytes and relationships among the analytes to be examined statistically.
- TPH components were limited to a subset of approximately 45 samples and, in most cases, samples analyzed for TPH components were not also quantified for pesticides. Because of this imbalance in characterization, any relationships between the occurrence of pesticides and TPH cannot be quantified.
- Total DDT and its constituents were the most commonly occurring of the chemicals in this analysis, detected in 91 to 94 percent of the samples collected. The minimum detected concentrations coincide with the minimum nondetect limit of detectionThe criterion used to evaluate total DDT (10 mg/kg) was exceeded in 34 of the 267 samples analyzed, a 12.7 percent frequency of exceedance.
- Four pesticides (the three chlordane isomers [chlordane, cis-chlordane and gamma-chlordane] and dieldrin) and two PCBs (Aroclors 1254 and 1260) were less commonly detected, with FDs ranging between 15 and 20 percent.
- The BHC isomers (alpha-, beta-, gamma- and delta-) were infrequently detected. FDs range from less than 1 percent for delta-BHC up to 5 percent for beta-BHC. Further, when positively detected, the concentration range of the detected levels falls within the interval of reported limits of detection for nondetect results, indicating that the differentiation of detect and nondetect is not strong.

Step 7. Optimize the Design

The following applies to Problem Statements (a) and (b) (see Step 1) regarding the nature and extent of soil impacts and risk assessment. The other problem statements (treatment and waste disposal) will be addressed through judgmental design, as detailed in the FSP.

This section, Step 7, describes the considerations for design of the proposed soil sampling investigation to be conducted at the ECI property. Three elements are summarized below and described further in the following subsections.

- Step 7, Subsection 1 identifies data gaps to be filled in order to determine the extent to which any soil impacts from pesticides and PCBs are present at the ECI property within the historical stormwater pathway, and to determine if such impacts constitute a risk to human health.

- Step 7, Subsection 2 specifies design objectives that are based on the data gaps identified in Subsection 1. Subsection 2 identifies data required to address the problem statements and describes proposed sampling corresponding to each problem statement.

(1) Data Gaps

The following bullets identify gaps in currently available information that are needed to determine the nature and extent of soil impacts associated with the historical stormwater pathway, any removal or remediation potentially required for the ECI property, and any necessary restrictions that may be required on future uses. The proposed soil boring locations are presented in **Figure 8** of the QAPP.

- Soil samples collected in the vicinity of the historical stormwater drainage pathway at the ECI property demonstrated the presence of total DDT in exceedance of the regional residential background concentrations, and some samples exceeded applicable criteria for chlordane and PCBs. Neither lateral extent nor vertical depths of soil contamination have yet been characterized sufficiently to determine the extent of impacts associated with the central area of the historical stormwater drainage pathway.
- Finally, the relationships among the various contaminants, including the organochlorine pesticides and PCBs (i.e., trends in concentration, location, and frequency of detection) found within the historical stormwater pathway (the ECI Property) may be used to support a determination of the source of the DDT and/or PCBs detected. Sampling is intended to provide additional information regarding the extent to which the pesticides and PCBs found in soil, may be attributable to the historical stormwater drainage pathway.

(2) Design Objectives

The data gaps listed in Step 7, Subsection 1 above, resulted in the development of two objectives. The objectives are specific to further characterization of soil in the historical stormwater pathway for the distribution of organochlorine pesticides and PCBs.

A single phase of investigation is planned at the ECI property. A total of 38 borings are planned; 34 borings will be sampled to a depth of 24 feet bgs, 4 borings in the northern slope area of the Site will be sampled to a depth of 16 feet bgs. **Figure 8** of the QAPP shows the proposed boring locations. This phase of investigation is further described below.

(2.1) ECI Property within Historical Stormwater Pathway

Design Objective

To what extent do pesticides and PCB impacts to soil extend laterally and vertically within soils found on the ECI Site?

Proposed Sampling, Grid Spacing, and Sample Size

Lateral Extent: Currently available sample results from the ECI Property are limited to those available from the sampling performed by Haley & Aldrich in 2005 (**Figure**

6, Tables 1 through 3 in Section 2.0 of the QAPP). Statistical evaluation of this data shows a comparatively higher frequency of total DDT values exceeding regional residential background levels in soil borings located within the eastern portion of the ECI property, as compared to those collected from borings located on the ECI property outside (west of) the historical drainage pathway area. However, the existing soil sampling is not sufficient to characterize the full extent of the historical stormwater pathway within the ECI property.

