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28 June 2004

Ms. Betty Graham
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612

Mr. Barney Chan
Alameda County Health Care Services
Environmental Health Services
Environmental Protection
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Subject: Former United Airlines Oakland Maintenance Center
Site Investigation and Risk Assessment Report
Oakland International Airport, Oakland, California

Dear Ms. Graham and Mr. Chan:

On behalf of United Airlines (UAL), Environmental Resources Management (ERM) presents the enclosed site investigation and risk assessment report to the San Francisco Bay Regional Water Quality Control Board (RWQCB) and Alameda County Health Care Services (ACHCS). The investigation described in this report was conducted at the former UAL Oakland Maintenance Center (OMC), located at 1100 Airport Drive within Oakland International Airport, prior to UAL's cessation of operations and exit of the facility on 31 May 2003. The objective of the investigation was to identify and investigate areas of concern where hazardous substances may have been released. The risk assessment was performed to evaluate risks to potential receptors and need for corrective actions.

Nineteen areas of concern were identified and investigated for VOCs, SVOCs, TPH, metals, and PCBs in soil and ground water. The investigation was coordinated with a concurrent assessment performed by Weiss Associates on behalf of the Port of Oakland. All existing analytical data from both investigations are included in the enclosed document to provide a comprehensive evaluation of site conditions.

A site-specific risk assessment was performed to evaluate the results of the subsurface investigation. The results of the subsurface investigation and risk assessment indicate that the concentrations of chemicals and metals detected in soil and ground water at the OMC do not pose an unacceptable risk to any of the potential receptor populations considered including airport workers, construction workers, and ecological receptors. Therefore, no further action is recommended for the 19 AOCs investigated. UAL requests formal approval of the regulatory status of each AOC as recommended herein.

Following your review of this letter, we would be happy to meet with you and representatives of the Port of Oakland to discuss the site. If you have any questions or comments, please contact me at (925) 946-0455 or Dan Tisoncik of UAL at (847) 700-6586.

Sincerely,

Jim Warner, R.G.
Principal

JBW/jal/5310.10
Attachments: OMC Investigation/Risk Assessment Report
cc: Mr. Dan Tisoncik, United Airlines
Mr. Dale Klettke, Port of Oakland

RO 414

Former United Airlines Oakland Maintenance Center Site Investigation and Risk Assessment Report

Oakland International Airport

Presented to

United Airlines
1200 E. Algonquin Road
Elk Grove Township, IL 60007

June 2004

Prepared by

ERM
Environmental Resources Management
1777 Botelho Drive, Suite 260
Walnut Creek, CA 94596

UNITED AIRLINES

United Airlines

Former United Airlines Oakland Maintenance Center Site Investigation and Risk Assessment Report

Oakland International Airport

June 2004

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ERM

ENVIRONMENTAL RESOURCES MANAGEMENT

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United Airlines

Former United Airlines Oakland Maintenance Center Site Investigation and Risk Assessment Report

Oakland International Airport

June 2004

5310.10

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ERM

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On behalf of United Airlines (UAL), ERM-West, Inc. (ERM) conducted a subsurface investigation and risk assessment of the former UAL Oakland Maintenance Center (OMC) located at 1100 Airport Drive in Oakland, California (Figure ES-1). The OMC was leased by UAL from the Port of Oakland from February 1988 through 31 May 2003. The objectives of the investigation and risk assessment included the following:

- Investigate 19 areas of concern (AOCs; Figure ES-2) identified based on the history and operations of the OMC to determine if releases of hazardous chemicals to soil and ground water have occurred;
- Evaluate the analytical results with respect to regulatory and risk-based standards to categorize each AOC as either suitable for No Further Action status or requiring additional investigation and/or remedial actions; and
- Prepare this report documenting the results for submittal to the San Francisco Bay Area Regional Water Quality Control Board (RWQCB) and Alameda County Health Care Services (ACHCS) to formally establish the regulatory status of each AOC.

The OMC is a 39.09-acre facility within Oakland International Airport, which UAL used to perform maintenance on wide-body aircraft. The OMC property was within San Francisco Bay until the late 1950s or early 1960s, when filling began as part of construction of the South Field of the airport, which opened in 1962. The filled area occupied by the OMC remained undeveloped until 1973, when the hangar building and surrounding paved taxiways and aircraft parking areas were constructed for World Airways, the property tenant from its initial construction in 1973 until 1988. UAL leased the OMC from 1988 through 31 May 2003.

The subsurface investigation addressed volatile organic compounds (VOCs), semivolatile organic compounds, total petroleum hydrocarbons (TPH), polychlorinated biphenyls, and metals in soil and ground water. In addition, the Port of Oakland conducted its own soil and ground water investigation at the OMC. The analytical results generated during the Port of Oakland investigation are also included in this report to present a comprehensive evaluation of all relevant data. Between the two investigations, a total of 147 soil samples were collected and analyzed. Fifty-one grab ground water samples and 48 monitoring well samples were collected and analyzed during the investigations. The analytical results were compared to screening criteria and regulatory standards commonly used for sites under RWQCB and DTSC oversight to direct additional investigation and determine that investigation activities were adequately completed.

During the investigation, artificial fill was encountered between ground surface and approximately 13 feet bgs. Young Bay Mud, an aquitard, was encountered below the artificial fill. The lower contact of the Young Bay Mud was not encountered during this investigation. The stratigraphy encountered during the investigation is consistent with the general geology of the East Bay Plain. Ground water at the site was encountered within the artificial fill at depths ranging from 2 to 8 feet bgs and ground water flow direction and gradient were variable.

A water supply well survey was also performed as part of the investigation. The nearest water supply well locations are approximately 1 mile east of the OMC and are screened in aquifers below the Young Bay Mud. Given the distance of the identified water supply wells from the OMC and the lack of pumping from the artificial fill unit, it is unlikely that releases at the OMC have the potential to migrate to the water supply wells. In addition, ERM reviewed a RWQCB report on the beneficial uses of ground water within the OMC area. The report indicates that ground water within the shallow artificial fill along the Bay-front is unlikely to be used as a source of drinking water due to high total dissolved solids, the potential for saltwater intrusion, elevated levels of coliform from leaking sewer pipes, low yield, and the requirement for 50-foot well seals for new water supply wells.

Soil analytical results generated during this investigation indicated the presence of VOCs, TPH, and metals within soils at the OMC. The following table identifies the AOCs with detections of the identified compound class and AOCs with detections above investigation screening levels (EPA Region 9 Industrial Preliminary Remediation Goals {PRGs} or RWQCB Environmental Screening Levels {ESLs}).

Compound Class	AOCs with Detected Concentrations	AOCs with Concentrations over Screening Level
VOCs	AOC 1, AOC 2, AOC 3, AOC 9	None
TPH	AOC 1, AOC 2, AOC 3, AOC 4, AOC 5, AOC 9, AOC 11, AOC 14, AOC 18, AOC 19	AOC 2, AOC 9, AOC 19
Metals	AOC 1, AOC 2, AOC 3, AOC 5, AOC 7, AOC 8, AOC 9, AOC 10, AOC 13, AOC 14, AOC 16, AOC 18, AOC 19	None

Ground water results of samples collected during this investigation indicated the presence of VOCs, TPH, and metals in OMC ground water. The following table identifies the AOCs with detections of the identified compound class and AOCs with detections above investigation screening levels (California Maximum Contaminant Levels (MCLs) or ESLs).

Compound Class	AOCs with Detected Concentrations	AOCs with Concentrations over Screening Level
VOCs	AOC 1, AOC 2, AOC 5, AOC 7, AOC 9, AOC 15, AOC 17, AOC 18	AOC 1, AOC5, AOC 7, AOC 17, AOC 18
TPH	AOC 1, AOC 2, AOC 3, AOC 4, AOC 5, AOC 6, AOC 7, AOC 9, AOC 11, AOC 12, AOC 14, AOC 17	AOC 2, AOC 3, AOC 5
Metals	AOC 1, AOC 2, AOC 3, AOC 5, AOC 7, AOC 8, AOC 9, AOC 14, AOC 17, AOC 18, AOC 19	AOC 1, AOC 2, AOC 3, AOC 5, AOC 9, AOC 14, AOC 17

A site-specific risk assessment was performed to evaluate the results of the subsurface investigation. A conceptual site model (CSM) was developed to identify potential exposure routes and populations for media containing compounds of concern (COCs) at the OMC. The CSM identified three potential receptor populations to be retained for the risk assessment: Indoor and Outdoor Airport Workers, Construction Workers, and Ecological Receptors.

The risk assessment consisted of a three-step process. The first step (Tier-1) consisted of comparison of detected soil and/or ground water chemical concentrations to their RWQCB ESLs. If an ESL was not established for a compound, then PRGs or MCLs were used depending on the media. For chemicals that exceeded their Tier-1 standard, a Tier-2 risk assessment was conducted, which consisted of the application of site-specific information to either select a more appropriate ESL for the particular receptor population and exposure pathway or to derive standards specific to the OMC. For chemicals that exceeded the Tier-2 standards for a particular receptor population and exposure pathway, a Tier-3 risk assessment was conducted. The Tier-3 risk assessment consisted of a statistical analysis of the chemical concentrations detected at the site, potential background evaluation for metals, and further evaluation of the exposure pathway in light of site-specific conditions.

As summarized in Table ES-1, the results of the subsurface investigation and risk assessment indicate that the concentrations of chemicals and metals detected in soil and ground water at the OMC do not pose an unacceptable risk to any of the exposure populations considered, including airport workers, construction workers, and ecological receptors. Therefore, no further action is recommended for the 19 AOCs investigated. UAL requests formal approval of the regulatory status of each AOC as recommended herein.

Project No. 5310.10
Date: 08/07/03
Drawn By: J. Estrada
CAD File: g:\5310\10\531032.dwg

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0 1200
Approx. Scale (feet)

Figure ES-1
July 2002 Aerial Photograph of the OMC and Surrounding Area
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California

ERM 08/03

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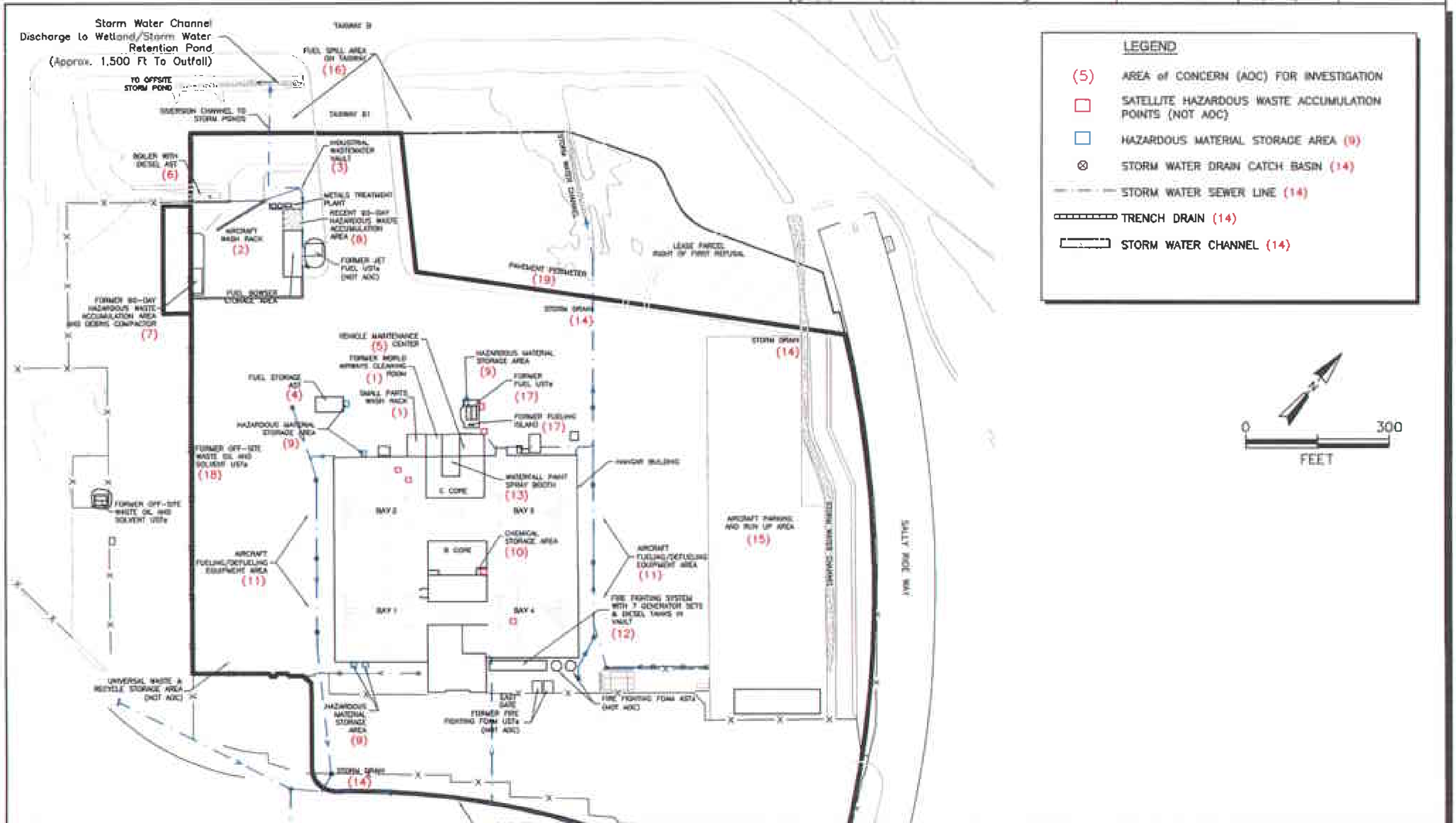

Figure ES-2

Site Features and Areas of Concern

Former United Airlines Oakland Maintenance Center

Oakland International Airport, Oakland California

ERM *03/04*

1.0 INTRODUCTION

On behalf of United Airlines (UAL), Environmental Resources Management (ERM) conducted a soil and ground water investigation of the former Oakland Maintenance Center (OMC) located at 1100 Airport Drive in Oakland, California (Figure 1). UAL leased the OMC from the Port of Oakland from February 1988 through 31 May 2003. During this time, the facility was used for aircraft maintenance. UAL ceased operations and exited the facility on 31 May 2003. The investigation described in this report was conducted to determine whether chemicals of concern occur in soil and ground water at the site. The results were used to perform a human health and ecological risk assessment to establish the regulatory status of the site.

1.1 REPORT ORGANIZATION

This report is organized as follows:

- Section 1.0 presents a site description and history, as well as the objectives of the investigation and risk assessment;
- Section 2.0 identifies the areas of concern at the OMC based on the history and operations of the facility;
- Section 3.0 summarizes the soil and ground water investigation activities and methods;
- Section 4.0 presents the results of the investigation;
- Section 5.0 includes a risk assessment for chemicals detected in soil and ground water at the site;
- Section 6.0 presents conclusions and recommendations;
- Section 7.0 lists the references cited in this report;
- Figures and tables are presented following the text; and
- Appendices follow the tables and provide supporting information.

1.2 SITE DESCRIPTION AND HISTORY

This section describes the site and summarizes the history of its development and operations. Figure 2 is an aerial photograph of the OMC and surrounding area that was taken in July 2002. Figure 3 is an OMC site map showing primary features of interest.

The OMC is a 39.09-acre facility that UAL leased from the Port of Oakland between February 1988 and 31 May 2003 to perform maintenance on wide-body aircraft. An approximately 309,910-square-foot structure containing four adjoining hangars is the primary building on the OMC property. The area surrounding the hangar building is paved with either asphalt or concrete, and was primarily used for aircraft movement. The hangar and surrounding areas contained a number of structures and facilities during UAL operations, including an aircraft wash rack, small parts wash rack, vehicle fueling station, wastewater treatment system, vehicle maintenance shop, hazardous materials storage areas, and miscellaneous equipment storage areas. Since UAL's exit of the facility, the Port of Oakland has begun removing many of these site features, including the wastewater treatment system and hazardous materials storage areas, to prepare the site for future uses. The future use of the OMC property has not been determined, but it is anticipated to continue to be used for airport-related activities.

A review of historical aerial photographs and records indicates that the current area of the OMC property was within San Francisco Bay until the late 1950s or early 1960s, when filling began as part of construction of the South Field of the airport, which opened in 1962. The filled area now occupied by the OMC remained undeveloped until 1973, when the hangar building and surrounding paved taxiways and aircraft parking areas were constructed. World Airways was the property tenant from its initial construction in 1973 until 1988. World Airways conducted aircraft maintenance and associated activities during its period of operation at the OMC. UAL leased the OMC from 1988 until ceasing operations and exiting the facility on 31 May 2003. The property is currently vacant and unused except for routine activities associated with the maintenance of the hangar building and associated utilities, in addition to equipment removal by the Port of Oakland.

The OMC property is located within the Oakland International Airport in a predominantly commercial/industrial area. Land use within a 1-mile radius of the OMC includes the airport and associated passenger parking, terminal buildings, aircraft storage and maintenance facilities, airfreight shipping operations, and rental car agencies. This area also contains a golf course, stormwater retention ponds, and undeveloped parcels. Figure 2 presents a recent aerial photograph of the OMC and areas immediately surrounding the property. As shown, the surrounding area includes storm water drainage channels/ponds and an aircraft taxiway connecting the North Field and South Field of the airport to the north; Sally Ride Way to the east, beyond which is additional parking for the airport and the runway and taxiways for the North Field; Airport Drive to the south, beyond which is the long-term parking area, rental car facilities, and unoccupied wetlands; and an access road and the economy parking lot to the west. Since UAL's exit of the facility, the economy parking lot on the west side of the OMC has been expanded to include a portion of the paved area on the west side of the hangar building.

The OMC property is at an elevation of approximately 4 to 5 feet above mean sea level (msl). The surface topography of the property is relatively level and slopes gently toward the west. The surface water nearest to the OMC is San Francisco Bay, which is approximately 2,000 feet south and 1 mile west of the property (Figures 1 and 2). Storm water within the northern portion of the OMC is diverted into storm drains and a storm water channel, which flow into an open storm channel northwest of the property to a retention pond west of the OMC. Storm water within the southern portion of the OMC is diverted to storm drains that flow south to an outfall to San Francisco Bay.

The South Field and surrounding areas of the airport (including the area of the OMC property) were constructed on filled portions of San Francisco Bay using hydraulically dredged bay sediments, rock from quarries in Point Richmond and San Rafael, and topsoil from the Leona Quarry and another nearby source in the vicinity of Lake Temescal. During the current and previous investigations conducted at the property, this fill has been encountered to depths of approximately 13 feet below ground surface (bgs). The Bay Mud is encountered beneath the fill. Bay Mud consists of organic clay and silt deposited in San Francisco Bay and is generally considered to be an aquitard. Ground water occurs in the fill at 2 to 8 feet bgs and flow direction varies with location.

1.3 *INVESTIGATION AND RISK ASSESSMENT OBJECTIVES*

The objectives of the investigation and risk evaluation included the following:

- Investigate 19 areas of concern (AOCs) identified based on the history and operations of the OMC to determine if hazardous chemicals are present in soil and ground water;
- Evaluate the analytical results with respect to regulatory and risk-based standards to categorize each AOC as either suitable for No Further Action status or requiring additional investigation and/or remedial actions; and
- Prepare this report documenting the results for submittal to the San Francisco Bay Area Regional Water Quality Control Board and Alameda County Health Care Services to formally establish the regulatory status of each AOC.

2.0 *IDENTIFICATION OF AREAS OF CONCERN*

This section presents the AOCs that were identified based on operations conducted by UAL and historical operations by former tenants of the OMC. Section 2.1 summarizes the evaluation approach used to identify AOCs. Section 2.2 describes AOCs at the OMC that were deemed to require site investigation. Section 2.3 describes off-site, adjacent AOCs that were recommended for site investigation. Section 2.4 describes environmental sites/issues at the OMC that were identified during the evaluation, but were categorized as not requiring further investigation.

2.1 *EVALUATION APPROACH TO IDENTIFY AOCS*

The approach for identifying AOCs included the following:

- A visual inspection of the OMC property (19 March 2003);
- Interviews with past and present UAL employees and review of UAL files to determine current and historical use or releases of potentially hazardous substances;
- Review of available documents identifying historical uses of the OMC property and adjacent properties, including aerial photographs and Port of Oakland files; and
- Review of available local, state, and federal environmental agency records for sites within one mile of the OMC property.

2.2 *AREAS OF CONCERN AT THE OMC PROPERTY*

The AOCs identified at the OMC property to require further investigation are described below and as indicated on Figure 3. Each AOC has a number (AOC 1, AOC2, etc.) corresponding to its designation on figures and tables.

2.2.1 *Small Parts Wash Rack/Former World Airways Cleaning Room (AOC 1)*

The small parts wash rack is immediately adjacent to the northwestern side of the hangar (Figure 3). Since UAL operations began in 1988, UAL used only alkaline cleaner for cleaning parts in this area. This area was previously used by World Airways, which may have used solvents for parts cleaning. The wash rack is surrounded by a 2- to 4-inch concrete berm to contain water. Water collected in the bermed area drains into an approximately 2,000-gallon concrete sump. The sump predates UAL occupancy and is thought to be constructed of about 6-inch-thick concrete. The sump discharges into the sanitary sewer for treatment by the East Bay Municipal Utility District (EBMUD) at the main Oakland treatment facility. Two additional smaller sumps are also located in the small parts wash rack area. These sumps drain into the 2,000-gallon sump for discharge to the sanitary sewer.

World Airways also operated a cleaning room with a sump and grated floor drain inside the hangar building adjacent to this area to the east. According to UAL personnel, UAL used this cleaning room from approximately 1988 until the mid-1990s. UAL subsequently filled the sump with gravel and poured a concrete floor over the grated area. This sump discharged to the 2,000-gallon sump described above, which discharged to the sanitary sewer. Based on the potential historic use of chlorinated solvents in this area, it was investigated.

2.2.2 *Aircraft Wash Rack (AOC 2)*

The aircraft wash rack was in the northwestern corner of the OMC property in the concrete paved area formerly used for aircraft storage by World Airways (Figure 3). Aircraft were washed using steam cleaners as well as alkaline cleaner since the wash rack was installed by UAL in 1990. Aircraft washing was not performed by UAL at the OMC prior to installation of the wash rack. From approximately 1990 to 2001, the wash water was collected in drains and diverted to an approximately 2,000- to 2,500-gallon concrete sump (AOC 3). The sump was used to catch wash water and/or the first 20 minutes of runoff during significant rainfall events. This water was sent to the sanitary sewer system for subsequent treatment by EBMUD at the main Oakland treatment facility. After 20 minutes of significant rainfall, the surface water runoff was diverted to storm water drains.

Due to exceedances of EBMUD Ordinance 311 discharge limits for copper and cadmium for sanitary sewer discharges from the aircraft wash rack, UAL installed trench drain collectors and a metals treatment plant in 2001 to collect and treat wash water and the first 20 minutes of storm water runoff. Several aboveground storage tanks (ASTs) were also installed as part of the metals treatment plant, including two 11,000-gallon feed tanks, two 250-gallon process tanks, two 100-gallon sludge tanks, and one 1,900-gallon sludge tank. Following installation, UAL exceeded the required sewer discharge criteria for metals on only one occasion in April 2002. Based on the detection of metals within the aircraft wash water, this area was investigated.

2.2.3 *Industrial Wastewater Vault (AOC 3)*

As discussed in Section 2.2.2, water from the aircraft wash rack in the northwestern corner of the OMC property collected in a trench drain and was diverted to an approximately 2,000- to 2,500-gallon concrete sump, which is designated as AOC 3 (Figure 3). Water was treated by an on-site metals removal system (installed in 2001) prior to discharge to the sanitary sewer for treatment by EBMUD at the main Oakland treatment facility. During storm events, the first 20 minutes of runoff was diverted from the sump into the holding tanks for the metals removal plant and subsequent runoff was diverted to storm water drains at the OMC property. The diversion channel from the sump to the storm water drains is unlined; therefore, the sump and unlined diversion channel were investigated.

2.2.4 *Aboveground Fuel Storage Tank (AOC 4)*

A double-walled, fuel AST (AOC 4) is located north of the hangar (Figure 3). This tank consists of two separate compartments with an 8,000-gallon diesel tank and a 4,000-gallon unleaded fuel tank. This tank was installed by UAL in 1999. This tank was emptied and cleaned prior to UAL's exit of the OMC in May 2003. The area beneath and surrounding the tank is paved with concrete. This was considered an AOC due to minor staining observed on the concrete pad surrounding the tank during the site inspection.

2.2.5 *Vehicle Maintenance Center (AOC 5)*

The vehicle maintenance center (AOC 5) was located inside the main hangar building at the northern end of the building (Figure 3). According to UAL personnel, vehicle maintenance was performed both inside and immediately outside of the building since UAL operations began in 1988. Based on information provided by UAL personnel, it appears that a subgrade hydraulic lift previously used by World Airways in this area was used by UAL until it was abandoned in place in the mid-1990s. Investigation was considered appropriate for this area due to minor staining observed on the floor of the vehicle maintenance center during the site inspection and the history of vehicle maintenance activities in this area.

2.2.6 *Boiler and Aboveground Diesel Storage Tank (AOC 6)*

A boiler and 1,000-gallon diesel AST (AOC 6) were installed by UAL in the northwestern corner of the OMC property in approximately 1990 for heating water for the aircraft wash rack (Figure 3). A minor leak on an exterior diesel filtration line occurred and diesel was spilled onto non-paved ground in this area. According to UAL personnel, soil was removed as a remedial action for this leak, although no information on confirmation sampling could be located in UAL files. A 2,000-gallon aboveground poly tank was also present in this area. This poly tank was used to contain detergent for aircraft washing activities on the adjacent aircraft wash rack (AOC 2). The Port of Oakland removed the boiler and aboveground tanks from this area following UAL's exit of the OMC. Due to the history of this area, it was considered an AOC and investigated.

2.2.7 *Former 90-Day Hazardous Waste Accumulation Area (AOC 7)*

Prior to 2003, hazardous wastes were stored in a fenced area (AOC 7) near the southwestern corner of the aircraft wash rack (Figure 3). Containers of waste were stored on pallets with secondary containment. A compactor was also present for compacting debris. Liquid wastes stored in this area included used oil, antifreeze, non-chlorinated solvents, and jet fuel. No spills are known to have occurred in this area; however, based on the historical use of this area for waste storage, it was considered an AOC and investigated.

2.2.8 *Recent 90-Day Hazardous Waste Accumulation Area (AOC 8)*

Hazardous wastes were stored in a fenced area (AOC 8) on the eastern side of the aircraft wash rack (Figure 3). Containers of waste were stored on pallets with secondary containment. This facility was used from approximately January 2003 until May 2003. Liquid wastes stored in this area included used oil, antifreeze, non-chlorinated solvents, and jet fuel. Based on the use of this area for waste storage, it was considered an AOC and investigated.

2.2.9 *Hazardous Material Storage Areas (AOC 9)*

Five mobile safety storage buildings (AOC 9) were present at the OMC at the locations shown in Figure 3. These mobile buildings contained small volumes of hazardous materials, including new product as well as waste (satellite storage). The majority of waste generated by the facility was solid debris (rags, containers, etc). Liquid wastes including used oil, antifreeze, non-chlorinated solvents, and jet fuel, were recycled, if possible, or properly disposed of. Based on the use of these areas for liquid product and waste storage, they were investigated.

At the hazardous material storage area on the northwestern side of the hangar building, a monitoring well was observed during the site inspection (Figure 3). This well had a measured total depth of 15 feet bgs. Information on the purpose for this well and its construction was subsequently retrieved from UAL files. The information indicated that this well was installed as a piezometer in March 1999 during a geotechnical investigation for a planned expansion of the hangar building. No ground water sampling information was available for this well.

2.2.10 *Chemical Storage Area (AOC 10)*

A chemical storage area (AOC 10) was located within the hangar building (Figure 3). This room was constructed in 2000 and used by employees to procure chemicals for use in the hangars. This room was also used for storage of empty chemical containers and for hazardous waste satellite accumulation. Materials stored in this area included oils, paints, lubricants, and non-chlorinated solvents. Based on the use of this area for chemical and waste storage, it was investigated.

2.2.11 *Aircraft Fueling/Defueling Equipment Area (AOC 11)*

A mobile system was used at the OMC to fuel and defuel aircraft parked in the hangar. A tanker truck was situated approximately 50 feet outside of the hangar doors (AOC 11) and connected to the aircraft using mobile piping to fuel or defuel aircraft. These areas were observed to have some minor staining possibly related to drips from the fueling/defueling operations.

Additionally, a fuel spill was reported to have occurred in one of these areas on 15 December 2001. Approximately 40 gallons of jet fuel were spilled on the pavement in the area outside of Bay 2 on the western side of the hangar building (Figure 3). Absorbent materials were used to clean up the spill and no fuel was reported to have reached any storm drains. The City of Oakland Fire Department was immediately informed and the fire chief that witnessed the cleanup was reported to be satisfied with UAL's actions in containing the spill. Piazza Mobile Sweep was called in to sweep the area once the spill had been cleaned up. A copy of 15 December 2001 *UAL's Environmental Spill Report, Investigation Data Collection Form, and Security – Maintenance Report* regarding this incident are included in Appendix A. Due to the presence of staining and the previously reported spill, these areas were investigated.

2.2.12 *Fire System Generators (AOC 12)*

Seven diesel-powered motors were used to power the fire system water pumps. Each motor has an approximately 250-gallon diesel storage tank (AOC 12). The tanks and motors are located in an underground concrete vault located immediately southeast of the hangar (Figure 3). The motors and diesel storage tanks appeared in proper working order, and no diesel drips or stains were observed within the vault. The drain in the vault discharges to the sanitary sewer. This area was investigated due to the presence of the diesel storage tanks.

2.2.13 *Paint Spray Booth (AOC 13)*

A waterfall-style paint spray booth (AOC 13) was installed by UAL in the early 1990s within the northern portion of the hangar building (Figure 3). Paints and non-chlorinated solvents were used and stored by UAL in this area. During the inspection, the spray booth was no longer operable due to leaks in the water holding tank caused by corrosion. The booth was decommissioned by UAL in 1998, and the water and sludge were properly disposed of off site. Paint overspray was observed within the booth during the site inspection. Based on operations in this area, it was investigated.

2.2.14 *Storm Drains (AOC 14)*

A number of storm water drains, pipelines, and ditches convey storm water off of the property (Figure 3). These include a storm ditch on the eastern edge of the property, storm drains and an underground pipeline on the eastern side of the hangar building, and storm drains and an underground pipeline on the western side of the hangar building. The storm ditch and the underground pipeline on the eastern side of the hangar building drain north into an open storm channel. The western pipeline drains south under Airport Drive to San Francisco Bay south of Airport Drive. Potential leaks from the storm water conveyance system were investigated at the property boundary.

2.2.15 *Aircraft Parking and Run-Up Area (AOC 15)*

Discussions with UAL personnel indicate that the concrete paved area east of the hangar (AOC 15) was used as an aircraft run-up area. In addition, UAL personnel and review of aerial photographs indicate the area east of the hangar was used for aircraft parking. Some minor evidence of fuel or oil staining was observed in this area during the inspection; therefore, it was investigated.

2.2.16 *Fuel Spill Area on Taxiway (AOC 16)*

An approximately 15 gallon jet fuel spill occurred during refueling on Taxiway B-10 on 2 July 2001. The letter, included in Appendix A and entitled *Taxiway Fuel Spill and Response* (ENSR, 21 August 2001), indicates that the Alameda County Fire Department washed down the taxiway, which resulted in runoff of spilled fuel and wash water onto the adjacent soils east and west of the taxiway. As presented in the letter, soil from these areas was hand-shoveled into drums on 2 July 2001 and a backhoe was used to excavate additional soil on 3 July 2001. The letter indicates that 13.17 tons of soil containing hydrocarbons was excavated and sent for treatment to TPS Technologies, Inc., in Richmond, California. The letter indicates that, for safety reasons, the excavation was backfilled the same day.

Previous investigation activities were completed in this area to assess any residual hydrocarbons in soil. The investigation consisted of collection of soil samples from excavation walls and shallow borings installed in the area surrounding the excavation. The soil sampling results indicated the presence of residual concentrations of total petroleum hydrocarbons (TPH) less than 4 milligrams per kilogram (mg/kg), with the exception of the eastern and northern excavation walls, which contained TPH concentrations of 330 and 630 mg/kg, respectively. Benzene was not detected in any of the samples collected and toluene, ethylbenzene, and xylenes concentrations were either non-detect or just greater than their respective detection limits.

Based on the limited compounds of concern (COCs) detected in the soil samples, the ENSR letter requested a finding of No Further Action from Alameda County. However, a review of UAL and Alameda County files did not identify a reply from Alameda County. Therefore, the status of this site is not known. The reported residual hydrocarbon compounds in this area and the uncertainty related to the regulatory status of this location warranted further investigation.

2.2.17 *Former Vehicle Fueling USTs (AOC 17)*

One 10,000-gallon diesel UST (identified by the Port of Oakland as MF35) and one 10,000-gallon unleaded gasoline UST (identified by the Port of Oakland as MF36) and associated piping and dispensers (AOC 17) were excavated and removed from the OMC property in January 1999 (Figure 3). Soil containing hydrocarbons in the vicinity of the USTs was also removed at this time.

Following well installation and ground water monitoring in 1999 and 2000, ENSR, on UAL's behalf, requested a finding of No Further Action (NFA) from Alameda County in a letter entitled *Third Quarter 2000 Ground Water Monitoring Report and Request for No Further Action* (ENSR, 6 February 2001). In a response letter entitled *Underground Tank Investigation for UAL Building M-110* (Alameda County Health Care Services Agency, 23 April 2001) and included as Appendix B, the County stated that they would not require further work for the USTs; however, a formal NFA letter could not be issued because another leaking UST site at the same address (1100 Airport Drive) was still under active County oversight. As discussed in Section 2.3 below, this off-site leaking UST site is not on the former UAL OMC property nor is it UAL's responsibility.

Three monitoring wells (UAL-MW-1 through MW-3) were observed in the area surrounding the former gasoline and diesel UST locations. These wells were associated with the previous monitoring activities conducted by ENSR in this area. One additional well was also found in this area during the site inspection. Information on the purpose of this well and its construction was subsequently located in UAL files. This well was installed as a piezometer in March 1999 during a geotechnical investigation for a planned expansion of the hangar building. No ground water sampling information was available for this well. Due to the use and history of AOC 17, and its location adjacent to AOC 5, this area was investigated.

2.3 *AREAS OF CONCERN AT NEIGHBORING PROPERTIES*

AOCs identified at locations off of the OMC property are described below. Each of these areas is shown in Figure 3.

2.3.1 *Migration of Off-Site Solvent Plume onto OMC Property (AOC 18)*

As discussed in Section 2.2.17, a leaking UST site (AOC 18) is still under County oversight and listed for the OMC property address (1100 Airport Drive). This still active, former UST site is located in the economy parking area west of the OMC property, at the location shown in Figure 3. This area was part of World Airways operations at the OMC and is therefore listed under the address of the OMC, but it is not within UAL's former leasehold area. This leaking UST site, first identified in October 1988, consists of a former 1,000-gallon solvent UST and a former 3,000-gallon waste oil UST (identified by the Port of Oakland as MF25 and MF26). The tanks were removed by the Port of Oakland in March 1992. Investigation of these tank sites indicated the presence of TPH as gasoline, TPH as diesel, benzene, toluene, ethylbenzene, total xylenes, methyl-tert-butyl-ether, 1,1,1-trichloroethane, 1,1-dichloroethane, 1,2-DCA, 1,2-dichloroethene, and trichloroethene in soil and/or ground water. The Port of Oakland currently performs ground water monitoring within this area to address the releases from these former USTs. Potential migration of contamination in ground water from these off-site former USTs onto the OMC property was considered a concern requiring investigation. This additional investigation was required to document the extent to which off-site chemical sources have resulted in the presence of chemicals in soil and ground water on the OMC property.

2.3.2 *Runoff from Pavement to Unpaved Area North of OMC (AOC 19)*

As shown in Figure 3, the area immediately northeast of the OMC property consists of an unpaved grassy area (AOC 19) where storm water drains from the OMC property. Runoff from the paved areas of the OMC property adjacent to this unpaved area has the potential to have caused impacts to soil and ground water; therefore, this area was investigated.

2.4 *AREAS NOT REQUIRING INVESTIGATION*

In addition to the AOCs identified in Section 2.2 and 2.3 above, several areas with potential environmental concerns were evaluated and not considered to require further investigation. Each of these areas is described below along with the rationale for not investigating them.

2.4.1 *Aboveground Fire-Fighting Foam Storage Tanks*

Two 5,000-gallon ASTs are present southeast of the hangar building (Figure 3). These tanks were installed by UAL in 1999. These tanks contained three percent Aer-o-lit (Aqueous Film Forming Foam), used for fire-fighting purposes. These ASTs are not considered a concern based on the recent age of the tanks, the lack of evidence of leaks, and the type of materials stored in the tanks. The tanks were left at the site in good condition and in compliance with local regulations.

2.4.2 *Former Underground Fire-Fighting Foam Storage Tanks*

Two 8,500-gallon Aer-O-Foam USTs (identified by the Port of Oakland as MF37 and MF38) were abandoned in place at the OMC property in January 1999. The USTs were located immediately south of AOC 12 and extended partially beneath an airport security fence and guardhouse. Therefore, the City of Oakland, Fire Services Agency, granted permission for in-place abandonment of the USTs.

As presented in the *Underground Storage Tank Closure Report* (ENSR, 26 March 1999), following abandonment of the USTs, an investigation consisting of the collection of six soil and two ground water samples from the area surrounding the USTs was conducted. The soil and ground water samples were analyzed for ethylene glycol, the only constituent of potential concern identified for the fire-fighting foam previously stored in the USTs. The results of this investigation indicated that no detectable concentrations of ethylene glycol were present in any of the samples collected. Therefore, no further actions were conducted in this area.

These former USTs are not considered an AOC requiring investigation based on the results of the previous investigation in this area and the type of material formerly stored in these tanks.

2.4.3 *Former Underground Jet Fuel Storage Tanks*

Two 12,000-gallon Jet A USTs (identified by the Port of Oakland as MF23 and MF24) and associated piping were excavated by the Port of Oakland along with hydrocarbon-impacted soil in June 1991 from the northern portion of the OMC property, immediately south of AOC 8 at the location shown on Figure 3. Following tank removal and a period of ground water monitoring, the Port of Oakland requested a finding of No Further Action from the Alameda County Health Care Services Agency (ACHCS) in a 12 August 1996 letter entitled *Quarterly Groundwater Monitoring Report and Closure Request – Former Tank MF-23 and MF-24, Metropolitan Oakland International Airport, United Airlines Hangar Area – Taxiway Site, 1100 Airport Drive, Oakland, California.* ACHCS confirmed that no further action would be required in a 24 October 1996 letter to the Port of Oakland but stated that site closure would be withheld until the investigation of former USTs MF25 and MF26 within the adjacent economy parking area (AOC 18) is complete. This letter is included in Appendix B. As previously stated, the Port of Oakland is currently monitoring the former MF25 and MF26 area but, to date, has not obtained closure for this tank site. As discussed in Section 2.3.1, this other leaking UST site is not on the UAL OMC property nor is it UAL's responsibility.