A total of 38 soil borings are proposed to characterize the nature and extent of pesticides/PCBs within the historical stormwater pathway at the ECI property as shown in **Figure 8**. The rationale for the selection of these 38 boring locations is provided in this section.

The nature and extent of pesticides/PCBs within the historical stormwater pathway at the ECI property will be characterized using a series of transects intersecting the pathway as shown in **Figure 8**. There are nine east-west transects shown in this figure, intersecting the stormwater pathway in an approximate perpendicular manner. The transects are a series of borings drilled in a single row and designed to provide a high level of characterization at various intervals along the historical stormwater flowpath. Within each transect, borings will be spaced 30-feet apart and extend from the eastern ECI property line to or beyond the estimated western extent of the historical stormwater pathway. Because the estimated width of the historical stormwater pathway varies and because the pathway curves eastward, the number of borings in each transect varies from two to six borings. The transects are spaced 60-feet apart, providing a relatively high level of characterization along the historical stormwater pathway. The total number of borings to be drilled along transects at the ECI property is 31 borings as shown in **Figure 8.**

Three additional borings were identified by EPA at locations not associated with the transects as shown in **Figure 8**. These borings and their locations were identified by EPA with the intent to provide additional characterization of soils between the current stormwater pathway (concrete box drain) and the eastern property boundary. With the addition of these three area-specific borings, the total number of borings to be drilled at the ECI property (parking and equipment storage yard) is 34 borings.

Although the ECI property borders Torrance Boulevard to the north, the ECI property surface is approximately 10 feet higher in elevation than the surface adjacent to the south side of Torrance Boulevard. A sloped embankment with a vegetative cover extends from the south side of Torrance Boulevard to the northern extent of the ECI property parking lot and equipment storage yard. A total of four borings are proposed along this slope for purposes of characterizing the nature and extent of pesticides/PCBs in this area as shown in **Figure 8**. With the addition of these four borings along the northern sloped embankment, the total number of borings to be drilled at the ECI property is 38 borings.

The 34 borings located within the main ECI property will be drilled to a depth of 24 feet bgs. This target depth was identified by EPA in order to ensure that all borings are drilled deep enough to sample the original unimproved slough estimated to occur at approximately 16 feet above mean sea level (AMSL). Because the highest portions of the investigation area occur at elevations between 39 and 40 feet AMSL, a target depth of 24 feet is required to sample the estimated original slough surface.

Soils will be continuously sampled during drilling of investigation borings, and 8 samples will be composited for analysis from each of the 34 borings located at the main ECI property as shown in **Table 8**. Composite soil samples will be collected across the following vertical intervals:

- 0-0.5 feet bgs
- 0.5-2 feet bgs
- 2-5 feet bgs
- 5-8 feet bgs
- 8-12 feet bgs
- 12-16 feet bgs
- 16-20 feet bgs
- 20-24 feet bgs

The continuous sampling, with collection of composite samples over specific intervals, is designed to provide a comprehensive characterization of subsurface soils. In this manner, the soil sampling results fully characterize soils between surface and 24 feet bgs. In shallow soils (i.e., 0 to 8 feet bgs), the sampling frequency occurs over shorter intervals, 0.5 to 3 feet, due to a higher potential for human exposure and for purposes of supporting human health risk assessment. In deep soils (i.e., 8 to 24 feet bgs), the sampling frequency occurs every 4 feet due to a reduced potential for human exposure. At a sampling frequency of 8 composite samples per boring, the total number of primary samples to be analyzed at the ECI property is 272 samples.