According to the *Report on Underground Jet Fuel Storage Tank Removals and Preliminary Groundwater Investigation Work Plan* (Baseline Environmental Consulting, 30 July 1991), UAL never used the jet fuel USTs as part of its operations at the OMC. Based on the results of previous investigations, which indicated little or no remaining soil and ground water impacts at the time investigation activities were completed in 1997, the time that has elapsed since the USTs were removed, and UAL's lack of use of the USTs as part of its operations at the OMC, these former Jet A USTs were not investigated.

2.4.4 *Potential PCB-Containing Equipment*

ERM inspected the property for types of equipment that have been historically associated with the use of PCBs as a dielectric fluid coolant and stabilizer. The only potential PCB-containing equipment at the OMC property identified by ERM is the former hydraulic lift abandoned in place by UAL in the vehicle maintenance area (AOC 5 as discussed in Section 2.2.5). According to discussions with UAL personnel and UAL records, none of the transformers or light ballasts at the OMC contain or have contained PCBs.

2.4.5 *Indications of On-Site Land Disposal*

ERM observed no evidence of on-site dumping or landfilling during the site inspection, and UAL personnel knew of no on-site dumping or landfilling at the site. The records review also did not identify any on-site dumping activities.

3.0 *INVESTIGATION OVERVIEW*

This section provides an investigation overview. A summary of the investigation methods including permitting, utility clearance, drilling and sampling, analytical methods, data review, surveying, and investigation-derived waste management are described in Appendix C. The specific investigation activities conducted for each AOC are also presented in Appendix C.

Based on the operational and historical evaluation, 19 AOCs were identified for investigation as presented in Section 2.0. Prior to initiating the soil and ground water investigation, UAL was informed that the Port of Oakland was also conducting a concurrent investigation of the OMC property in April 2003. At UAL's request, ERM met with the Port of Oakland and the Port's consultant, Weiss Associates (Weiss), on 10 April 2003 to review the individual investigation programs. This meeting indicated that the two proposed investigations overlapped in scope. Based on this overlap, ERM and Weiss coordinated efforts to provide a complete data set for the OMC evaluation and reduce unnecessary expenditures by UAL and the Port of Oakland. In areas where both Weiss and ERM planned to collect samples, arrangements were made to share the installation of the planned borings to avoid redundancy. Due to UAL's compressed schedule, ERM collected split samples from the borings installed by Weiss within these areas for laboratory analysis; UAL agreed to provide the analytical data from samples collected in the shared areas in lieu of Weiss collecting samples from the ERM-installed borings. An ERM geologist accompanied Weiss personnel during their fieldwork to collect the appropriate split samples as well as observe the condition of soil and ground water encountered and sample collection procedures. The results of the Port of Oakland investigation are presented in the report entitled *United Maintenance Hangar Area, Metropolitan Oakland International Airport* (Weiss, 2003).

Figure 4 identifies the AOCs as well as the boring locations completed within each area as part of the investigation. This figure identifies the 27 borings installed by ERM and the 39 borings installed by Weiss. Table 1 summarizes the analytical program completed by ERM. ERM and Weiss completed the 66 borings between 14 and 22 April 2003. Grab ground water samples collected from AOCs 1, 2, and 3 contained concentrations of chemicals above regulatory screening standards. Based on these results, a subsequent phase of investigation involving the installation, development, and sampling of 10 monitoring wells was completed between 5 May and 9 May 2003. The 10 additional monitoring wells (ERM-MW-01 through -10) were installed in AOCs 1, 2, and 3 to confirm the grab ground water results.

On 6 and 7 November 2003, ERM sampled the existing wells at the OMC to confirm the concentrations detected in wells during the April and May 2003 sampling events. Based on the sampling results, ERM contracted Weiss to install 7 additional wells (ERM-MW-11 through -17) in AOCs 1, 2, and 7 to provide further characterization of identified COCs in ground water (AOCs 1 and 2) and confirm previous sampling results (AOC 7). The installation, development, and sampling of these wells were completed between 22 December and 30 December 2003.

A total of 147 soil samples were collected and analyzed during the investigations, including 47 by ERM and 100 by Weiss. Fifty-one grab ground water samples and 48 monitoring well samples were collected and analyzed during the investigations, including 40 grab ground water and 43 monitoring well samples by ERM and 11 grab ground water and 5 monitoring well samples by Weiss. In addition, split grab ground water samples were collected by ERM from 6 of the Weiss borings.

Investigation procedures and methods including permitting, utility clearance, soil and ground water sampling, well installation and developments, analytical data review, surveying, waste management, and slug testing are outlined in Appendix C. In addition, the specific investigation activities conducted in each AOC are presented in Appendix C and a sample summary is provided in Table 1.

4.0 INVESTIGATION RESULTS

This section presents the analytical results of soil and ground water samples collected from each of the 19 AOCs. The sample results are compared against regulatory standards to ensure that chemical occurrence within each AOC is adequately characterized. Section 4.1 summarizes the site stratigraphy and ground water flow data collected during the investigation. Section 4.2 presents the results of the water supply well survey and a summary of the San Francisco Bay Region RWQCB's May 2003 *East Bay Plain Groundwater Basin Beneficial Use Evaluation Report* (Beneficial Use Evaluation Report) for the East Bay Plain Ground Water Basin, which includes the OMC. This information is used to demonstrate that shallow fill ground water at the site is not suitable for use as potable water and that chemicals of concern detected at the OMC are not likely to migrate to receptors. Section 4.3 presents a summary of background metals concentrations to provide a context for evaluating metals detections in soil and ground water at the OMC. Section 4.4 discusses the regulatory standards that have been used for evaluating the data and the rationale for selecting these standards. Section 4.5 presents a discussion of the soil and ground water analytical data for each AOC.

4.1 SITE STRATIGRAPHY AND HYDROGEOLOGY

This subsection discusses the geology, ground water occurrence and flow, and potential preferential ground water flow pathways encountered at the OMC during the investigation.

4.1.1 Geology

The OMC is located on the eastern margin of the San Francisco Bay within the East Bay Plain. The geology of the East Bay Plain in the vicinity of the OMC is characterized by the presence of unconsolidated sediments of Pleistocene and Holocene age overlying consolidated bedrock of Jurassic, Cretaceous, and Tertiary age corresponding to the Franciscan Complex and the Great Valley Sequence (Muir, 1993). Unconsolidated sediments in the vicinity of the OMC are believed to be over 1,000 feet thick and represent alternating sequences of continental and marine sediments (RWQCB, May 2003). From oldest to youngest, the following unconsolidated sedimentary units are encountered within the East Bay Plain:

- The Santa Clara Formation is a Pleistocene formation characterized by alluvial fan deposits with interfingering lake, swamp, river channel, and flood plain deposits. Thickness of this unit in the East Bay Plain ranges from 300 to 600 feet (RWQCB, May 2003).

- The Alameda Formation, including the following members, from oldest to youngest: the Yerba Buena Mud Member, the San Antonio/Merritt/Posey Member, and Young Bay Mud. The Yerba Buena Mud Member, also know as the Old Bay Mud, is a black organic clay with a thickness ranging from 25 to 50 feet thick. The San Antonio/Merritt/Posey Member contains alluvial fan deposits and ranges in thickness from 0 to 120 feet. The Young Bay Mud is a black, organic rich clay containing occasional sand and gravel lenses, shell intervals, peat, and organic debris. The thickness of the Young Bay Mud in the vicinity of the OMC is estimated to be 60 feet thick.
- The imported fill is found primarily in the vicinity of San Francisco Bay and represents land recovered from the bay front and surrounding wetlands. Fill thickness varies from 1 to 50 feet and consists of sediment dredged during the completion of the Oakland Inner Harbor, as well as rock from the Leona Quarry, construction and demolition debris, and municipal wastes (RWQCB, May 2003).

Logs were completed for all soil borings and monitoring wells (Appendix D). As seen on the boring logs, silts and fine sands comprising the artificial fill were encountered between ground surface and approximately 13 feet bgs. Young Bay Mud was encountered below the artificial fill and was characterized by dark gray silts and clays with abundant shell fragments. The lower contact of the Young Bay Mud was not encountered during this investigation. The stratigraphy encountered during the investigation is consistent with the general geology of the East Bay Plain.

4.1.2 *Ground Water Occurrence and Flow*

Regional ground water flow in the aquifers beneath the Young Bay Mud generally follows topography with flow from the east to the west (RWQCB, May 2003). Ground water at the site was encountered within the artificial fill at depths ranging from 2 to 8 feet bgs. Ground water was typically encountered between 6 and 8 feet bgs throughout the OMC with the exception of the aircraft wash rack area (AOC 2), where ground water was encountered at 2 to 3 feet bgs.

Water level measurements were collected from site wells during 5 events between 18 April 2003 and 12 January 2003. The results of these monitoring events are presented in Table 2. Figures 5 through 8 present the results of four of the monitoring events including 9 May 2003, 6 November 2003, 8 December 2003, and 12 January 2004. As seen in these figures, ground water flow in the AOC 1 area is consistently to the northeast with hydraulic gradients ranging from 0.0046 to 0.034. Ground water flow in AOCs 2 and 3 appears to vary between a northwest and southwest direction with gradients ranging from 0.00064 to 0.0031. The 8 December 2003 and 12 January 2004 events included off-site monitoring wells installed to address the former USTs in the economy parking lot. As seen in Figures 7 and 8, ground water flow within the fill unit in this area is primarily to the south-southeast with gradients ranging from 0.016 to 0.028. These figures show the variability of ground water flow direction and gradient within the fill unit. It is unknown whether different areas are in hydraulic communication or represent isolated areas of saturated fill material.

Weiss reported that during their April 2003 investigation, ground water measurements from the AOC 5 and 17 monitoring wells (near AOC 1) indicated a westerly flow; however, the data was not presented to confirm this result. This flow direction is opposite of the flow direction indicated in Figures 5 through 8. In addition, Weiss collected measurements at high and low tide to determine tidal influences at the site. These measurements showed slight differences (0.04 to 0.07 foot) in elevations, indicating possible minimal tidal influence.

ERM conducted slug tests on six wells in December 2003 to determine the hydraulic conductivity of the fill unit and estimate ground water flow velocities within this unit. The results of the testing and the data evaluation are presented in Appendix G. Hydraulic conductivities (K) within the fill unit ranged from 0.49 to 18 feet per day ($1.6x10^{-4}$ to $6x10^{-3}$ centimeters/second [cm/s]) with an average of 5.6 feet per day ($1.9x10^{-3}$). These values are consistent with the sandy silt/silty sand of the fill unit (Freeze and Cherry, 1979). Gradients within the fill unit range from $6.4x10^{-4}$ to $3.4x10^{-2}$ feet per foot with an average gradient of $1.1x10^{-2}$ feet per foot, based on the five water level measuring events. Based on results of the slug tests and the ground water monitoring and using a conservative estimate of 25 percent porosity for the fill unit, ground water flow rates (seepage velocities) ranging from 0.44 to 890 feet per year, with an average of 90 feet per year were calculated for the fill unit. The wide range in ground water flow rates is indicative of the variability of the fill material. It is highly unlikely that the upper range of these ground water flow rates is representative of site-wide conditions, but the average value is considered conservative for the fate and transport evaluations presented in the risk assessment in Section 5.0.

Based on the information presented above, the following conclusions can be drawn:

- Regional flow in aquifers beneath the Bay Mud is to the west toward San Francisco Bay;
- Ground water flow direction and gradients within the shallow fill (2 to 13 feet bgs) at the site appears to be variable by location and over time;
- Ground water within the shallow fill exhibits minimal tidal influence;

- Estimated ground water flow rates for the fill unit range from 0.44 to 894 feet/year with an average of 90 feet/year.

4.1.3 *Potential Flow Along Utility Corridors*

For past work conducted by ERM for UAL at San Francisco International Airport (SFIA), the dominant ground water to surface water pathway is considered to be utility corridors, primarily storm water sewers. This primary pathway is defined in *RWQCB Order 99-045, Revised Site Cleanup Requirements for the San Francisco International Airport, San Mateo County, California* (RWQCB, 1999). Given the similarity of the OMC to the SFIA, it is reasonable to assume that preferential flow in utility conduits may be the primary route for potential chemical migration toward surface water at the OMC as well. Both airports are adjacent to San Francisco Bay and are characterized by imported fill underlain by Bay Mud, with the fill containing low yield, non-potable ground water. In addition, both locations have extensive storm water systems that discharge to retention ponds and San Francisco Bay.

To determine if utility corridors at the OMC have the potential to provide preferential pathways for ground water flow, ERM reviewed Port utility drawings and used a private utility locating service to identify and survey utility corridors. The results of this survey are presented on Figure 9. As seen in Figure 9, a number of utility lines are located at the OMC, including sanitary and storm sewers, water lines, gas lines, air lines, and electrical lines. The results of the utility survey by the private locating service indicated that the majority of the utilities (water lines, gas lines, air lines, and electrical lines) were encountered at depths of less than 5 feet bgs. This indicates that these corridors are above ground water at the majority of the site, with the exception of the northern edge of the aircraft wash rack. However, as seen in Figure 9, only a small number of air, water, and electrical lines are found in this area and it is unlikely that appreciable migration of ground water occurs along these corridors.

The sanitary and storm sewers occur at depth greater than 5 feet bgs and, therefore, possibly intersect the ground water table. As seen in Figure 9, the sanitary sewer potentially intersects the ground water table in AOCs 1 and 3. The storm sewer potentially intersects the ground water table in AOC 2, AOC 3, AOC 9, AOC 11, and AOC 14. It is possible that ground water could preferentially flow within the backfill of these sewers if the backfill is more permeable than the surrounding fill. As previously discussed, ground water flow rates within the fill material are highly variable and, therefore, it is unknown whether the sewer backfill is more permeable than the surrounding fill. However, as seen in Figure 9, even if the backfill of the sanitary sewer lines serve as a preferential pathway for chemical migration, these sewer lines do not provide a conduit to any surface water body or water supply well.

As seen on Figure 9, the storm sewers could potentially provide a preferential pathway to nearby retention ponds within wetlands areas adjacent to San Francisco Bay, as well as directly into San Francisco Bay and were identified as a potential AOC (AOC 14). However, as seen in Figure 9, as discussed in Section 4.5.14, the results of the investigation did not identify migration of the chemicals of concern along these corridors. In addition, areas with COCs in ground water were, in general, not proximal to the storm sewers. The potential for migration of chemicals of concern to surface water through storm water sewers is evaluated further in the risk assessment in Section 5.

4.2 *WELL SURVEY AND BENEFICIAL USE EVALUATION SUMMARY*

This subsection presents the results of the water supply well survey and provides a brief summary of the Beneficial Use Evaluation Report. Appendix H describes the well survey procedures and results, as well as a more detailed summary of the Beneficial Use Evaluation. This information provides perspective in terms of understanding the potential risks of chemicals detected in soil and ground water at the OMC. The information in Appendix H and summarized below indicates the following:

- Shallow ground water in the fill unit at the OMC is not a suitable source for potable water supply development; and
- The nearest water supply wells are approximately 1 mile east of OMC in an upgradient direction and are not screened within the fill unit; therefore, chemicals of concern in ground water at the OMC are not expected to have the potential to migrate to drinking water receptors.
- Based on these results, the risk evaluation discussed in Section 5 did not consider fill ground water to drinking water to be a complete pathway.

4.2.1 *Water Supply Well Survey*

ERM conducted a water supply well survey to identify potential drinking water receptors near the OMC. The results of the survey are summarized on Table 3 and Figure 10. Figure 10 presents the location of wells within 1.5 miles of the OMC, and demonstrates that the closest wells are approximately 1 mile to the east. These wells include potentially active and abandoned domestic, irrigation, and industrial wells (Table 3). The locations of seven irrigation, three abandoned, two domestic, and one industrial well could not be ascertained from the information obtained from Alameda County; however, the three wells that may be nearest to the OMC, identified in Table 3 as having an Oakland Airport address or associated with the nearby Metro Golf course located near the intersection of Doolittle and Airport Drives, are deep wells (350 to 634 feet bgs) most likely screened in the coarse-grained intervals within the Alameda and Santa

Clara Formations. Regional ground water flow in the aquifers below the Bay Mud is to the west towards San Francisco Bay following topography (RWQCB, May 2003).

Given the location of the wells, lack of pumping in the fill unit, and magnitude of chemical impacts at the OMC (Section 4.5), it is unlikely that releases at the OMC have the potential to migrate to water supply wells in the area.

4.2.2 *Beneficial Use Evaluation Summary*

The San Francisco Bay RWQCB conducted an evaluation of the beneficial uses of ground water within the East Bay Plain Ground Water Basin (Basin), which includes the OMC. This subsection summarizes the results of a comprehensive review of this document in the context of the OMC. The complete review is presented in Appendix H.

The Basin is on the eastern side of the San Francisco Bay and stretches from Richmond to Hayward (Figure 11). As shown on Figure 11, the Basin has been divided into seven sub-areas. The OMC lies within the Central sub-area. The report indicates that the Central sub-area extends beneath the San Francisco Bay and is primarily filled with alluvial fan deposits of the Santa Clara and Alameda Formations. The Yerba Buena Mud member (also known as the Old Bay Mud) of the Alameda Formation overlies the Santa Clara Formation and is a continuous unit that the report indicates should form a barrier to vertical migration. The alluvial deposits of the Alameda Formation (San Antonio, Posey, and Merritt members) and the Young Bay Mud overlie the Yerba Buena Mud member. In the vicinity of the OMC, the Young Bay Mud is overlain by artificial fill derived from dredged sediment and local quarries, which is the interval where chemicals of concern have been detected. The Young Bay Mud is also considered to be a barrier to vertical ground water migration.

The report indicates that ground water within the shallow artificial fill along the Bay-front is unlikely to be used as a source of drinking water due to high total dissolved solids (TDS), the potential for saltwater intrusion, elevated levels of coliform from leaking sewer pipes, low yield, and the requirement for a 50-foot well seal for new municipal wells. Therefore, as indicated by this report, any potential impact to shallow ground water will most likely not require an aggressive remediation approach due to the fact that it is an unlikely drinking water resource (RWQCB, May 2003; p.94).

First encountered ground water beneath the site is contained in a low permeability silt and fine sand that does not yield sustainable ground water production. Sampling-related purging in wells that fully penetrate the fill led to dewatering, requiring multiple purges to acquire sufficient volumes. In addition, TDS in samples collected during the investigation ranges from 1,300 to 15,000 milligrams per liter (mg/L). Based on these characteristics, the first encountered ground water beneath the site would not be suitable as a drinking water supply, consistent with the Beneficial Use Evaluation Report. Furthermore, the underlying Bay Mud aquitard is expected to prevent ground water and chemicals from migrating down to drinking water aquifers.

4.3 *METALS IN SOIL*

Analytical results for soil are discussed by AOC in Section 4.5. Due to the fact that metals are naturally occurring in soil and that the shallow soil at the OMC is composed of imported fill from a number of sources, an evaluation was completed to identify the commonly detected metals and determine background concentrations to provide context for the metals results presented in Section 4.5. This evaluation is presented in Appendix I and the results are summarized in the following paragraphs.

During the investigation, eight metals were detected in greater than half of the 124 soil samples analyzed. These metals include arsenic, barium, chromium, cobalt, copper, nickel, vanadium, and zinc. Table 4 presents the high and low detections and averages for the commonly detected metals. For comparison, both industrial and residential United States Environmental Protection Agency (USEPA) Preliminary Remediation Goals (PRGs) are shown on Table 4. PRGs are risk-based concentrations that are intended to assist risk assessors and others in initial screening-level evaluations of environmental impacts. PRGs are not necessarily cleanup standards but are often used as "screening" criteria to evaluate the potential need for remedial action.

None of the metals concentrations exceed their industrial PRGs for soil, with the exception of false-elevated thallium results due to iron interference from samples analyzed using Inductively Coupled Plasma (ICP) methods. The false-elevated thallium results are discussed below and in Appendix I. While industrial PRGs are appropriate for the site based on its current and historical usage, it should be noted that only 3 soil samples contained metals concentrations in excess of the more conservative residential PRGs (excluding arsenic and thallium ICP results).

Table 4 provides a range of background metals values derived from nine publicly available studies performed on Bay Area sites, representing over 850 background soil samples. Table 5 presents more details and the sources for these studies. From these studies, a range of typical background values was generated for each metal to support the evaluation of metals detected at the OMC. These values are considered representative of background conditions in East Bay soil. The metals evaluation indicates that the concentrations of metals detected in the soil samples from the OMC are generally within the range of background concentrations for Bay Area sites and were all below industrial PRGs. This conclusion is consistent with the use of fill obtained from various locations for the in-filling of the OMC property. Only one sample collected at W-B-12 (AOC 3 - Industrial Wastewater Vault) contained concentrations of copper, cadmium, and nickel that appear to indicate potential impact from site operations; however, these concentrations were also all below industrial PRGs.

The metals evaluation determined that soil samples collected during the April 2003 investigation and analyzed for arsenic and thallium using ICP methods were elevated due to interference by naturally occurring iron within the samples. The interference was confirmed by reanalyzing the sample with the highest thallium concentration in soil and ground water by the graphite furnace (GF) method. The results of this reanalysis indicated that these samples did not contain detectable concentrations of thallium. Samples collected by Weiss and analyzed for arsenic and thallium used a GF method that is not susceptible to iron interference. These samples include splits of soil samples collected by ERM and analyzed by ICP. A comparison of the arsenic and thallium concentrations of the soil splits indicated that samples analyzed by ICP contained elevated concentrations of arsenic and thallium compared with the associated split sample analyzed by GF, confirming the interference. Therefore, based on this evaluation, the AOC evaluations presented below only considered the GF results for arsenic and thallium to be representative of site conditions. This issue is discussed in more detail in Appendix I.

Although our analysis indicates that all but possibly a few metals detections at OMC are related to background conditions[1], Section 4.5 (analytical results section) presents the data without further addressing background.

4.4 *REGULATORY SCREENING CRITERIA FOR INVESTIGATION*

In California, the RWQCB and Department of Toxic Substances Control (DTSC) establish cleanup levels on a site-specific basis as part of regulatory enforcement actions. Except for several UST sites described herein, the AOCs addressed by this investigation are not currently under regulatory oversight; therefore, enforceable cleanup levels have not been established. Although cleanup criteria have not been established for the site, screening criteria and regulatory standards

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[1] Additional assessment of whether a given detection is attributed to background or may be related to OMC operations is discussed in the Risk Assessment (Section 5.0) for detections that exceed screening levels.

commonly used for sites under RWQCB and DTSC oversight were used to direct additional investigation and determine that investigation activities were adequately completed. These screening criteria are not cleanup standards. Section 5 presents the site-specific, risk-based cleanup standards developed for the OMC. (not agreed on)

The regulatory standards used for comparison to the investigation results include the following:

- ***USEPA Preliminary Remedial Goals (PRGs).*** PRGs are risk-based concentrations that are intended to assist risk assessors and others in initial screening-level evaluations of environmental impact. PRGs are not necessarily cleanup standards but are often used as "screening" criteria to evaluate the potential need for remedial action. California-specific PRGs are published by Region 9 of the USEPA and are typically updated annually. The PRGs presented herein were published in the USEPA's 1 October 2002 *Region 9 PRGs Table 2002 Update* and pertain to VOCs, semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and metals in soil in both residential and industrial settings.
- ***California Maximum Contaminant Levels (MCLs).*** MCLs are drinking water standards adopted by the California Department of Health Services pursuant to the Federal Safe Drinking Water Act. In accordance with the RWQCB's *Water Quality Control Plan* (Basin Plan; RWQCB, 1995), MCLs are applicable to ground water designated for use as domestic or municipal supply. According to the Basin Plan, all ground water is considered potentially suitable for domestic or municipal supply; however, ground water with TDS greater than 3,000 mg/L and water sources incapable of producing an average sustained yield of 200 gallons per day can qualify as exceptions to this rule. As discussed in Section 4.2.2, the shallow ground water containing COCs at the OMC above the Bay Mud is not suitable for potable water development due to low water yield and high salinity. The MCLs presented herein were published in Title 22 of the California Code of Regulations dated 11 April 2003, and pertain to VOCs, SVOCs, PCBs, and metals in ground water.
- ***RWQCB Environmental Screening Levels (ESLs).*** ESLs are screening levels for soil and ground water that were developed by the RWQCB to address environmental protection goals presented in the Basin Plan for the San Francisco Bay region. For surface water and ground water, these goals include protection of drinking water resources, protection of aquatic biota, and protection against adverse nuisance conditions. For soil, these goals include protection of human health, ground water, and terrestrial biota, as well as protection against adverse nuisance conditions. ESLs are particularly useful for sites with limited impacts where the preparation of a more formal risk assessment is not warranted. ESLs are not cleanup goals and the presence of a chemical above ESLs does not necessarily indicate that adverse impacts to

of a chemical above ESLs does not necessarily indicate that adverse impacts to human health or the environment are occurring. The ESLs presented herein were published in the RWQCB's July 2003 *Screening for Environmental Concerns at Sites with Contaminated Soil and Ground Water* (ESL report), and provide screening criteria for TPH in soil and ground water in both industrial and residential settings, as TPH is not addressed by PRGs or MCLs.

The most commonly used screening criteria for VOCs, SVOCs, PCBs and metals in soil are residential or industrial PRGs. Due to the industrial usage of the airport property, the soil data collected during this investigation have been screened against industrial PRGs. Residential PRGs have also been provided on the data tables for context.

The most commonly accepted screening criteria for VOCs, SVOCs, PCBs and metals in ground water are MCLs. First encountered ground water beneath the site is contained in a low permeability silt and fine sand that does not yield sustainable ground water flow, even at low sampling rates. In addition, TDS ranges from 1,300 to 15,000 mg/L. Based on these characteristics, the first encountered ground water beneath the site would not be suitable as a drinking water supply. In addition, as described in Section 4.2.2, the RWQCB's May 2003 Beneficial Use Evaluation report indicates that shallow ground water in the airport area will most likely never be used at a potable water source. Therefore, the use of MCLs represents a very conservative screening approach for evaluating site ground water.

TPH criteria are not provided as either PRGs or MCLs. TPH cleanup goals are typically established on a site-specific basis to account for the low solubility of heavy-end TPH, site-specific lithology and risk scenarios, and the widely recognized potential for natural attenuation in the subsurface. While ESLs are extremely conservative, risk-based values and are not designed as cleanup criteria, they do provide published screening criteria for TPH in soil and ground water. ESLs provide different values for soil and ground water criteria for ground water that (1) is a potential drinking water supply or (2) is not a potential drinking water supply. In addition, ESLs for soil are provided for both residential and commercial settings similar to PRGs. The commercial soil ESL for ground water that is not a potential drinking water supply has been selected for the data evaluation given the site conditions and land use.

In summary, in the text that follows, soil data are screened against industrial PRGs for VOCs, SVOCs, PCBs, and metals, and against non-drinking water supply commercial ESLs for TPH. In addition, residential PRGs have also been provided in the soil data tables for context. Similarly, ground water data are screened against MCLs for VOCs, SVOCs, and metals and against non-drinking water supply ESLs for TPH.

4.5 *ANALYTICAL RESULTS*

The analytical results for soil and ground water samples are presented in the following subsections. An ERM chemist has reviewed the data generated during this investigation for quality assurance/quality control (QA/QC) purposes. The results of this QA/QC review and copies of the laboratory reports are presented in Appendix E. The analytical results have been segregated based on the identified AOCs and have been evaluated using the regulatory screening levels discussed above. Analytical data generated by Weiss have been included for the evaluation of the individual AOCs. Table 6 lists the regulatory criteria used for all compounds detected during this investigation. The results of the soil analyses are presented in Tables 7 (VOCs, SVOCs, and TPH) and 8 (Metals). Results of leachability testing on soil samples collected by Weiss are presented in Table 9. Ground water results are presented in Tables 10 (VOCs), 11 (TPH and SVOCs), and 12 (Metals). As discussed in Section 4.3 and Appendix I, due to iron interference in metals samples analyzed by ICP methods, the AOC evaluations presented below only considered the GF results for arsenic and thallium to be representative of site conditions.

Figures 12 through 23 present the soil and ground water results for each AOC. These figures indicate whether compounds of a given class of chemical (VOCs, benzene, toluene, ethylbenzene, total xylenes (BTEX), total extractable petroleum hydrocarbons (TEPH), total purgeable petroleum hydrocarbons (TPPH), metals, PCBs, and SVOCs) were detected within soil (brown) and ground water (blue) samples collected at each location and, if so, whether the detections were above or below screening criteria. If multiple samples were collected at a location, the highest concentration detected per sample matrix is presented on these figures. Compounds detected at concentrations in excess of screening criteria are identified on the figures with yellow highlighting along with the concentration detected and the screening level. Data generated by Weiss are presented in italics.

4.5.1 *Small Parts Wash Rack/Former World Airways Cleaning Room (AOC 1)*

Figure 12 presents the soil and ground water data for AOC 1. Low concentrations of VOCs were detected in two soil samples collected from AOC 1 (W-B-4 at 0 feet and W-B-5 at 0 feet). Compounds detected include tetrachloroethene (PCE), 1,1,1-trichloroethane (1,1,1-TCA), and xylenes. As seen in Table 6, the concentrations detected were well below their respective industrial PRGs.

TEPH was detected in three soil samples collected directly under the pavement at W-B-4, W-B-5, and W-B-6. As seen in Table 7, the samples appear to contain concentrations of a heavier hydrocarbon most likely in the motor oil range. Since these samples were collected directly under the pavement, which was asphalt and concrete, the detections could be due to the presence of asphaltic material in the sample. All TEPH concentrations detected in these samples were below their respective ESL (500 mg/kg for TEPH as diesel and jet fuel and 1,000 mg/kg for TEPH as motor oil). TPPH was detected in two samples at concentrations of 1.7 and 3.1 mg/kg, which are below the RWQCB ESL of 400 mg/kg.

Barium, chromium, copper, nickel, vanadium, and zinc were detected in all soil samples collected from this area. In addition, cobalt was detected in eight of 11 samples; lead was detected in three of 11 samples; cadmium was detected in two of 11 samples; and mercury was detected in one of 11 samples. Arsenic was detected in six of 11 samples; the remaining five samples were elevated due to iron interference and are not considered to be representative of site conditions. None of the metal concentrations detected were above their respective industrial PRGs.

A sample collected from directly under the pavement at W-B-5 by Weiss contained a chromium concentration of 70 mg/kg, which is in excess of 10 times the Soluble Threshold Limit Concentration (STLC) for chromium set at 5 mg/L. The STLC is a waste disposal criterion and is not used as a remediation screening guideline for soil. Based on a 10-fold dilution involved with a Waste Extraction Test (WET) analysis, samples containing metal concentrations in excess of 10 times their STLC could theoretically contain soluble concentrations of the metals in excess of their STLC. Therefore, Weiss analyzed this sample using the standard California WET methodology. The results of the WET analyses are presented in Table 9. A soluble concentration of chromium was detected at 0.23 mg/L, which is below the chromium STLC set at 5 mg/L. This is not indicative of the soluble fraction of this soil that could be leached by rain or ground water under natural conditions due to the fact that the standard WET test uses a citric acid extractant, which is acidic and has a pH of 5. Ground water pH at the site ranges from approximately 6.5 to 7.5.

VOCs were detected in all five grab ground water samples analyzed. Compounds detected include 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethene (1,1-DCE), cis-1,2-DCE, 1,1,1-TCA, trichloroethene (TCE), chloroethane, styrene, and dichloromethane (DCM). With the exception of 1,1-DCA and cis-1,2-DCE, VOC concentrations in grab ground water were below their respective MCLs. The five grab ground water samples contained concentrations of 1,1-DCA ranging from 16 to 47 μg/L, which are in excess of its MCL of 5 μg/L. One ground water sample (ERM-B-2) contained a concentration of cis-1,2-DCE of 9.2 μg/L, which is in excess of its MCL of 6 μg/L.

ERM installed, developed, and sampled nine monitoring wells to evaluate the VOC results of the grab ground water sampling. The fourteen well samples contained low concentrations of VOCs including 1,1-DCA, 1,2-DCA, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, TCE, 1,1,1-TCA, toluene, vinyl chloride, chloroethane, chloroform, 1,2-dichlorobenzene (1,2-DCB), 1,4-DCB, isopropylbenzene, p-isopropyltoluene, naphthalene, n-propylbenzene, 1,2,4-trimethylbenzene (1,2,4-TMB), 1,3,5-TMB, ethylbenzene, and xylenes. With the exception of 1,1-DCA, 1,2-DCA, cis-1,2-DCE, and vinyl chloride, VOC concentrations detected in the wells were below their respective MCLs. Thirteen of the 14 well samples contained concentrations of 1,1-DCA ranging from 6.8 to 52 µg/L, all of which are above its MCL of 5 µg/L. 1,2-DCA was detected in seven samples from five wells (ERM-MW-1, ERM-MW-2, ERM-MW-4, ERM-MW-5, and ERM-MW-12) at concentrations ranging from 0.56 to 5.2 µg/L, which are in excess of its MCL of 0.5 µg/L. Four samples from two wells, ERM-MW-1 (19 and 7.3 µg/L) and ERM-MW-5 (46 and 38 µg/L), contained concentrations of cis-1,2-DCE in excess of its MCL of 6 µg/L. Vinyl chloride was detected in one sample collected from ERM-MW-5 at a concentration of 0.89 µg/L, which is in excess of its MCL of 0.5 µg/L.

Three of the five grab ground water samples (ERM-B-1, W-B-4, and W-B-6) contained detectable concentrations of TEPH. Concentrations ranged between 97 and 340 µg/L. These concentrations are below the RWQCB ESL for TEPH set at 640 µg/L. Two samples (ERM-B-1 and ERM-B-2) contained low concentrations of TPPH ranging from 71 to 110 µg/L. These concentrations are below the RWQCB ESL for TPPH set at 500 µg/L. SVOCs were not detected in the ground water sample collected from ERM-B-2.

The grab ground water samples collected in April 2003 from this area contained detectable concentrations of four metals, including barium, cobalt, nickel, and zinc. Two samples, ERM-B-1 and ERM-B-2, contained nickel concentrations of 0.19 and 0.13 mg/L, respectively, which exceed the nickel MCL of 0.1 mg/L. None of the other detected metal concentrations were in excess of their respective MCLs. To evaluate these grab ground water sample nickel exceedances of the MCL, samples were collected from the new monitoring wells and analyzed for nickel. Twelve of the fourteen samples collected from all nine wells contained detectable concentrations of nickel ranging from 0.01 to 0.590 mg/L. Samples from four of the wells (ERM-MW-1, ERM-MW-4, ERM-MW-13, and ERM-MW-14) contained concentrations of nickel in excess of its MCL of 0.1 mg/L.

The analytical results of soil samples collected from this AOC indicate that soil sources of the chemicals of concern (VOCs, TPPH, TEPH, and metals) to ground water do not appear to be present as none of the samples contained concentrations in excess of regulatory screening levels. **Therefore, additional soil investigation within this AOC was not required.**

The presence of generally low concentrations of chlorinated VOCs in excess of MCLs indicates that minor ground water impact has occurred within this AOC. The lack of soil impact near ground water detections may be due to the presence of a subsurface concrete sump located within the center of the wash pad. This concrete sump has an approximate depth of 10 feet bgs. Given that ground water levels in the area are encountered at approximately 8 feet bgs, it is possible that sump water infiltrated directly into ground water. UAL has no record of using chlorinated solvents at this location. The sump was cleaned out prior to UAL's departure on 31 May 2003.

The source of nickel to ground water in this AOC is unknown. Soil analytical results indicate that of the 124 soil samples collected during the investigation only one sample from AOC 3 was outside of the range of Bay Area background concentrations. This suggests that a soil source of nickel to ground water due to UAL operations does not exist in AOC 1 and the nickel may be at least partially due to background levels due to the various sources of imported fill. As discussed in Appendix I, nickel is a common constituent in Bay Area soils due to the presence of ultramafic rocks within the Franciscan Formation. The ultramafic rocks include serpentinite, which can contain appreciable amounts of nickel substituted for magnesium in serpentine (Hurlbut and Klein, 1985).

In general, the ground water investigation results delineated the areas with concentrations of VOCs and nickel above regulatory screening levels. **Therefore, ground water additional investigation was not required.**

4.5.2 *Aircraft Wash Rack (AOC 2)*

Figure 13 presents the soil and ground water data from AOC 2. Seven soil samples contained detectable concentrations of VOCs, including naphthalene, isopropylbenzene, p-isopropyltoluene, 1,2,4-TMB, 1,3,5-TMB, n-butylbenzene, sec-butylbenzene, toluene, ethylbenzene, and total xylenes. None of these compounds were detected at concentrations in excess of their respective industrial PRGs.

TEPH was detected in seven soil samples at concentrations ranging from 2.3 to 1,800 mg/kg. With the exception of the 1,800 mg/kg concentration detected in a sample collected by Weiss from directly under the concrete at W-B-7, the TEPH concentrations detected in samples from this AOC are below the RWQCB ESL of 500 mg/kg established for TEPH. The sample collected directly beneath the concrete at W-B-7 may not be representative of soil conditions due to sampling procedures. Concrete coring equipment was used to provide access to soils under the wash pad. This equipment uses water to cool the core bit and the soil directly beneath the concrete is usually saturated with this water. Since the boring locations were installed based on staining on the concrete surface, it is possible that the water from concrete coring could have transported hydrocarbons from the surface down to the concrete/soil interface. This observation is supported by the low concentrations of TEPH in samples collected between 1 and 3 feet bgs from the same location (13 and 3.3 mg/kg). Two additional samples collected and analyzed by Weiss contained concentrations of TEPH as motor oil at 390 and 700 mg/kg. These concentrations are below the RWQCB ESL for TEPH as motor oil set at 1,000 mg/kg. If the shallow sample at W-B-7 is representative of TPH occurrence, then it is of limited extent based on the data. SVOCs were not detected in the sample collected from ERM-B-6.

TPPH was also detected in eight samples at concentrations ranging from 1.1 to 1,000 mg/kg. With the exception of the 1,000 mg/kg concentration detected in a sample collected from directly under the concrete at W-B-7, the TPPH concentrations detected in samples from this AOC are below the RWQCB ESL of 400 mg/kg established for TPPH. As discussed above, this detection is not believed to be representative of soil conditions due to the infiltration of cooling water used during concrete coring. This observation is supported by the low concentrations of TPPH in samples collected between 1 and 3 feet bgs from the same location (7.9 and 2.6 mg/kg).