The 4 borings located along the sloped embankment at the northern ECI property boundary will be drilled to a depth of 16 feet bgs, if possible. The sloped embankment will limit use of drilling rigs for soil sampling, and therefore, the depths of borings in this area will be shallower than those within the main ECI property (drilling by hand may be necessary in this area). Additionally, borings located along the embankment will occur at a shallower elevation, and therefore, it will not be necessary to drill to 24 feet bgs to characterize subsurface soils in this area. A target depth of 16 feet bgs was therefore selected for the 4 borings located along the sloped embankment, although achieving this depth will be dependent on many factors including the type of drilling equipment used and the presence of subsurface debris or rocks. Six samples will be composited for analysis from each northern slope boring across the following vertical intervals:

- 0-0.5 feet bgs
- 0.5-2 feet bgs
- 2-5 feet bgs
- 5-8 feet bgs

- 8-12 feet bgs
- 12-16 feet bgs

A total of 24 primary, composite soil samples will be analyzed from the borings within the northern sloped embankment. In all, a total of 296 composite soil samples will be collected for analysis from the ECI property and adjacent sloped embankment as shown in **Table 8**.

Analytes Measured: All samples collected will be analyzed for pesticides and PCBs. Boring logs will be prepared from continuous cores collected in the field.

DQO Statements: Statements defining the problem decision points, inputs, boundaries, decision rules, acceptable limits on decisions, and optimization of sampling are presented in **Table A-3** (Design Objective 1).

(2.2) DDT Relationships to Other Organochlorine Pesticides

Design Objective

To what extent does the occurance of other organochlorine pesticides in soil correlate with total DDT and/or DDT isomers at the ECI property, and at the depths sampled on the ECI property within the historical stormwater pathway?

Proposed Sampling

Statistical evaluations will rely on results from the areas identified in Step 7, Subsections 2.1, above.

Statements defining the problem decision points, inputs, boundaries, decision rules, acceptable limits on decisions, and optimization of sampling are presented in **Table A-3** (Design Objective 1).

TABLE A-1. ECI Haley-Aldrich Sampling Summary Sitewide Results
ECI Property, 20846 Normandie Avenue, Torrance, CA

SOIL INVESTIGATION FOR HISTORICAL STORMWATER PATHWAY - SOUTH
MONTROSE CHEMICAL SUPERFUND SITE, LOS ANGELES COUNTY, CALIFORNIA

	Count Detects	Count Results	Frequency of Detection	Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Median	Standard Deviation	Coefficient of Variation	RB Level = Risk-Based Action Level	Count Detects > RB Level	Percent Exceedance	Count Nondetects > RB Level
DDT total	251	267	0.94	0.0015	0.3	0.0015	325.1	5.42	0.664	21.55	3.98	10	34	12.7	--
DDT44	244	267	0.91	0.0005	0.1	0.0005	310	3.96	0.33	19.98	5.05				
DDD44	242	267	0.91	0.0005	0.1	0.0006	19	0.96	0.11	2.40	2.49				
DDE44	242	267	0.91	0.0005	0.1	0.0006	8.7	0.50	0.13	0.86	1.75				
ARO1260	138	267	0.52	0.005	0.05	0.005	1.8	0.03	0.008	0.15	4.58				
ARO1254	80	267	0.30	0.0005	0.05	0.006	22	0.13	0.005	1.40	10.65				
CDNEg	54	266	0.20	0.0005	0.2	0.0006	0.46	0.01	0.0025	0.04	2.72				
CDNEc	50	266	0.19	0.0005	0.2	0.0006	0.49	0.01	0.0025	0.04	2.87				
DLDRN	50	266	0.19	0.0005	0.2	0.0005	0.18	0.01	0.0025	0.03	2.15				
CDNE	39	266	0.15	0.005	2	0.006	3.5	0.12	0.0205	0.32	2.58				
BHCb	12	265	0.05	0.0005	0.2	0.0005	0.019	0.01	0.001	0.03	2.29				
BHCa	2	265	0.01	0.0005	0.2	0.001	0.0011	0.01	0.0005	0.03	2.34				
BHCg	2	265	0.01	0.0005	0.2	0.0008	0.0062	0.01	0.0005	0.03	2.33				
BHCd	1	265	0.00	0.0005	0.2	0.0041	0.0041	0.01	0.0005	0.03	2.33				
TPHg		46	0.00	0.37	1			0.53	0.37	0.28	0.52				
TPHo	45	45	1.00			4	21000	724.73	37	3148.12	4.34				
TPHd	45	46	0.98	10	10	3.8	7900	259.95	24	1163.85	4.48				