Barium, chromium, copper, nickel, and vanadium were detected in all soil samples collected from this area. In addition, zinc was detected in six of 10 samples; cobalt was detected in five of 10 samples; lead was detected in five of 10 samples; mercury was detected in three of 10 samples; cadmium was detected in two of 10 samples; and molybdenum was detected in two of 10 samples. Arsenic was detected in three of 10 samples; six of the remaining seven samples were elevated due to iron interference and are not considered to be representative of site conditions. None of the metal detections were above their respective industrial PRGs.

Two samples collected from W-B-8 by Weiss contained lead concentrations of 90 and 92 mg/kg, which are in excess of 10 times the STLC of 5 mg/L for lead. Therefore, Weiss analyzed these samples using the standard California WET methodology. The results of the WET analyses are presented in Table 9. The soluble concentrations of lead detected in these samples were 2.7 and 2.9 mg/L, which are below the lead STLC of 5 mg/L.

VOCs were detected in three of the seven grab ground water samples analyzed. Compounds detected include DCM, naphthalene, 1,2,4-TMB, 1,3,5-TMB, p-isopropyltoluene, isopropylbenzene, and total xylenes. With the exception of DCM, VOC concentrations in ground water were below their respective MCLs. Two ground water samples, ERM-B-5 and ERM-B-6, contained DCM concentrations of 86 and 85 μg/L, respectively, which are in excess of its MCL of 5 μg/L.

To evaluate the VOC results of the grab ground water sampling, ERM installed, developed, and sampled four monitoring wells (ERM-MW-6 through ERM-MW-9) within this AOC. As seen on Figure 11, the wells were adjacent to four grab ground water locations with VOC exceedances. Four of the eight samples collected from the four well contained low concentrations of VOCs, including n-butylbenzene, t-butylbenzene, isopropylbenzene, p-isopropyltoluene, naphthalene, n-propylbenzene, 1,2,4-TMB, 1,3,5-TMB, ethylbenzene, toluene, and xylenes. VOC concentrations detected in all wells were below their respective MCLs.

All of the grab ground water samples analyzed contained detectable concentrations of TEPH. Concentrations ranged from 79 to 4,700 μg/L. Three of the samples (ERM-B-4, ERM-B-5, and ERM-B-6) contained TEPH concentrations in excess of the RWQCB ESL for TEPH set at 640 μg/L. One sample (ERM-B-6) contained a TPPH concentration of 1,700 μg/L, which is in excess of the RWQCB ESL for TPPH set at 500 μg/L. 4-Methylphenol, an SVOC, was detected at a concentration of 34 μg/L in the sample collected from ERM-B-5. An MCL has not been established for this compound.

Ground water samples collected from four of the new wells (ERM-MW-6, ERM-MW-7, ERM-MW-8, and ERM-MW-9) contained detectable concentrations of TEPH ranging from 89 to 760 μg/L. The sample collected from ERM-MW-9 in November 2003 contained a concentration of TEPH as diesel of 760 μg/L, which is above the RWQCB ESL for TEPH set at 640 μg/L. In addition, TPPH was detected in two samples collected from ERM-MW-9, adjacent to ERM-B-6, at concentrations of 220 and 210 μg/L, which are below the RWQCB EBSL for TPPH set at 500 μg/L. This result did not confirm the TPPH exceedance detected in the ERM-B-6 grab sample.

The grab ground water samples collected from this area contained detectable concentrations of one or more of the following eight metals: barium, cadmium, chromium, copper, lead, molybdenum, nickel, and zinc. Six of the seven samples contained metals in excess of their respective MCLs. Four samples (ERM-B-3, ERM-B-4, ERM-B-5, and ERM-B-6) contained nickel concentrations ranging from 0.12 to 0.26 mg/L, which exceed the nickel MCL of 0.1 mg/L. The ground water sample collected from ERM-B-7 contained a cadmium concentration of 0.0056 mg/L, which is in excess of the cadmium MCL of 0.005 mg/L. In addition, the ground water sample from W-B-8 contained a lead concentration of 1.9 mg/L, which is in excess of its 0.015 mg/L MCL. None of the other detected metals concentrations were in excess of their respective MCLs.

Ground water samples collected from four new monitoring wells (ERM-MW-6 through ERM-MW-9) were analyzed for nickel, cadmium, and lead. Cadmium was not detected in any of the eight samples. Lead was detected in each well during the November sampling event. Concentrations of lead in these samples ranged from 0.02 to 0.033 mg/L and all of the concentrations exceeded the lead MCL of 0.015 mg/L. Nickel was detected in seven of the eight samples with concentrations ranging between 0.01 to 0.37 mg/L. Samples collected from ERM-MW-8 and ERM-MW-9 contained concentrations nickel in excess of MCL of 0.1 mg/L. To further delineate the extent of nickel in AOC 2, two additional wells (ERM-MW-15 and ERM-MW-16) were installed and sampled in December 2003. Ground water samples collected from these wells were analyzed for nickel. The samples contained concentrations of 0.006 and 0.013 mg/L, which are below the nickel MCL of 0.1 mg/L. In addition, during the December 2003 sampling event, an additional sample was collected from ERM-MW-6 and analyzed for copper. This sample contained a copper concentration of 0.017 mg/L, well below the copper MCL of 1.3 mg/L.

As the analytical results indicate, this AOC does not contain a soil source of the potential chemicals of concern. With the exception of the sample collected directly under the pavement at W-B-7, none of the soil samples contained concentrations in excess of their regulatory screening levels. In addition, as discussed above, the sample collected directly under the pavement at W-B-7 is limited in extent and may not be representative of site conditions. **Therefore, additional soil characterization is not required for this AOC.**

The results of ground water samples from this AOC indicate the presence of nickel above its MCL of 0.1 mg/L. The source of nickel to ground water in this AOC is unknown. Soil analytical results indicate that of the 124 soil samples collected during the investigation only one sample from AOC 3 was outside of the range of Bay Area background concentrations. This suggests that a soil source of nickel to ground water due to UAL operations does not appear to exist within this AOC and the nickel may be at least partially due to background levels due to the various sources of imported fill. As discussed in Appendix I, nickel is a common constituent in Bay Area soils due to the presence of ultramafic rocks within the Franciscan Formation. The ultramafic rocks include serpentinite, which can contain appreciable amounts of nickel substituted for magnesium in serpentine (Hurlbut and Klein, 1985). The extent of nickel within the AOC above the regulatory screening level is defined; **therefore, additional ground water characterization is not required.**

4.5.3 *Industrial Wastewater Vault (AOC 3)*

Figure 13 presents the soil and ground water data from AOC 3. VOCs were detected in one soil sample collected from this area. The surface soil sample collected at W-B-10 contained a low concentration of xylenes (0.039 mg/kg), which is below the industrial PRG of 420 mg/kg. TEPH was detected in five soil samples at concentrations below their respective ESLs (500 mg/kg for TEPH as diesel and jet fuel and 1,000 mg/kg for TEPH as motor oil). TPPH was detected in two samples at concentrations below the RWQCB ESL of 400 mg/kg.

Chromium, nickel, vanadium, and zinc were detected in all soil samples collected from this area. Barium, copper, and cobalt were detected in 11 of 12 samples; lead was detected in six of 12 samples; antimony and molybdenum were detected in three of 12 samples; and mercury and silver were detected in one of 7 samples. Arsenic was detected in two of 12 samples; three of the remaining ten samples were elevated due to iron interference and are not considered to be representative of site conditions. A soil sample collected from W-B-12 contained elevated concentrations of cadmium, chromium, copper, molybdenum, and nickel compared to Bay Area background levels for these metals as presented in Tables 4 and 8. However, none of the metals concentrations detected in samples collected from this AOC were above their respective industrial PRGs.

Two samples collected from W-B-12 (at 0 and 3 feet) by Weiss contained copper and cadmium concentrations in excess of 10 times the STLCs of 25 and 1 mg/L, respectively. Therefore, Weiss analyzed these samples using the standard California WET methodology. The results of the WET analyses are presented in Table 9. The soluble concentrations of cadmium detected in these samples were 1.1 mg/L in the 0-foot sample and 0.89 mg/L in the 3-foot sample. The soluble concentrations of copper detected in these samples were 46 mg/L in the 0-foot sample and 16 mg/L in the 3-foot sample. The soluble concentrations of cadmium and copper within the 0-foot sample exceeded their respective STLCs of 1 mg/L and 25 mg/L, respectively. These results are used for waste classification and are not indicative of the soluble fraction of these soils that could be leached by rain or ground water under natural conditions due to the fact that the standard WET test uses a citric acid extractant, which is acidic and has a pH of 5. Ground water pH at the site ranges from approximately 6.5 to 7.5.

VOCs were not detected in any of the three grab ground water samples analyzed. All of the grab ground water samples analyzed contained detectable concentrations of TEPH. Concentrations ranged between 93 and 5,100 µg/L. W-B-12 contained a TEPH concentration of 5,100 µg/L, which is in excess of the RWQCB ESL of 640 µg/L established for TEPH. This sample was analyzed for SVOCs and none were detected. TPPH was not detected in any of the samples analyzed.

The grab ground water samples collected from this area contained detectable concentrations of one or more of the following six metals: barium, cadmium, copper, molybdenum, nickel, and zinc. One of the ground water samples (W-B-12) contained a cadmium concentration of 0.038 mg/L, which exceeds the cadmium MCL of 0.005 mg/L. None of the other metal concentrations detected were in excess of their respective MCLs.

To evaluate the grab ground water results, one monitoring well (ERM-MW-10) was installed, developed, and sampled adjacent to boring W-B-12. Ground water samples from this well did not contain detectable concentrations of VOCs. TEPH was detected at concentrations below the RWQCB ESLs, which did not confirm the TEPH concentrations detected in the W-B-12 grab sample. Samples collected from ERM-MW-10 contained concentrations of nickel at 0.082 (May 2003) and 0.12 mg/L (November 2003). The November 2003 sample exceeds the nickel MCL of 0.1 mg/L. Cadmium and lead were not detected in either sample, which did not confirm the exceedance of the cadmium MCL detected in the W-B-12 grab sample. In addition, a ground water sample was collected in December 2003 and analyzed for copper. Copper was not detected above its detection limit of 0.005 mg/L, which did not confirm the concentration detected in the W-B-12 grab sample.

Based on the analytical results, none of the soil samples contained concentrations of chemicals of concern in excess of the regulatory guidelines. One of the two ground water samples from MW-10 contained a concentration of nickel slightly above its MCL; however, the lack of elevated concentrations of nickel in adjacent grab samples indicates the limited extent of this potential impact. In addition, as discussed above in AOCs 1 and 2, nickel in ground water at the site may be attributed to background levels in ground water. **Therefore, additional soil and ground water characterization was not required for this AOC.**

4.5.4 *Aboveground Fuel Storage Tank (AOC 4)*

Figure 14 presents the soil and ground water data from AOC 4. TEPH, TPPH, BTEX, and methyl tertiary-butyl ether (MTBE) were not detected in any of the soil samples collected from this area. In addition, SVOCs were not detected in ERM-B-9. BTEX and MTBE were not detected in the two ground water samples analyzed. The ground water samples analyzed contained TEPH concentrations of 72 and 150 µg/L, which are below the RWQCB ESL for TEPH of 640 µg/L. TPPH was not detected in any of the samples analyzed. **This AOC does not contain concentrations of chemicals of concern in excess of regulatory screening levels; therefore, no further investigation was required for this AOC.**

4.5.5 *Vehicle Maintenance Center (AOC 5)*

Figure 12 presents the soil and ground water data from AOC 5. VOCs including MTBE were not detected in any of the 10 soil samples analyzed. In addition, TPPH was not detected in any of the 13 soil samples analyzed from this area. Low concentrations of TEPH were detected in three of the 13 samples analyzed ranging from 6.3 to 100 mg/kg, which are below their respective ESLs (500 mg/kg for TEPH as diesel and jet fuel and 1,000 mg/kg for TEPH as motor oil). Barium, chromium, copper, nickel, vanadium, and zinc were detected in all soil samples collected from this area. Cobalt was detected in 7 of 10 samples and lead was detected in 6 of 10 samples. Arsenic was detected in two of 10 samples; four of the remaining eight samples were elevated due to iron interference and are not considered to be representative of site conditions. None of the metals detections in samples collected within this AOC were above their respective industrial PRGs.

Two samples (W-B-1 at 0 feet and W-B-3 at 0 feet) collected by Weiss contained chromium concentrations of 190 and 180 mg/kg, which is in excess of 10 times the STLC for chromium set at 5 mg/L. Weiss analyzed these samples using the standard California WET methodology. The results of the WET analyses are presented in Table 9. The soluble concentrations of chromium detected in these samples were 0.13 and 0.19 mg/L, which are below the chromium STLC of 5 mg/L.

MTBE was detected in all seven grab ground water samples analyzed at concentrations ranging from 73 to 210 μg/L, which are in excess of the MTBE MCL of 13 μg/L. In addition, ground water samples collected from ERM-B-10 and ERM-B-11 contained 1,1-DCA concentrations of 0.61 and 1.6 μg/L, respectively, which are below the 1,1-DCA MCL of 5 μg/L. There were no other VOCs detected in the ground water samples. All of the ground water samples analyzed contained detectable concentrations of TEPH. One sample collected and analyzed by Weiss contained a TEPH concentration of 650 μg/L, which is above the RWQCB ESL for TEPH set at 640 μg/L; however, a corresponding split sample collected by ERM contained a TEPH concentration of 77 μg/L, which is well below the ESL. SVOCs were not detected in the sample collected from W-B-2. TPPH was detected in three of the seven samples analyzed at concentrations ranging from 59 to 90 μg/L, which are below the RWQCB ESL for TEPH of 500 μg/L.

The ground water samples collected from this area contained detectable concentrations of one or more of the following five metals: antimony, barium, beryllium, nickel, and zinc. Two of the seven samples contained metals in excess of their respective MCL. ERM-B-10 and W-B-3 contained antimony concentrations of 0.074 and 0.055 mg/L, respectively, which are in excess of the antimony MCL set at 0.006 mg/L. One sample (ERM-B-10) contained a beryllium concentration of 0.0086 mg/L, which exceeds the beryllium MCL of 0.004 mg/L. To address these exceedances, ERM collected ground water samples from the four adjacent AOC 17 wells in November 2003 to determine if ground water in this area potentially contains arsenic, antimony, and beryllium. Antimony and beryllium were not detected in any of the four well samples and arsenic was only detected in UAL-MW-4 at 0.047 mg/L, which is below the arsenic MCL. Therefore, the antimony and beryllium concentrations detected in the grab samples within this AOC were not confirmed by the monitoring well samples.

None of the soil samples contained concentrations of the potential chemicals of concern in excess of the regulatory guidelines. MTBE was detected in ground water samples collected from this AOC at concentrations in excess of its MCL of 13 μg/L. The one TEPH exceedance from ground water collected at W-B-3 was not confirmed by the split sample collected by ERM from the same location and, therefore, is not representative of ground water in this AOC. The presence of MTBE and TEPH in ground water from this area is related to the adjacent former fuel USTs and fueling island area (AOC 17). As discussed in Section 2.2.17, the ACHCS has indicated no further action is required to address the former fuel USTs. The two grab ground water samples containing metals in excess of their MCLs were not confirm by monitoring well samples and are not considered representative of ground water conditions within the AOC. None of the other compounds detected in ground water were in excess of their regulatory screening criteria. **Therefore, no further investigation was required for this AOC.**

4.5.6 *Boiler and Aboveground Diesel Storage Tank (AOC 6)*

Figure 13 presents the soil and ground water data from AOC 6. BTEX and TEPH were not detected in the soil sample collected from this area. BTEX compounds were not detected in the ground water sample analyzed. The ground water sample contained a TEPH concentration of 180 μg/L, which is below the RWQCB ESL for TEPH of 640 μg/L. SVOCs were not detected in this sample. **This AOC does not contain concentrations of chemicals of concern in excess of regulatory screening levels; therefore, no further investigation was required for AOC 6.**

4.5.7 *Former 90-Day Hazardous Waste Accumulation Area (AOC 7)*

Figures 13 and 15 present the soil and ground water data from AOC 7. VOCs, TEPH, and TPPH were not detected in any of the soil samples collected from this AOC. Barium, chromium, copper, nickel, vanadium, and zinc were detected in all soil samples collected from this area. In addition, cobalt was detected in five of six samples and mercury was detected in three of six samples. None of the metals detected in soil were above their respective industrial PRGs.

VOCs were detected in ground water samples collected and analyzed from both locations. Compounds detected include 1,1-DCA, 1,1- DCE, and 1,1,1- TCA. The samples collected from W-B-17 contained 1,1-DCA and 1,1-DCE concentrations of 54 μg/L and 59 μg/L, respectively. These concentrations are in excess of the 1,1-DCA MCL of 5 μg/L and the 1,1-DCE MCL of 6 μg/L. All other VOC detections were below their respective MCLs. To confirm these concentrations, a monitoring well (ERM-MW-17) was installed adjacent to W-B-17 in December 2003. The ground water sample collected from this well contained low concentrations of 1,1-DCA (3.7 μg/L), 1,1-DCE (3.9 μg/L), and toluene (0.68 μg/L), which were less than their respective MCLs. The 1,1-DCA and 1,1-DCE concentrations detected in the grab samples were not confirmed by the well data and, therefore, are not considered representative of ground water conditions at this AOC.

Two of the grab ground water samples collected and analyzed contained TEPH concentrations of 69 and 200 μg/L. These concentrations of TEPH are below the RWQCB ESL for TEPH set at 640 μg/L. In addition, TPPH was not detected in either ground water samples collected during this investigation. SVOCs were not detected in the sample collected from W-B-17.

Grab ground water samples collected from this AOC contained detectable concentrations of arsenic, molybdenum, and nickel. None of the metals were detected at concentrations in excess of their respective MCLs. A sample was also collected from ERM-MW-17 and analyzed for arsenic. Arsenic was not detected in this sample.

The analytical results of soil samples collected from this AOC indicate that soil sources of the chemicals of concern to ground water are not present within this AOC. Ground water samples analyzed from this AOC indicate the presence of low concentrations of VOCs below their respective MCLs[2]. The low concentrations of VOCs in ground water at AOC 7 are possibly related to migration from the former off-site waste solvent tanks (AOC 18), which are discussed in detail in Section 4.5.18. **No further investigation was required for this AOC.**

4.5.8 Recent 90-Day Hazardous Waste Accumulation Area (AOC 8)

Figure 13 presents the soil and ground water data from AOC 8. VOCs, TEPH, and TPPH were not detected in the soil sample collected and analyzed from this area. Metals detected in soil include barium, chromium, cobalt, copper, nickel, vanadium, and zinc. None of the metals detected in soil were above their respective industrial PRGs.

The ground water sample collected from ERM-B-12 did not contain detectable concentrations of VOCs, TEPH, and TPPH. Metals detected in this sample include barium, molybdenum, and nickel. None of the metals concentrations detected in this sample were in excess of their respective MCLs.

This AOC does not contain concentrations of potential chemicals of concern in excess of the regulatory screening levels; therefore, no further investigation was required for AOC 8.

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[2] Concentrations of 1,1-DCA and 1,1-DCE detected in the W-B-17 grab sample were not confirmed by the sample collected from ERM-MW-17 and, therefore, are not representative of ground water conditions.

4.5.9 *Hazardous Material Storage Areas (AOC 9)*

Figure 16 presents the soil and ground water data from AOC 9. One of the nine soil samples (ERM-B-13) contained detectable concentrations of DCM (0.047 mg/kg) and naphthalene (0.063 mg/kg). These concentrations are well below the industrial PRGs for DCM and naphthalene of 21 and 190 mg/kg, respectively. VOCs were not detected in any other sample collected from this area.

TEPH was detected in three of the soil samples collected and analyzed by Weiss. The detections ranged from low concentrations (1.2 to 57 mg/kg) of TEPH as diesel, jet fuel and/or motor oil directly under the pavement (W-B-21 at 0 feet and W-B-22 at 0 feet) to a 2,100 mg/kg concentration of motor oil in W-B-23 at 3 feet. The concentration of motor oil detected in this sample exceeds the RWQCB ESL established for motor oil at 1,000 mg/kg. However, this concentration is considered anomalous or highly localized since TEPH as motor oil was not detected in the sample collected directly under the concrete at this location, which indicates that this material could have been a component of the fill emplaced at OMC. In addition, a silica gel cleanup procedure was not performed on this sample, indicating that this concentration could be influenced by to the presence of naturally occurring organic material. The lack of elevated concentrations of motor oil in any of the other five samples collected within the same general area, as well as the lack of detectable concentrations of TEPH in ground water, indicate that this occurrence, if representative, is highly localized. TEPH was not detected in any of the other six samples collected for this AOC. TPPH was not detected in any of the soil samples.

Barium, chromium, copper, nickel, vanadium, and zinc were detected in all nine soil samples collected from this area. In addition, cobalt was detected in seven samples; mercury was detected in four samples; and lead was detected in two samples. Arsenic was detected in two of nine samples; three of the remaining seven samples were elevated due to iron interference and are not considered to be representative of site conditions. As seen on Table 8, none of the detected metals concentrations were above their respective industrial PRGs.

A sample collected by Weiss from W-B-23 at 3 feet bgs contained a chromium concentration of 110 mg/kg, which is in excess of 10 times the STLC of 5 mg/L for chromium. Weiss analyzed this sample using the standard California WET methodology. The results of the WET analyses are presented in Table 9. A soluble concentration of chromium was detected at 0.11 mg/L, which is below the chromium STLC of 5 mg/L.

VOCs were detected in four of the five ground water samples collected for this AOC. Low concentrations of MTBE (0.84 to 1.7 µg/L) were detected in four samples collected from two locations (ERM-B-13 and P-2/UAL-MW-5). These concentrations are below the MTBE MCL set at 13 μg/L. The sample collected from W-B-22 contained 0.8 μg/L of 1,1-DCA, which is below its MCL set at 5 μg/L. In addition, this sample contained a low (0.51 μg/L) concentration of chloromethane; an MCL for chloromethane has not been established. No other VOCs were detected in these samples.

Two of the five samples, ERM-B-13 and ERM-B-14, contained TEPH concentrations of 77 and 170 μg/L, respectively. These concentrations are below the RWQCB ESL of 640 μg/L for TEPH. SVOCs were not detected in the sample collected from ERM-B-14. TPPH was not detected in any of the samples.

The ground water samples collected from this area contained detectable concentrations of one or more of the following six metals: barium, beryllium, lead, molybdenum, silver, and zinc. One of the three samples contained metals in excess of their respective MCL. ERM-B-13 contained a beryllium concentration of 0.0059 mg/L, which exceeds the beryllium MCL of 0.004 mg/L; this sample also contained a lead concentration of 0.057 mg/L, which exceeds the lead MCL of 0.015 mg/L. Based on random distribution, the extensive use of imported soil fill at the OMC, and the lack of elevated concentrations in related soil samples, these beryllium and lead concentrations appear to be naturally occurring and not due to OMC operations. None of the other detected metals concentrations were in excess of their respective MCLs.

The analytical results indicate the presence of TEPH as motor oil at 2,100 mg/kg, which is above its RWQCB ESL of 1,000 mg/kg, in one sample collected from W-B-23 adjacent to two storage sheds near the southwestern corner of the hangar. This sample was the only one of seven soil samples collected from three borings (W-B-21, W-B-22, and W-B-23) completed adjacent to these storage sheds to exceed the TEPH screening level standard. The data indicate that this apparent soil impact is limited in the vicinity of the sheds. In addition, the lack of TEPH in the ground water sample collected from this area indicates that the soil does not represent an ongoing source of TEPH to ground water. The concentrations of beryllium and lead detected in a ground water sample from ERM-B-13 in excess of their respective MCLs are believed to be naturally occurring concentrations and not indicative of impact due to OMC operations. None of the other compounds detected in either soil or ground water were in excess of their regulatory screening criteria. **Therefore, no further investigation was required for AOC 9.**

4.5.10 Chemical Storage Area (AOC 10)

Figure 17 presents the soil data from AOC 10. The soil sample did not contain detectable concentrations of VOCs, TEPH, and TPPH. Metals detected in the soil sample collected in this area included barium, chromium, copper, nickel, vanadium, and zinc. As seen on Table 8, none of the detected metals concentrations were above their respective industrial PRGs. **AOC 10 does not contain concentrations of potential chemicals of concern in excess of the regulatory screening levels; therefore, no further investigation was required.**

4.5.11 *Aircraft Fueling/Defueling Equipment Areas (AOC 11)*

Figure 18 presents the soil and ground water data from AOC 11. TEPH and BTEX were not detected in any of the soil samples collected from this area. BTEX compounds were not detected in the four ground water samples analyzed. TEPH was detected in all four ground water samples at concentrations ranging from 80 to 100 μg/L, which are below the TEPH RWQCB ESL of 640 μg/L. **AOC 11 does not contain concentrations of chemicals of concern in excess of the regulatory screening levels; therefore, no further investigation was required.**

4.5.12 *Fire System Motors and Associated Fuel Tanks (AOC 12)*

Figure 19 presents the soil and ground water data from AOC 12. BTEX and TEPH were not detected in any of the soil samples collected from this area. BTEX compounds were not detected in the two ground water samples analyzed. TEPH was detected in both ground water samples at concentrations ranging from concentrations of 83 and 130 μg/L, which are below the TEPH RWQCB ESL of 640 μg/L. SVOCs were not detected in the sample collected from ERM-B-21. **AOC 12 does not contain concentrations of chemicals of concern in excess of the regulatory screening levels; therefore, no further investigation was required.**

4.5.13 *Paint Spray Booth (AOC 13)*

Figure 20 presents the soil and ground water data from AOC 13. The soil sample did not contain detectable concentrations of VOCs, TEPH, or TPPH. Metals detected in the soil sample from this area include barium, chromium, copper, nickel, vanadium, and zinc. As seen on Table 8, none of the detected metals concentrations were above their respective industrial PRGs. **AOC 13 does not contain concentrations of potential chemicals of concern in excess of the regulatory screening levels; therefore, no further investigation was required.**

4.5.14 *Storm Drains (AOC 14)*

Figure 21 presents the soil and ground water data from AOC 14. VOCs were not detected in any soil sample collected from this area. TEPH was detected in three soil samples collected from one location (W-B-32) at concentrations between 3 and 22 mg/kg, which are well below the TEPH RWQCB ESL of 500 mg/kg. TPPH was not detected in any of the samples.

Barium, chromium, copper, nickel, vanadium, and zinc were detected in all 12 soil samples collected in this area. In addition, cobalt was detected in 10 of 12 samples; cadmium was detected in four of 12 samples; lead was detected in four of 12 samples; and mercury was detected in two of 12 samples. Arsenic was detected in two of 12 samples; three of the remaining ten samples were elevated due to iron interference and are not considered to be representative of site conditions. As seen on Table 8, none of the detected metal concentrations were above their respective industrial PRGs.

VOCs were not detected in any of the three ground water samples analyzed. Two of the three ground water samples analyzed contained detectable concentrations of TEPH. Concentrations ranged between 120 and 160 μg/L, which are below the TEPH RWQCB ESL of 640 μg/L. TPPH was not detected in any of the samples analyzed.

Ground water samples collected from this area contained detectable concentrations of one or more of the following five metals: barium, beryllium, copper, lead, and zinc. One of the ground water samples (W-B-32) contained beryllium and lead concentrations (0.0058 mg/L and 0.05 mg/L, respectively) that are in excess of their respective MCLs (0.005 mg/L for beryllium and 0.015 mg/L for lead). Based on the random distribution, the extensive use of imported soil fill at the OMC, and the lack of elevated concentrations in related soil samples, these concentrations appear to be naturally occurring and not due to UAL operations. None of the other metal concentrations detected were in excess of their respective MCLs.

Soil samples collected and analyzed from AOC 14 did not contain chemical concentrations in excess of their regulatory screening criteria. One ground water sample contained beryllium and lead concentrations slightly above MCLs, which are believed to be naturally occurring concentrations and not indicative of impact due to OMC operations. None of the other compounds detected in ground water were in excess of their regulatory screening criteria. **Therefore, no further investigation was required for this AOC.**

4.5.15 Aircraft Parking and Run Up Area (AOC 15)

Figure 22 presents the soil and ground water data from AOC 15. BTEX and TEPH were not detected in any of the soil samples collected from this area. Total xylenes were detected in the one ground water sample (ERM-B-25) at a concentration of 1.5 μg/L, which is well below the total xylenes MCL set at 1,750 μg/L. TEPH was detected in all three ground water samples at concentrations ranging from 140 to 160 μg/L, which are below the TEPH RWQCB ESL of 640 μg/L. SVOCs were not detected in the sample collected from ERM-B-24. **AOC 15 does not contain concentrations of chemicals of concern in soil or**

ground water in excess of the regulatory screening levels; therefore, no further investigation was required.

4.5.16 *Reported Fuel Spill Area on Taxiway (AOC 16)*

Figure 13 presents the soil and ground water data from AOC 16. VOCs, BTEX, TPPH and TEPH were not detected in any of the soil samples collected from this AOC. Barium, chromium, cobalt, copper, nickel, vanadium, and zinc were detected in all eight soil samples analyzed for metals from this AOC. In addition, one soil sample contained an arsenic concentration of 2.8 mg/kg. As seen on Table 8, none of the detected metal concentrations were above their respective industrial PRGs. BTEX compounds were not detected in the ground water sample analyzed. The ground water sample contained a TEPH concentration of 69 μg/L, which is below the TEPH RWQCB ESL of 640 μg/L. **AOC 16 does not contain concentrations of chemicals of concern in excess of regulatory screening levels; therefore, no further investigation was required.**

4.5.17 *Former Vehicle Fueling USTs (AOC 17)*

Figure 12 presents ground water data from AOC 17. MTBE was detected in ten of the eleven ground water samples, with concentrations ranging from 0.65 to 84 μg/L. Samples collected from three of the wells (UAL-MW-2, UAL-MW-3, and P-1/UAL-MW-4) contained MTBE concentrations in excess of the MTBE MCL of 13 μg/L. Samples collected from the same three wells (UAL-MW-2, UAL-MW-3, and P-1/UAL-MW-4) contained low concentrations of 1,1-DCA ranging from 1.3 to 4.9, which are below its MCL of 5 μg/L. Samples collected from UAL-MW-2 also contained cis-1,2-DCE concentrations of 3 and 4.6 μg/L, which are below its MCL of 6 μg/L. No other VOCs were detected in these samples.

TEPH was detected in three well samples collected during April 2003 (UAL-MW-2, UAL-MW-3, and P-1/UAL-MW-4) at concentrations ranging from 78 to 120 μg/L. These concentrations are below the TEPH RWQCB ESL of 640 μg/L. Samples collected from the same wells by Weiss during April 2003 did not contain detectable concentrations of TEPH. In addition, samples collected by ERM in November 2003 did not contain detectable concentrations of TEPH. The sample collected from UAL-MW-2 in April 2003 did not contain detectable concentrations of SVOCs. TPPH was not detected in any of the ground water samples analyzed.

Ground water samples collected in April 2003 from the four wells by Weiss were also analyzed for metals. These samples contained detectable concentrations of barium (three detections), arsenic (two detections), and nickel (one detection). The sample collected from P-1/UAL-MW-4 contained an arsenic concentration of 0.847 mg/L, which is in excess of the 0.05 mg/L arsenic MCL. In addition, a nickel concentration of 0.1 mg/L was detected in a sample from UAL-MW-3, which equals the 0.1 mg/L MCL for nickel. The wells were resampled in November 2003 and the samples were analyzed for arsenic, antimony, and beryllium to address ground water detections in the adjacent AOC 5. Antimony and beryllium were not detected in any of these samples and arsenic was detected in P-1/UAL-MW-4 at a concentration of 0.047 mg/L. The arsenic detection in P-1/UAL-MW-4 did not confirm the concentration detected by Weiss in the April 2003 sampling event. Based on the random distribution, the extensive use of imported soil fill at the OMC, and the lack of elevated concentrations in related soil samples from the adjacent AOC 5, the arsenic and nickel concentrations appear to be naturally occurring and not due to OMC operations.

Three of the monitoring wells within this AOC contain MTBE concentrations in excess of the MTBE MCL of 13 mg/L. However, with the exception of well P-1/UAL-MW-4, which was not installed to address the former fuel USTs and, therefore, not sampled, these concentrations are less than historical concentrations detected in these wells. As discussed in Section 2.2.17, the ACHCS has indicated no further action is required to address the former fuel USTs. In addition, the two samples containing metals equal to or in excess of MCLs appear to represent natural site conditions, and are of limited extent. None of the other compounds detected in ground water were in excess of regulatory screening criteria. **Therefore, no further investigation was required.**

4.5.18 Migration of Off-Site Solvent Plume onto OMC Property (AOC 18)

Figure 15 presents the soil and ground water data from AOC 18. This AOC was investigated specifically to evaluate potential migration of chlorinated VOCs into the OMC from the off-site former waste solvent tanks immediately west of the UAL leasehold. VOCs were not detected in any soil sample collected from this area. One soil sample (W-B-18 at 4.5 feet) contained a low concentration of TEPH at 2 mg/kg, which is well below the RWQCB ESL of 500 mg/kg. TPPH was not detected in any of the soil samples analyzed. Barium, chromium, cobalt, copper, nickel, vanadium, and zinc were detected in all five soil samples analyzed for metals from this AOC. In addition, two samples (W-B-9 at 4 feet and W-B-18 at 7.5 feet) contained low mercury concentrations of 0.064 and 0.093 mg/kg. As seen on Table 8, none of the detected metal concentrations were above their respective industrial PRGs.

Three of the six ground water samples contained concentrations of VOCs. W-B-9 contained a low concentration of chloromethane (0.51 μg/L); however, the split sample collected by Weiss did not contain any detectable concentrations of VOCs including chloromethane. An MCL has not been established for this compound. A ground water sample collected from W-B-19 contained concentrations of chloromethane, 1,1-DCA, cis-1,2-DCE, and TCE; however, the split sample collected by Weiss only contained a concentration of TCE and cis-1,2-DCE. TCE was detected in both samples collected from this location at concentrations of 34 and 56 μg/L, which is above its MCL of 5 μg/L. Cis-1,2-DCE was also detected in both samples at concentrations of 5 and 6.4 μg/L. The 6.4 μg/L detection is slightly above the cis-1,2-DCE MCL of 6 μg/L.

TEPH and TPPH were not detected in any of the four ground water samples analyzed from this AOC. Barium was the only metal detected in three (W-B-9, W-B-18, and W-B-20) of the four samples analyzed at concentrations ranging from 0.099 to 0.57 mg/L, which is below the MCL of 1.0 mg/L. Metals were not detected in the sample collected from W-B-19.

AOC 18 is located along the northwestern boundary of the OMC to the south of AOC 7, which has also been impacted by chlorinated VOCs in ground water. Approximately 200 feet west of AOC 18 and 500 feet southwest of AOC 7 is the location of the former off-site waste solvent tanks. As indicated in *Site Closure Report, UST Sites MF25 & MF26, Economy Parking Lot, Oakland International Airport* (Port of Oakland, 2001) and previously discussed in Section 2.3.1, a sample collected from one of the tanks contained elevated concentrations of VOCs including 1,1,2,2-tetrachloroethane, PCE, toluene, ethylbenzene, methylene chloride, 1,1-DCA, 1,1,1-TCA, and benzene. During the removal of the tanks, soil samples collected from the excavation contained elevated concentrations of TPPH, BTEX, and VOCs including TCE (up to 100 mg/kg), 1,1,1-TCA (up to 140 mg/kg), and 1,1-DCA (up to 30 mg/kg). In addition, 1,1-DCE, detected in a ground water sample from AOC 7, is a common breakdown product of 1,1,1-TCA, PCE, and TCE (USEPA, 1998; Vogel, Criddle, and McCarty, 1987; McCarty, 1996). Ground water flow direction in the former tank area has not been established. The results of these analyses as well as results of the most recent sampling of monitoring wells installed to investigate the former waste solvent tanks are presented on Figure 15.

The presence of a documented source of VOCs, including 1,1-DCA and TCE, in close proximity to AOC 7 and AOC 18 indicates that the low concentrations of VOCs in grab ground water from these areas are potentially related to migration of VOCs from this off-site source. This observation is supported by the lack of an identified soil source within the OMC, especially within AOC 18, AOC 7 (former 90-day hazardous waste accumulation area) and AOC 2 (aircraft wash rack), and the variable ground water flow direction within the shallow fill. The lack of VOC detections in the soil samples collected within this AOC, as well as the lack of TCE detections in adjacent AOCs including AOCs 2 and 7, the presence of compounds in ground water consistent with those detected in soil and ground water from the off-site solvent tank area, and the distribution of VOC concentrations suggest that the VOCs in ground water detected in AOCs 7 and 18 are most likely due to migration from the off-site former solvent tanks. **Therefore, further investigation was not required.**

4.5.19 *Runoff from Pavement to Unpaved Area North of OMC (AOC 19)*

Figure 23 presents the soil and ground water data from AOC 19. VOCs were not detected in any of the 39 soil samples. TPPH was detected in one sample (W-B-33 at 0 feet) at a concentration of 2.7 mg/kg, which is well below the RWQCB ESL of 400 mg/kg. In addition, TEPH was detected in 14 of the 39 samples collected at concentrations ranging from 1.1 to 2,100 mg/kg. Only one sample (W-B-33 at 0 feet) contained a concentration of TEPH (2,100 mg/kg) in excess of its applicable RWQCB ESL (1,000 mg/kg for TEPH as motor oil). A sample collected at 2.5 feet from W-B-33 contained a TEPH concentration of 8.8 mg/kg, well below the motor oil RWQCB ESL of 1,000 mg/kg. This indicates that this exceedance is an isolated occurrence (one of 39 samples) and appears to be limited to surface soils.

Barium, chromium, cobalt, copper, nickel, vanadium, and zinc were detected in all soil samples collected from this area. In addition, lead was detected in 22 of 39 samples; arsenic was detected in 21 of 39 samples; cadmium was detected in 14 of 39 samples; mercury was detected in 13 of 39 samples; and molybdenum was detected in one of 39 samples. Arsenic was detected in 19 of 39 samples; two of the remaining 20 samples were elevated due to iron interference and are not considered to be representative of site conditions. None of the concentrations of metals detected in this AOC exceed the industrial PRGs.

Three soil samples collected within this AOC (W-B-25 at 3 feet, W-B-31 at 3 feet, and W-B-31 at 3.5 feet) by Weiss contained chromium concentrations in excess of 10 times the chromium STLC of 5 mg/L. Therefore, Weiss analyzed these samples using the standard California WET methodology. Results of these analyses are presented in Table 9. Soluble concentrations of chromium ranging from 0.21 to 0.53 mg/L were detected, which are below the chromium STLC of 5 mg/L.