Notes:
Data were provided to EPA by Haley & Aldrich (ECI, 2005)

DDT total	Total DDT Isomers
DDT44	4,4'-dichlorodiphenyltricholoethane
DDD44	4,4'-dichlorodiphenyldichloroethane
DDE44	4,4'-dichlorodiphenyldichloroethene
ARO1260	Aroclor1260
ARO1254	Arochlor1254
CDNEg	GammaChlordane
CDNEc	cis-Chlordane
DLDRN	Dieldrin
CDNE	Chlordane
BHCb	beta-benzene hexachloride
BHCa	alpha-benzene hexachloride
BHCg	gamma-benzene hexachloride
BHCd	delta-benzene hexachloride
TPHg	Total Petroleum Hydrocarbons-gasoline
TPHo	Total Petroleum Hydrocarbons-oil
TPHd	Total Petroleum Hydrocarbons-diesel

TABLE A-2. EPA Calculations of ECI Total DDT Distribution: By Site / Excavation Unit

ECI Property, 20846 Normandie Avenue, Torrance, CA

SOIL INVESTIGATION FOR HISTORICAL STORMWATER PATHWAY - SOUTH
MONTROSE CHEMICAL SUPERFUND SITE, LOS ANGELES COUNTY, CALIFORNIA

	Site	**EXC03**	**EXC05**	**EXC09**	**EXC20**	**EXC32**	**EXC35**	**noEXC**
Count Detects (D)	251	25	37	35	52	15	25	61
Count Results (N)	267	28	37	35	52	15	25	74
Frequency of Detection: D/N	0.94	0.89	1.00	1.00	1.00	1.00	1.00	0.82
Minimum Nondetect	0.0015	0.0015						0.0015
Maximum Nondetect	0.3	0.06						0.3
Minimum Detect	0.0015	0.0018	0.0204	0.0015	0.0031	0.147	0.21	0.002
Maximum Detect	325.1	0.314	325.1	18.1	52.7	10.25	12.62	5.68
Arithmetic Mean	5.4	0.0	18.7	3.4	8.7	3.1	4.4	0.39
Median	0.67	0.0	4.0	2.0	3.8	1.2	2.9	0.06
Standard Deviation	21.6	0.1	54.2	4.3	11.5	3.3	3.8	0.9
Coefficient Of Variation: SD/MEAN	4.0	1.5	2.9	1.3	1.3	1.1	0.9	2.4
95% UCL on Mean	8.0	0.1	36.7	4.8	11.9	4.9	6.0	0.6
Risk-Based Action Level	10	10	10	10	10	10	10	10
Count Detects > DDTcrit	34		10	4	17	1	2	
Percent Exceedance: 100*(D>CRIT/N)	12.7	0.0	27.0	11.4	32.7	6.7	8.0	0.0
Count Nondetects > DDTcrit		0	0	0	0	0	0	0

Notes:

D/N = number of detections/number of samples

SD/MEAN = standard deviation/arthimetic mean

UCL = upper confidence limit

DDTcrit = total DDT criterion of 10 ppm which is the upper range of regional background total DDT values

100*(D>CRIT/N) = Percentage of detections greater than DDT criterion:

(D = number of detections, CRIT = DDT criterion, N = number of results)

TABLE A-3
Design Objective 1

To what extent do pesticides and PCBs extend laterally and vertically within soils at the ECI property along the historical stormwater pathway?
Decision Point ECI Property within the historical stormwater drainage pathway.
Inputs to the Decision Soil sample results from ECI soil borings performed by Haley & Aldrich (2005) (**Table 2** in the QAPP). Thirty-eight (38) soil borings (34 borings sampled at 8 depth intervals to 24 feet bgs [8 samples per boring], and 4 soil borings sampled at 7 depth intervals to 16 feet bgs [6 samples per boring]) will be collected on a 30-foot grid spacing along 9 east-west transects spaced 60 feet apart as shown in **Figure 8**.
Study Boundaries Approximately 1.48 acres lying within the historical stormwater water drainage. Bounded by ECI Property boundaries on north, south, and east, and extent of historical stormwater drainage on west.
Decision Rules Applicable criterion will be analyte-specific risk-based concentrations appropriate for both residential and industrial land use. Sample results will be evaluated on depth-specific intervals. *If* the 95 percent upper confidence level on the mean concentration exceeds the 10 mg/kg criterion for total DDT *or if* the upper 90th percentile of the observations exceeds the 10 mg/kg criterion for total DDT the layer will be considered contaminated for the land use specific to the criterion applied. The specific area potentially requiring additional characterization, removal, or remediation will depend on spatial distribution of observed concentrations. Spatial overlap of multiple sample depths failing the comparison to criterion will be used to identify three-dimensional areas potentially requiring further characterization, removal, and/or remediation in order to satisfy conditions applicable to current and proposed land use.
Acceptable Limits on Decision Errors 95 percent UCL on the mean and the 90th percentile of the observations ensure that neither the population overall nor the upper bound of the observed distribution exceeds applicable criteria.
Optimized Sampling Design The 30-foot grid spacing along transects ensures that adequate sample coverage is maintained at right angles to the long axis of the historical stormwater pathway. The multiple sampling depths ensure that adequate data will be collected to characterize vertical extent.

APPENDIX B

Analytical Specifications

Documentation and Deliverables for Analytical Methods:

All documentation and deliverables required in the QAPP must be submitted. All packages will include full documentation, and data for the individual methods shall stand on their own. Deliverables for each Sample Delivery Group include, but are not limited to, the following:

1. Table of contents – All sections should be detailed and page numbers designated. Subsections, such as within the raw data sections need to be identified with page numbers. Within the same Sample Delivery Group (SDG), data from the different methods need to be separated.
2. All Sample Tracking Reports (i.e., signed Packing Lists/Chain-of-Custody forms).
3. Sample log-in information with documentation for cooler temperature measurement and pH check.
4. Complete SDG File (CSF) inventory.
5. Any telephone logs referring to the samples.
6. A case narrative signed by the laboratory manager or his/her designee, certifying the accuracy and validity of all data reported. The narrative will detail the specific deviation quantatively, as well as provide an affirmative statement for parameters where there were no deviations.
7. Tabulated sample results, with analyte concentration units clearly specified. As applicable to the method, surrogate recoveries will be included with the individual sample results.
8. A QC summary section, which includes the following summary data, as applicable to the individual methods: Blanks, laboratory control standards, matrix spikes and duplicates, initial calibration, continuing calibration, tuning, interference checks, breakdown checks, site sample internal standard area and retention time summaries.
9. A sequence log (presented in the QC summary section) showing all QC runs and associated samples in chronological order, including: initial calibration, continuing calibration tuning, interference checks, blanks, laboratory control standards, matrix spikes and duplicates. The QC sample IDs should be clearly traceable to the raw data sections. Associations between different QC runs and samples should be clearly identified. Run times for site and QC samples should be shown. Client sample IDs and laboratory sample IDs need to be clearly shown, and cross-referenced to each other.
10. The raw data section should be comprehensive and the data should be clearly presented, including:

    a. All computer printouts with integrated areas, peak heights, and calibration factors.

    b. Bench sheets for sample preparation, indicating dates, times, methods of sample preparation, sample dilution, spiking solution identification and volumes/amounts added, instrument run time/date, etc.

    c. A formula (including definitions) showing how the results were calculated, with an xample of an actual calculation.

    d. Standards preparation logs, including the source and traceable lot numbers, and concentrations of all standards used for calibration and spiking.

    e. Data review checklists

Table A
Toxicity Characteristics Leaching Procedure (TCLP) Regulatory Levels for VOC's, Pesticides, and Trace Metals (Methods 8260B, 8081A, and 6020)
Soil Investigation for Historical Stormwater Pathway - South
ECI Property, Torrance, CA

Substance	Regulatory Level (mg/L)
Arsenic	5
Barium	100
Benzene	0.5
Cadmium	1
Carbon tetrachloride	0.5
Chlordane	0.03
Chlorobenzene	100
Chloroform	6
Chromium	5
1,2-Dichloroethane	0.5
1,1-Dichloroethylene	0.7
Endrin	0.02
Heptachlor (and its hydroxide)	0.008
Lead	5
Lindane	0.4
Mercury	0.2
Methoxychlor	10
Methyl ethyl ketone	200
Selenium	1
Silver	5
Toxaphene	0.5
Tetrachloroethylene	0.7
Trichloroethylene	0.5
Vinyl Chloride	0.2