VOCs, TEPH, and TPPH were not detected in any of the ground water samples analyzed. The ground water samples contained low concentrations of zinc. In addition, W-B-29 contained a barium concentration of 0.12 mg/L. No other metals were detected in the samples. None of the metal concentrations detected were in excess of their respective MCLs.

The analytical results indicate the presence of TEPH as motor oil above screening levels in one sample collected from W-B-33 at ground surface. A sample collected at 2.5 feet from W-B-33 contained a TEPH concentration of 8.8 mg/kg, well below the RWQCB ESL of 1,000 mg/kg. This indicates that this exceedance is an isolated occurrence (one of 39 samples) and appears to be limited to surface soils. Based on the isolated occurrence of the TEPH exceedance and the lack of any other chemicals of concern in excess of their regulatory screening levels, further investigation was not required.

4.5.20 *Analytical Results Summary*

The following table provides a summary of soil and ground water detections above their appropriate screening levels per AOC. The table also provides the section reference for each AOC.

AOC	Sample Media	Compound Class	Chemicals Detected Above Investigation Screening Levels*	Section Reference
AOC 1	Soil	VOCs	None	4.5.1
		TPH	None	
		Metals	None	
	Ground Water	VOCs	1,1-DCA, 1,2-DCE, cis-1,2-DCE, vinyl chloride	
		TPH	None	
		SVOCs	None	
		Metals	Nickel	
AOC 2	Soil	VOCs	None	4.5.2
		TPH	TEPH	
		SVOCs	None	
		Metals	None	
	Ground Water	VOCs	None	
		TPH	TEPH	
		SVOCs	None	
		Metals	Nickel, Lead	
AOC 3	Soil	VOCs	None	4.5.3
		TPH	None	
		Metals	None	
	Ground Water	VOCs	None	
		TPH	None	
		SVOCs	None	
		Metals	Nickel	
AOC 4	Soil	VOCs	None	4.5.4
		TPH	None	
		SVOC	None	
	Ground Water	VOCs	None	
		TPH	None	
AOC 5	Soil	VOCs	None	4.5.5
		TPH	None	
		Metals	None	
	Ground Water	VOCs	MTBE	
		TPH	None	
		SVOCs	None	
		Metals	None	
AOC 6	Soil	BTEX	None	4.5.6
		TPH	None	
	Ground Water	BTEX	None	
		TPH	None	
AOC 7	Soil	VOCs	None	4.5.7
		TPH	None	
		Metals	None	
	Ground Water	VOCs	None	
		TPH	None	
		SVOCs	None	
		Metals	None	

AOC	Sample Media	Compound Class	Chemicals Detected Above Investigation Screening Levels*	Section Reference
AOC 8	Soil	VOCs	None	4.5.8
		TPH	None	
		Metals	None	
	Ground Water	VOCs	None	
		TPH	None	
		Metals	None	
AOC 9	Soil	VOCs	None	4.5.9
		TPH	TEPH	
		Metals	None	
	Ground Water	VOCs	None	
		TPH	None	
		SVOCs	None	
		Metals	Beryllium, Lead	
AOC 10	Soil	VOCs	None	4.5.10
		TPH	None	
		Metals	None	
AOC 11	Soil	BTEX	None	4.5.11
		TPH	None	
	Ground Water	BTEX	None	
		TPH	None	
AOC 12	Soil	BTEX	None	4.5.12
		TPH	None	
	Ground Water	BTEX	None	
		TPH	None	
AOC 13	Soil	VOCs	None	4.5.13
		TPH	None	
		Metals	None	
AOC 14	Soil	VOCs	None	4.5.14
		TPH	None	
		Metals	None	
	Ground Water	VOCs	None	
		TPH	None	
		Metals	Beryllium, Lead	
AOC 15	Soil	BTEX	None	4.5.15
		TPH	None	
	Ground Water	BTEX	None	
		TPH	None	
		SVOCs	None	
AOC 16	Soil	VOCs	None	4.5.16
		TPH	None	
		Metals	None	
	Ground Water	BTEX	None	
		TPH	None	
AOC 17	Ground Water	VOCs	MTBE	4.5.17
		TPH	None	
		Metals	Nickel	
AOC 18	Soil	VOCs	None	4.5.18
		TPH	None	
		Metals	None	
	Ground Water	VOCs	TCE, cis-1,2-DCE	
		TPH	None	
		Metals	None	

AOC	Sample Media	Compound Class	Chemicals Detected Above Investigation Screening Levels*	Section Reference
AOC 19	Soil	VOCs	None	4.5.19
		TPH	TEPH	
		Metals	None	
	Ground Water	VOCs	None	
		TPH	None	
		Metals	None	

* - Investigation results were compared to screening criteria (USEPA PRGs and State of California MCLs) commonly used for sites under RWQCB and DTSC oversight to direct additional information and determine that investigation activities were adequately completed. These criteria are not cleanup standards; site-specific, risk-based cleanup standards developed for the OMC are presented in Section 5.

5.0 *RISK ASSESSMENT*

Chemicals of concern have been detected in soil and ground water at the OMC and have the potential to be contacted by human and/or ecological receptors. The chemicals in soil and ground water also have the potential to be transported to other media (vapors or surface waters) where they could be contacted by human and/or ecological receptors. A risk assessment was conducted to evaluate the human health and ecological risks and determine whether additional actions are warranted to address media containing COCs at the site.

This section presents the conceptual site model (CSM) used to identify potential receptors and exposure pathways for chemicals in soil and ground water at the OMC, a description of the procedures that were employed to conduct the risk assessment, and a summary of the risk assessment results. Based on the results, recommendations for the regulatory status (additional action or no further action) are presented.

5.1 *CONCEPTUAL SITE MODEL*

A CSM was developed to identify potential exposures routes and populations for media containing COCs at the OMC. The development of a CSM is recommended by regulatory guidance to evaluate information on chemical sources, migration pathways, and potential site receptors and is an accepted industry practice (USEPA, 1988; USEPA, 1989; USEPA, 2002b; DTSC, 1994). The CSM presented below provides an overview of site features, affected media, potential chemical migration pathways, receptor populations, and exposure pathways. Based on the CSM, complete exposure pathways and receptor populations at the OMC were identified for risk assessment. Pathways that were categorized as incomplete based on the CSM were not included in the risk assessment.

5.1.1 *Physical Setting*

The physical setting of the OMC is described below, including surface features, surface water hydrology, geology, and ground water.

Surface Features

The OMC property is at an elevation of approximately 4 to 5 feet above msl. The surface topography of the property is relatively level and slopes gently toward the west. The OMC property consists of an approximately 39.09-acre facility. An approximately 309,910-square-foot structure containing four adjoining hangars is the primary building on the OMC property. The area surrounding the hangar building is paved with either asphalt or concrete, and was primarily used for aircraft movement. The hangar and surrounding areas formerly contained a number of structures and facilities including an aircraft wash rack, small parts wash rack, vehicle fueling station, wastewater treatment system, vehicle maintenance shop, hazardous materials storage areas, and miscellaneous equipment storage areas. Since UAL's exit of the facility, the Port of Oakland has removed many of these site features, including the wastewater treatment system and hazardous materials storage areas. The future use of the OMC property has not been determined, but is anticipated to continue to be for airport-related activities and will continue to be zoned industrial.

The OMC property is located within the Oakland International Airport in a predominantly commercial/industrial area. Land use within a 1-mile radius of the OMC includes the airport and associated passenger parking, terminal buildings, aircraft storage and maintenance facilities, airfreight shipping operations, and rental car agencies. This area also contains a golf course, stormwater retention ponds, and undeveloped parcels. Figure 24 includes a recent aerial photograph of the OMC and areas immediately surrounding the property. As shown, the surrounding area includes storm water drainage channels/ponds and an aircraft taxiway connecting the North Field and South Field of the airport to the north; Sally Ride Way to the east, beyond which is additional parking for the airport and the runway and taxiways for the North Field; Airport Drive to the south, beyond which is the long-term parking area, rental car facilities, and wetlands; and an access road and the economy parking lot to the west.

Surface Water Hydrology

The nearest major surface water body to the OMC is San Francisco Bay, which is approximately 2,000 feet south and 1 mile west of the property (Figure 24). Several wetland areas are also located in the vicinity of the OMC. As shown in Figure 24, the wetland areas located immediately north of the OMC have been authorized to be filled by the United States Army Corps of Engineers. Wetland areas immediately south of the OMC have been filled during ongoing airport construction on Airport Drive. In addition, the drainage channel located to the immediate north of the OMC property has also been filled during recent construction. Wetland areas further to the north and south are designated wetlands by United States Army Corps of Engineers (USACE, 2000).

The entire OMC site is paved with asphalt and/or concrete and the hangar building covers a significant portion of the property. As a result, all surface water at the OMC is managed through a series of storm water drains, storm water sewers, and retention ponds. The location of these features is shown in Figure 24. Storm water from the OMC is discharged into two main drainage systems. Surface water from the southern and western portions of the OMC is directed into a storm drain located along the western side of the hangar building. This drain directs flow off of the OMC property to the south, along Neil Armstrong Drive, before discharging into San Francisco Bay. Surface water from the eastern and northern portions of the OMC is directed into storm drains located along the eastern side of the hangar building and eastern side of the OMC property. These drains empty into an open storm channel immediately northwest of the OMC property. The open storm channel directs the surface water west and then north, through a series of drains and open channels to the large wetland area located northwest of the OMC (Figure 24). Waters from this wetland area evaporate, infiltrate, or are discharged to San Francisco Bay via a pump system located north of the wetland.

The evaluation of ground water and chemical migration pathways at the OMC indicates that the only designated wetland that is in connection with the OMC is the large wetland area northwest of the property, which receives OMC stormwater. Due to the stormwater systems and limited mobility of ground water at the OMC, there does not appear to be a direct connection between the OMC and the other designated wetlands in the OMC vicinity.

The receiving wetland and San Francisco Bay (and associated mudflats and marshes along the shoreline) in the vicinity of the airport contain a wide variety of habitats for invertebrates and aquatic species that could be impacted by chemicals in site soil and ground water. These are included in the risk assessment.

Geology

The geologic setting of the OMC was presented in Section 4.1 and is summarized here. The OMC is located on the eastern margin of the San Francisco Bay within the East Bay Plain. The geology of the East Bay Plain in the vicinity of the OMC is characterized by the presence of unconsolidated sediments that are believed to be over 1000 feet thick. From deepest to shallowest, the following stratigraphic units are present beneath the OMC:

- Santa Clara Formation, a Pleistocene formation characterized by continental alluvial deposits with a thickness ranging from 300 to 600 feet;
- Alameda Formation, including the Yerba Buena Mud Member (Old Bay Mud), San Antonio/Merritt Sand/Posey Member, and the Young Bay Mud with a thickness range of approximately 100 to 300 feet; and
- Artificial fill, representing land recovered from the bay front and surrounding wetlands with a thickness up to 50 feet.

During the investigation, silts and fine sands comprising the artificial fill were encountered between ground surface and approximately 13 feet bgs. Young Bay Mud was encountered below the artificial fill and was characterized by dark gray silts and clays with abundant shell fragments. The lower contact of the Young Bay Mud was not encountered during this investigation. The Bay Mud is an aquitard that prevents vertical ground water flow; therefore, the CSM and risk assessment are focused on chemical occurrence and migration only in the saturated fill unit.

Ground Water

Ground water conditions and beneficial use are described below in the context of the CSM. More detailed information is presented in Sections 4.1 and 4.2.

Regional ground water flow in the aquifers beneath the Young Bay Mud generally follows topography with flow from the east to the west (RWQCB, May 2003). Ground water at the site was encountered within the artificial fill at depths ranging from 2 to 8 feet bgs. Ground water monitoring events at the OMC indicate the variability of ground water flow direction and gradient within the fill unit. Figures 5 through 8 illustrate the variable flow directions encountered during two of the events. Ground water gradients in the fill interval ranged from 6.4×10^{-4} to 3.4×10^{-2} feet per foot with an average gradient of 1.1×10^{-2} feet per foot during this investigation. In addition, Weiss collected measurements at high and low tide to determine tidal influences at the site. These measurements showed slight differences (0.04 to 0.07 foot) in elevations, indicating minimal tidal influence and, hence, communication with San Francisco Bay.

ERM conducted slug tests on six wells in December 2003 to determine the hydraulic conductivity of the fill unit and estimate ground water flow velocities within this unit. Hydraulic conductivities (K) within the fill unit ranged from 0.49 to 18 feet per day with an average of 5.6 feet per day. These values are consistent with the sandy silt/silty sand of the fill unit. Based on results of the slug tests and the ground water monitoring and using an estimate of 25 percent porosity for the fill unit, ground water flow rates ranging from 0.44 to 894 feet per year, with an average of 90 feet per year were calculated for the fill unit.

The sanitary and storm sewers occur at depths greater than 5 feet bgs and, therefore, possibly intersect the ground water table in a number of areas. It is possible that ground water could preferentially flow within the backfill of these sewers, although it is unknown whether the backfill is more permeable than the surrounding fill unit. The sanitary sewer lines do not provide a conduit to any surface water body or water supply well. As seen on Figure 24, the storm sewers could potentially provide a preferential pathway to nearby retention ponds within wetlands areas adjacent to San Francisco Bay, as well as directly into San

Francisco Bay and were identified as a potential AOC (AOC 14). As discussed in Section 4.5.14, the results of the investigation did not identify migration of the chemicals of concern along these corridors; however, the CSM assumes this is a complete pathway.

ERM conducted a water supply well survey to identify potential drinking water receptors near the OMC. The results of the survey are summarized on Table 3 and Figure 10. As seen in Figure 10, the location of the nearest wells is approximately 1 mile to the east. These wells are screened in the unconsolidated aquifer below the Young Bay Mud aquitard. Given the location of the wells, lack of pumping in the fill unit, and magnitude of chemical impacts at the OMC (Section 4.5), it is unlikely that releases at the OMC have the potential to migrate to water supply wells in the area. The CSM does not consider chemical migration to water supply wells a complete pathway.

The San Francisco Bay RWQCB conducted an evaluation of the beneficial uses of ground water within the East Bay Plain Ground Water Basin (Basin), including the airport. The results are summarized in the Beneficial Use Evaluation report described in Section 4.2. The report indicates that ground water within the shallow artificial fill along the Bay-front is unlikely to be used as a source of drinking water due to high TDS, the potential for saltwater intrusion, elevated levels of coliform from leaking sewer pipes, low yield, and the requirement for a 50-foot well seal for new municipal wells. The CSM does not consider ground water in the fill to be suitable for potable supply development, consistent with site conditions and the Beneficial Use Evaluation Report. Furthermore, chemicals of concern do not have the potential to migrate to off-site, water supply wells, which are located upgradient of the site and are screened in deeper aquifers.

5.1.2 *Receptor Populations and Exposure Pathways*

Possible receptors identified for the OMC include residents, travelers, airport workers, construction workers, and ecological receptors. The possible routes of exposure for human and ecological receptors at the OMC include inhalation (of volatile chemicals or dust), dermal contact with affected media, and ingestion of affected media.

Each of these potential receptor populations and exposure routes were further assessed for applicability to the current and future use of the OMC. Those receptor populations and exposure pathways that were deemed as complete exposure pathways at the OMC were retained for risk assessment. The incomplete exposure pathways were excluded from further risk analysis. The analysis of complete exposure populations and pathways at the OMC is presented below. A graphical summary of the results of this analysis is presented in Figure 25.

Residential Receptors

Exposures to residential receptors were included in the evaluation because residential receptors are generally the most sensitive receptors to contamination due to their long timeframes and high frequencies for exposure. No residential areas are currently present on or in the immediate vicinity (within one mile) of the OMC. In addition, no future residential development on or in the vicinity of the OMC is anticipated to occur, as the property and neighboring areas are expected to continue to be used for airport-related operations. Therefore, residential exposures to OMC-related chemicals are not considered a complete exposure pathway and no related risk assessment was conducted.

Travelers

Exposures to travelers were included in the evaluation because travelers are present at the airport and in parking areas near the OMC. The presence of travelers in the OMC vicinity is typically for very short time periods on an infrequent basis. In addition, the areas where travelers may be present in the OMC vicinity are paved, limiting potential exposures to media containing COCs at the OMC. It is very unlikely that travelers will be in contact with contaminated media associated with the OMC. Therefore, traveler exposures to OMC-related chemicals are not considered a complete exposure pathway and no related risk assessment was conducted.

Airport Workers

Airport worker exposures included in the evaluation consisted of both indoor and outdoor airport workers. Both indoor and outdoor airport workers are considered to be potential exposure populations at the OMC. The only complete exposure pathway identified for airport workers is inhalation of volatile chemicals from soil and/or ground water. No direct contact with soils and/or ground water containing COCs is anticipated to occur due the presence of pavement or structures throughout the OMC in areas containing chemicals in soil and/or ground water. Therefore, no inhalation of dusts, ingestion of soils or ground water, or dermal contact with soils or ground water is anticipated to occur for airport workers at the OMC.

Based on the complete inhalation exposure pathway for volatile chemicals in soil and ground water for airport workers, risk assessment for this exposure pathway was performed as described in Section 5.2.

Construction Workers

Construction workers are considered to be a potential exposure population at the OMC. Complete exposure pathways for construction workers include direct contact with soils during excavation activities at the OMC. Exposure routes of particular interest include inhalation of volatile chemicals in soil, inhalation of dust, dermal contact with soil, and ingestion of soil. Regular or prolonged contact with contaminated ground water is considered unlikely due to the routine construction practice of pumping out any collected water prior to conducting activities in excavations.

Based on the complete exposure pathways for construction workers for contact with soils containing COCs, risk assessment for these exposure pathways was performed as described in Section 5.2.

Ecological Receptors

No on-site ecological receptors were identified at the OMC because the entire OMC area is paved and/or covered with structures. Potential off-site ecological receptors include aquatic fauna and flora in San Francisco Bay and wetlands located in the vicinity of the OMC. As discussed previously, ground water containing COCs at the OMC may have the potential to migrate to the Bay or wetlands via utility conduits (storm sewer lines).

The leaching of chemicals in OMC soils into ground water and subsequent migration into surface water via utility conduits is another potential pathway for ecological receptors to be exposed to hazardous substances. Based on the complete exposure pathway for off-site ecological receptors in the Bay or wetlands, risk assessment for this exposure pathway was performed as described in Section 5.2.

Receptor Population and Exposure Pathway Summary

Based on the analysis presented above, the following receptor populations and exposure pathways were retained for risk assessment (Figure 25):

- Indoor and Outdoor Airport Workers
  - Inhalation of volatile vapors from soils containing VOCs; and
  - Inhalation of volatile vapors from ground water containing VOCs.
- Construction Workers
  - Inhalation of volatile vapors from soils containing VOCs;
  - Inhalation of dusts from soils with COCs;

- Incidental ingestion of soils with COCs; and
- Dermal contact with soils containing COCs.

- Ecological Receptors
  - Direct contact with surface water containing COCs due to migration of chemicals in ground water from the OMC via storm sewers.

The exposure pathways for all other receptor populations (i.e., residential and travel receptors) were determined to be incomplete and do not require risk assessment.

5.2 *OVERVIEW OF RISK ASSESSMENT PROCEDURES*

Risk assessment was performed for each receptor population and exposure pathway retained for analysis in Section 5.1. The risk assessment consisted of a three-step process. The first step (Tier-1) consisted of a comparison of the detected soil and/or ground water chemical concentrations at the OMC to generic RWQCB Environmental Screening Levels (ESLs) as presented in *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater* (RWQCB, July 2003), hereinafter referred to as "the ESL Report". ESLs are screening levels for soil and ground water developed by the RWQCB to address environmental protection goals presented in the Basin Plan for the San Francisco Bay region. The ESLs are not cleanup goals and the presence of a chemical above ESLs does not necessarily indicate that adverse impacts to human health or the environment are occurring. For compounds that were detected in soil that did not have an ESL established, the USEPA Region IX commercial/industrial PRGs were used for the Tier-1 comparison. Similarly, for compounds that were detected in ground water that did not have an ESL established, the California MCLs were used for the Tier-1 comparison. Their Tier-1 screening levels are the same as those that were used to evaluate the adequacy of investigation as discussed in Section 4.0.