Notes:

mg/L - milligrams per liter

TABLE B

Soluable Threshhold Limit Concentrations (STLC) for VOC's, Pesticides, PCBS, and Trace Metals

(Methods 8260B, 8081A, 8082, and 6020)

Soil Investigation for Historical Stormwater Pathway - South

ECI Property, Torrance, CA

Substance	**mg/L**
Inorganic Persistent Bioaccumulative Toxic Substances	
Antimony and compounds	15
Arsenic and compounds	5
Barium and compounds	100
Beryllium	0.75
Cadmium	1
Chromium (III) compounds	5
Cobalt	80
Copper	25
Lead	5
Molybdenum	350
Nickel	20
Selenium	1
Silver	5
Thallium	7
Vanadium	24
Zinc	250
Organic Persistent Bioaccumulative Toxic Substances	
Aldrin	0.14
Chlordane	0.25
DDT, DDE, DDD	0.1
Dieldrin	0.8
Endrin	0.02
Heptachlor	0.47
Lindane	0.4
Methoxychlor	10
Polychlorinated biphenyls (PCBs)	5
Toxaphene	0.5
Trichloroethylene	204

Notes:

mg/L - milligrams per liter

TABLE C
Analytical Method Information for EPA SW846 Method 8081A with 2,4-isomers (Soil)
Soil Investigation for Historical Stormwater Pathway - South
ECI property, Torrance,CA

Analyte	MDL	Reporting Limit	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
8081A-Pesticides in Soil (EPA 3545/8081A)								
Preservation: 4 C, cool			**Amount Required:** 100 grams				**Hold Time:** 14 days to extraction	
Container: 4 oz Glass Jar/Stainless Stell Sleeve								
Aldrin	0.1141	1.7 µg/kg			58-120	46	58-120	46
alpha-BHC	0.1167	1.7 µg/kg			42-117	20	42-117	20
beta-BHC	0.1177	1.7 µg/kg			68-120	20	68-120	20
delta-BHC	0.0655	1.7 µg/kg			70-130	20	70-130	20
gamma-BHC (Lindane)	0.1287	1.7 µg/kg			55-124	55	55-124	55
4,4'-DDD	0.2619	3.4 µg/kg			67-139	20	67-139	20
4,4'-DDE	0.2520	3.4 µg/kg			68-135	20	68-135	20
4,4'-DDT	0.1300	3.4 µg/kg			65-135	78	65-135	78
Dieldrin	0.2243	3.4 µg/kg			69-135	49	69-135	49
Endosulfan I	0.1719	1.7 µg/kg			66-120	20	66-120	20
Endosulfan II	0.3080	3.4 µg/kg			70-135	20	70-135	20
Endosulfan sulfate	0.2171	3.4 µg/kg			35-132	20	35-132	20
Endrin	0.2927	3.4 µg/kg			67-136	58	67-136	58
Endrin aldehyde	0.1716	3.4 µg/kg			18-123	20	18-123	20
Endrin ketone	0.2350	3.4 µg/kg			61-132	20	61-132	20
Heptachlor	0.1654	1.7 µg/kg			59-126	64	59-126	64
Heptachlor epoxide	0.1058	1.7 µg/kg			67-122	20	67-122	20
Methoxychlor	1.2570	1.7 µg/kg			70-130	20	70-130	20
2,4'-DDD	0.3120	3.4 µg/kg						
2,4'-DDE	0.3975	3.4 µg/kg						
2,4'-DDT	0.4280	3.4 µg/kg						
surr: Tetrachloro-m-xylene			41-124					
surr: Decachlorobiphenyl			45-128					

Table provided by Severn Trent Laboratories of West Sacramento, California

TABLE D
Analytical Method Information for EPA SW846 Method 8081A with 2,4-isomers (Water)
Soil Investigation for Historical Stormwater Pathway - South
ECI property, Torrance, California

Analyte	MDL	Reporting Limit	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
8081A-Pesticides in Water (EPA 3510C/8081A)								
Preservation: 4 C, cool			**Amount Required:** 2,000 ml				**Hold Time:** 7 days to extraction	
Container: 1 Liter Glass Amber								
Aldrin	0.0021	0.05 µg/L			59-112	26	59-112	26
alpha-BHC	0.0059	0.05 µg/L			56-115	21	56-115	21
beta-BHC	0.0047	0.05 µg/L			71-115	33	71-115	33
delta-BHC	0.0029	0.05 µg/L			55-136	35	55-136	35
gamma-BHC (Lindane)	0.0050	0.05 µg/L			67-119	22	67-119	22
2,4'-DDD	0.0200	0.10 µg/L						
2,4'-DDE	0.0200	0.10 µg/L						
2,4'-DDT	0.0200	0.10 µg/L						
4,4'-DDD	0.0040	0.10 µg/L			75-134	32	75-134	32
4,4'-DDE	0.0061	0.10 µg/L			77-128	33	77-128	33
4,4'-DDT	0.0051	0.10 µg/L			63-133	29	63-133	29
Dieldrin	0.0051	0.05 µg/L			80-119	28	80-119	28
Endosulfan I	0.0043	0.10 µg/L			76-116	26	76-116	26
Endosulfan II	0.0120	0.10 µg/L			79-127	28	79-127	28
Endosulfan sulfate	0.0042	0.10 µg/L			43-128	28	43-128	28
Endrin	0.0054	0.10 µg/L			80-126	29	80-126	29
Endrin aldehyde	0.0042	0.10 µg/L			10-114	48	10-114	48
Endrin ketone	0.0200	0.10 µg/L			70-118	28	70-118	28
Heptachlor	0.0032	0.05 µg/L			72-108	26	72-108	26
Heptachlor epoxide	0.0021	0.05 µg/L			79-115	27	79-115	27
Methoxychlor	0.0270	2.0 µg/L			67-122	29	67-122	29
surr: Tetrachloro-m-xylene			43-114					
surr: Decachlorobiphenyl			21-189					

Table provided by Severn Trent Laboratories of West Sacramento, California

TABLE E
Analytical Method Information for EPA SW846 Method 8082 (Soil)
Soil Investigation for Historical Stormwater Pathway - South
ECI property, Torrance, California

Analyte	MDL	Reporting Limit	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
8082-Pesticides in Water (EPA 3510C/8082)								
Preservation: 4 C, cool			**Amount Required:** 100 grams				**Hold Time:** 7 days to extraction	
Container: 4 oz Glass Jar/Stainless Stell Sleeve								
Arochlor 1016	8.30	33 µg/kg			67-123	26	67-123	26
Arochlor 1221	10.51	33 µg/kg						
Arochlor 1232	8.30	33 µg/kg						
Arochlor 1242	8.30	33 µg/kg						
Arochlor 1248	8.30	33 µg/kg						
Arochlor 1254	8.30	33 µg/kg						
Arochlor 1260	8.30	33 µg/kg			68-130	27	68-130	27
surr: Tetrachloro-m-xylene			55-124					
surr: Decachlorobiphenyl			33-146					

Table provided by Severn Trent Laboratories of West Sacramento, California

TABLE F
Analytical Method Information for EPA SW846 Method 8082 (Water)
Soil Investigation for Historical Stormwater Pathway - South
ECI property, Torrance, California

Analyte	MDL	Reporting Limit	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
8082-Pesticides in Water (EPA 3510C/8082)								
Preservation: 4 C, cool			**Amount Required:** 2,000 ml				**Hold Time:** 7 days to extraction	
Container: 1 Liter Glass Amber								
Arochlor 1016	0.2700	1.0 µg/L			71-120	33	71-120	33
Arochlor 1221	0.3553	1.0 µg/L						
Arochlor 1232	0.1300	1.0 µg/L						
Arochlor 1242	0.2000	1.0 µg/L						
Arochlor 1248	0.1127	1.0 µg/L						
Arochlor 1254	0.3200	1.0 µg/L						
Arochlor 1260	0.2500	1.0 µg/L			71-132	28	71-132	28
surr: Tetrachloro-m-xylene			44-116					
surr: Decachlorobiphenyl			21-135					

Table provided by Severn Trent Laboratories of West Sacramento, California