For those chemicals that exceeded their generic Tier-1 ESL standard for a particular receptor population and exposure pathway, a Tier-2 risk assessment was conducted. The Tier-2 risk assessment consisted of the application of site-specific information to either select a more appropriate ESL for the particular receptor population and exposure pathway or to derive standards specific to the OMC.

For chemicals that exceeded the Tier-2 standards for a particular receptor population and exposure pathway, a Tier-3 risk assessment was conducted. The Tier-3 risk assessment consisted of a statistical analysis of the chemical concentrations detected at the site and further evaluation of the exposure pathway in light of site-specific conditions. For a few selected chemicals, appropriate Tier-

2 standards were not available; therefore, further evaluation of the potential risks posed by these chemicals was also evaluated.

The data set used for conducting the risk assessment included the results from all of the investigations conducted by ERM and Weiss at the OMC, with the following exceptions:

- As discussed in Section 4.3 and Appendix I, the arsenic and thallium laboratory analytical results for samples collected by ERM were obtained using inductively coupled plasma (ICP) analysis methods, which can result in false positive detections for arsenic and thallium due to iron interference. Therefore, arsenic and thallium sampling results for soil and ground water samples collected by ERM were not used in the risk assessment, unless the results indicated a non-detectable concentration for one of these compounds. The non-detectable samples were considered acceptable for use because the ICP analysis only results in false positive detections, not false non-detections. As discussed in Section 4.3, at a majority of the sampling locations, Weiss collected samples from the same locations as ERM and had the arsenic and thallium samples analyzed using graphite furnace methods, which do not have iron interference problems. Therefore, the exclusion of ERM data is not considered a limitation for the risk assessment.
- At several sampling locations, monitoring wells were installed and sampled based on the results of grab ground water samples collected during the initial investigation activities at the OMC. At each location where both grab and monitoring well ground water samples were collected, the monitoring well data were the only sampling results used in the risk assessment, as these results are considered to be more representative of site conditions. At locations where no monitoring well data were available, the grab ground water sampling results were used in the risk assessment.
- During some of the investigation activities, the samples analyzed for TPH were analyzed without using silica gel cleanup to remove natural organic matter from the samples. Those samples that contained detectable concentrations of TPH were subsequently reanalyzed following silica gel cleanup. For samples where data are available for samples with and without silica gel cleanup, the results for the post-silica gel cleanup samples were used in the risk assessment, as these more accurately represent site conditions at the OMC.

The specific methods used to select and/or develop the Tier-1, -2, and -3 risk-based standards for each receptor population at the OMC are presented below. A comparison of the sampling results to these standards for each of the potential receptor populations and exposure routes is also presented.

5.3 AIRPORT WORKERS

Airport workers evaluated as receptors include both indoor and outdoor workers. The only complete exposure pathway identified for airport workers is inhalation of volatile chemicals from soil and/or ground water. No direct contact with soils and/or ground water containing COCs is anticipated to occur due the presence of pavement or structures throughout the OMC and ground water is not used as a drinking water source. Therefore, no inhalation of dusts, ingestion of soils or ground water, or dermal contact with soils or ground water is anticipated to occur for airport workers at the OMC. Based on the complete inhalation exposure pathway for volatile chemicals in soil and ground water for airport workers, risk assessment for these exposure pathways was performed as described below.

5.3.1 Tier-1 Evaluation

The Tier-1 evaluation for exposures to airport workers included the comparison of volatile chemical concentrations in soil and ground water to generic ESLs for commercial/industrial workers. These ESLs are presented in Table B of the ESL Report, *Environmental Screening Levels, Shallow Soils (≤3m bgs), Groundwater is not a Current or Potential Source of Drinking Water*. The generic ESLs for commercial/industrial workers are the most conservative ESLs developed for construction worker exposures as well as direct and indirect exposures to routine indoor and outdoor commercial/industrial workers. The ESLs were derived for a carcinogenic risk level of $1x10^{-5}$ and a non-carcinogenic hazard index of 0.2. Exposure pathways for soil and ground water included in the derivation of these generic ESLs include inhalation of volatiles; however, they also include inhalation of dust, ingestion of soil, and dermal contact with soil, which are not considered to be complete exposure pathways at OMC. The Table B ESLs assume shallow soil and ground water and that ground water at the site is not a source of drinking water, which is consistent with OMC conditions.

Table 13A presents a comparison of the volatile chemical concentrations in soil to the generic Tier-1 values for airport workers. Chemical concentrations exceeding their respective Tier-1 values are highlighted in the tables. As shown, the chemicals detected in soil at concentrations exceeding the Tier-1 values for airport workers included:

- Total purgeable petroleum hydrocarbons, total petroleum hydrocarbons (TPH) as diesel, and TPH as jet fuel at one soil sampling location (W-B-7 in AOC 2); and
- TPH as motor oil at two locations (W-B-23 in AOC 9 and W-B-33 in AOC 19).

Tables 13C and 13D present a comparison of the volatile chemical concentrations in ground water to the Tier-1 values for airport workers. Chemical concentrations exceeding their respective Tier-1 values are highlighted in the table. As shown, the chemicals detected in ground water at concentrations exceeding the Tier-1 values for airport workers included:

- 1,1-DCA at one monitoring well location (ERM-MW-05 in AOC 1) during one of two sampling events at this well;
- Naphthalene at two monitoring well locations (ERM-MW-01 in AOC 1 and ERM-MW-09 in AOC 2) during one of two sampling events at each well;
- Xylenes at one monitoring well location (ERM-MW-09 in AOC 2) during one of two sampling events at this well; and
- TPH as diesel at one monitoring well location (ERM-MW-09 in AOC 2) during one of two sampling events at this well.

A Tier-2 evaluation was conducted for those chemicals listed above that exceeded their respective Tier-1 standards in soil and/or ground water, as described below.

5.3.2 *Tier-2 Evaluation*

For volatile chemicals in soil and ground water that were detected at a concentration that exceeded the generic Tier-1 standards, more site-specific Tier-2 standards were selected for comparison. The Tier-2 standards for indoor and outdoor airport workers at the OMC consisted of the ESLs developed for commercial/industrial exposures as presented in Table E-1a of the ESL Report, *Groundwater Screening Levels for Evaluation of Potential Indoor Air Impacts (volatile chemicals only)*, and Table E-1b, *Soil Screening Levels for Evaluation of Potential Indoor Air Impacts (volatile chemicals only)*. ERM conservatively selected the ground water ESLs from Table E-1a for sites with high permeability vadose zone soil conditions (as opposed to low to moderate permeability condition values). The ESLs were derived for a carcinogenic risk level of $1x10^{-5}$ and a non-carcinogenic hazard index of 0.2. These values are for indoor air exposures to volatiles; however, protection of outdoor receptors is considered to be accommodated through the evaluation of indoor exposures, since indoor air is subject to less circulation and will contain higher chemical concentrations than outdoor air. These ESLs are considered appropriate for site-specific conditions at the OMC where airport workers are anticipated only to come into contact with chemicals in soil and ground water via inhalation of volatiles.

Table 14 presents a comparison of the chemical concentrations in ground water that exceeded their respective generic Tier-1 values for protection of airport worker to the Tier-2 values. As shown, no VOCs were detected in ground water at concentrations that exceeded their respective Tier-2 values for protection of airport workers. Additionally, as shown in Table 13A and discussed above, no VOCs were detected in soil at concentrations that exceeded their respective Tier-1 values for protection of airport workers. Therefore, no Tier-3 evaluation was required for VOCs; however, individual VOCs were compared to Tier-2 standards to address TPH as described below.

An ESL standard for inhalation of TPH for protection of commercial/industrial workers was not available in Tables E-1a and E-1b of the ESL Report. Because the only compounds in soil that exceeded their generic Tier-1 values for protection of airport workers were TPH mixtures, no table is included in this report that presents a comparison of these compounds to Tier-2 values. TPH is a complex mixture of chemicals with a wide range of volatilities and health effects that varies based on the refined fraction, as well as weathering, such that it is difficult to derive an individual screening level for inhalation exposures to TPH. As presented in the ESL report, the risks posed by exposure to TPH are those associated with the individual volatile components of the TPH mixture. Therefore, the risks posed to airport workers by the inhalation of TPH in soil and ground water at the OMC are assessed as the volatile components of TPH.

As described above, VOCs in ground water were not detected at concentrations that exceeded their respective Tier-2 standards for protection of airport workers. Likewise, VOCs in soil were not detected at concentrations that exceeded their respective Tier-1 standards for protection of airport workers. The lack of Tier-2 exceedances in ground water and Tier-1 exceedances in soil includes volatile components of TPH such as BTEX compounds. **Therefore, the risks associated with the presence of TPH exceeding the Tier-1 standards are not considered to exceed acceptable concentrations for the protection of airport workers since none of the VOCs detected in soil and ground water at the OMC exceed their respective Tier-2 standards for protection of airport workers.**

5.4 *CONSTRUCTION WORKERS*

Construction workers are considered to be a potentially exposed population at the OMC. Complete exposure pathways for construction workers are related to direct contact with soils during excavation activities. Exposure routes of concern include inhalation of volatile chemicals in soil, inhalation of dust, dermal contact with soil, and ingestion of soil. Contact with contaminated ground water is considered unlikely due to the routine construction practice of pumping out any collected water prior to conducting activities in excavations. Risk assessment for complete exposure pathways for construction workers due to contact with soils containing COCs was performed.

5.4.1 *Tier-1 Evaluation*

The Tier-1 evaluation for exposures to airport workers included the comparison of volatile chemical concentrations in soil and ground water to generic ESLs for commercial/industrial workers. These ESLs are presented in Table B of the ESL Report, *Environmental Screening Levels, Shallow Soils (≤3m bgs), Groundwater is not a Current or Potential Source of Drinking Water.* The generic ESLs for commercial/industrial workers are the most conservative ESLs developed for construction worker exposures as well as direct and indirect exposures to routine indoor and outdoor commercial/industrial workers. The ESLs were derived for a carcinogenic risk level of $1x10^{-5}$ and a non-carcinogenic hazard index of 0.2. Soil exposure pathways included in these generic ESLs include inhalation (of volatiles and dust), ingestion, and dermal contact. The Table B ESLs assume shallow soil and ground water and that ground water at the site is not a source of drinking water, which is consistent with OMC conditions.

Tables 13A and 13B present a comparison of the chemical concentrations in soil to the generic Tier-1 values for construction workers. Chemical concentrations exceeding their respective Tier-1 values are highlighted in these tables. As shown, the chemicals detected in soil at concentrations exceeding the Tier-1 values include:

- TPH as diesel and jet fuel at one location (W-B-7 in AOC 2);
- TPH as motor oil at two locations (W-B-23 in AOC 9 and W-B-33 in AOC 19);
- Arsenic at six soil sampling locations (W-B-8 in AOC 2, W-B-10 and W-B-12 in AOC 3, and W-B-31, W-B-34, and W-B-35 in AOC 19);
- Cadmium at three soil sampling locations (W-B-10 and W-B-12 in AOC 3, and W-B-28 in AOC 19);
- Total chromium at eight soil sampling locations (W-B-1, W-B-2, and W-B-3 in AOC 5, W-B-5 in AOC 1, W-B-12 in AOC 3, W-B-23 in AOC 9, and W-B-25 and W-B-31 in AOC 19);
- Copper at one soil sampling location (W-B-12 in AOC 3);
- Molybdenum at one soil sampling location (W-B-12 in AOC 3); and
- Nickel at one soil sampling location (W-B-12 in AOC 3).

These Tier-1 exceedances were present at generally isolated locations at the site (primarily at AOCs 2 and 3, which are adjacent to each other, and AOC 19). As discussed previously, no ground water exposures were evaluated for construction workers because this is not considered a complete exposure pathway. A Tier-2 evaluation was conducted for the chemicals listed above that exceeded their respective generic Tier-1 standards in soil, as described below.

5.4.2 *Tier-2 Evaluation*

For chemicals in soil that were detected at concentrations that exceeded their respective generic Tier-1 standards, more site-specific Tier-2 standards were selected for comparison. The Tier-2 soil standards selected for construction worker exposures for at the OMC were construction worker ESLs, as presented in Table K-3 of the ESL Report, *Direct-Exposure Screening Levels, Construction/Trench Worker Exposure Scenario*. The ESLs for construction workers in Table K-3 for soil exposures include inhalation (of volatiles and dust), ingestion, and dermal contact. The ESLs were derived for a carcinogenic risk level of $1x10^{-5}$ and a non-carcinogenic hazard index of 0.2. These ESLs are considered appropriate for site-specific conditions at the OMC where construction workers are the only population that is anticipated to come into direct contact with soils containing COCs.

Table 15 presents a comparison of the chemical concentrations in soil that exceeded their respective Tier-1 values to the Tier-2 values. As shown, the only chemicals that were detected in soil at concentrations that exceeded their respective Tier-2 values for construction workers include:

- Arsenic at two sampling locations (W-B-10 in AOC 3 and W-B-34 in AOC 19); and
- Cadmium at one sampling location (W-B-12 in AOC 3).

Arsenic was detected at concentrations of 25 and 32 mg/kg, which exceed the Tier-2 standard (16 mg/kg) for protection of construction workers. Cadmium was detected at a concentration of 44 mg/kg, which slightly exceeds its Tier-2 standard (38 mg/kg) for protection of construction workers. Due to the exceedances of the Tier-2 standards for protection of construction workers for arsenic and cadmium, a Tier-3 risk assessment was conducted to further assess the risks posed by these two compounds.

In addition to arsenic and cadmium, a Tier-3 risk assessment was also conducted for total chromium in soils. As presented in Table 15, no Tier-2 standard for total chromium in soil for the protection of construction workers is found in Table K-3 of the ESL Report. Table K-3 does include standards for trivalent chromium and hexavalent chromium; however, the differences between these standards was several orders of magnitude and ERM did not feel it was appropriate to apply either standard for comparison to the total chromium values detected in soil. Therefore, ERM conducted a Tier-3 risk assessment for the total chromium concentrations detected in site soil.

5.4.3 *Tier-3 Evaluation*

For the Tier-3 risk assessment for arsenic, cadmium, and total chromium in soil at the OMC, ERM conducted a statistical analysis of the arsenic, cadmium, and total chromium concentrations to better assess the overall risks posed by these metals in site soils. ERM also conducted a comparison of the arsenic, cadmium, and total chromium concentrations in site soils to typical background concentrations in soil in the Bay Area. These evaluations are described below.

Tier-3 Statistical Evaluation

ERM calculated the 95th percentile upper confidence limit (UCL) of the mean of the arsenic, cadmium, and total chromium concentrations in soil at the OMC. The 95 percent UCL of the mean indicates that the mean of samples from the site would be equal to or less than the calculated UCL value 95% of the time. This statistical approach was utilized to provide a sense for the overall concentrations of the metals of interest because the construction worker scenario would involve excavation. The 95 percent UCL mean concentrations were calculated assuming normal, lognormal, and non-parametric distribution of the concentrations at the site. Each of these potential distributions of chemical concentrations in soil was evaluated to ensure that the proper distribution was accounted for in analyzing site conditions. The 95 percent UCL mean for the normal and lognormal concentration distribution assumptions were calculated using the Student's t method (Devore, 1991) and the Land method (Land, 1975), respectively. The 95 percent UCL mean for the non-parametric concentration distribution assumption was calculated using Hall's Bootstrap method (USEPA, 2002c). The 95 percent UCL means of the arsenic and cadmium concentrations were then compared to the Tier-2 soil standards for arsenic and cadmium to assess the risk posed by the presence of these compounds for construction workers at the OMC. The 95 percent UCL means of the total chromium concentrations were compared to the Tier-1 soil standard for total chromium to assess the risk posed by the presence of chromium for construction workers at the OMC. The 95 percent UCL mean calculations for arsenic, cadmium, and total chromium in soil are included in Table 16.

As shown in Table 16, the 95 percent UCL means for arsenic in soil were calculated to range from 3.13 to 4.17 mg/kg, all of which are less than the Tier-2 standard for arsenic of 16 mg/kg. Similarly, the 95 percent UCL means for cadmium in soil were calculated to range from 1.08 to 2.29 mg/kg, all of which are less than the Tier-2 standard for cadmium of 38 mg/kg. Finally, the 95 percent UCL means for total chromium in soil were calculated to range from 31.2 to 35.0 mg/kg, all of which are less than the Tier-1 standard for total chromium of 58 mg/kg. All of the 95 percent UCL mean concentrations for metals are below their respective standards for protection of construction workers. This statistical evaluation indicates that the overall concentrations of these metals in soil are below Tier-2 standards, although a limited number of isolated exceedances exist (2 for arsenic and 1 for cadmium). These exceedances are addressed in light of background conditions below.

Tier-3 Background Evaluation

As described in Section 4.3 and Appendix I, the presence of metals (including arsenic, cadmium, and chromium) in OMC soils is interpreted to be related primary and possibly completely to background concentrations in fill soils used to originally develop the OMC property. The concentrations of arsenic, cadmium, and chromium were compared to the range of typical background values for these metals in soil to assess the isolated exceedances of Tier-2 (arsenic and cadmium) or Tier-1 (chromium) standards. The range of background concentrations for these chemicals were taken from the values listed in Table 5 and described in Appendix I.

The arsenic concentrations detected in soil at the OMC are presented in Figure 26. As shown, the range of arsenic concentrations detected in soil at the OMC (non-detect to 32 mg/kg) is generally consistent with the range of background arsenic concentrations presented in Table 4 (1.2 to 31 mg/kg). Since no sources for arsenic impacts in soil from OMC operations were identified during ERM's review of the history and operations at the OMC, the range of concentrations are generally consistent with background, and no hotspots were identified, the presence of arsenic in soil is likely associated with background conditions. This includes the two Tier-2 exceedances (W-B-10 in AOC 3 at 25 mg/kg and W-B-34 in AOC 19 at 32 mg/kg).

The cadmium concentrations detected in soil at the OMC are presented in Figure 27. As shown, the range of cadmium concentrations detected in soil (non-detect to 44 mg/kg) were also generally within the range of background (0.27 to 3.3 mg/kg), with the exception of elevated detections (greater than 3.3 mg/kg) in the former aircraft wash rack area (including the single elevated detection {44 mg/kg} at W-B-12 in AOC 3 exceeding the Tier-2 standard {38 mg/kg} for protection of construction workers) and along the northern edge of the pavement (W-B-28, W-B-32, and W-B-33). Sample location W-B-12 is also the only location where leachable concentrations of chemicals (cadmium and copper) were detected at concentrations exceeding their STLC values (see Table 9 and Section 4.3). The only potential source of cadmium identified from operations at the OMC is cadmium possibly present in aircraft wash water at the aircraft wash rack. As discussed in Section 2.2.3, the wash water treatment system that was formerly located adjacent to the aircraft wash rack was installed to address metals (primarily cadmium and copper) in aircraft wash water. The isolated, elevated detections of cadmium in this area may be a result of former aircraft washing operations.

The total chromium concentrations measured in soil at the OMC are presented in Figure 28. As shown, the range of total chromium concentrations detected in soil at the OMC (2.8 to 190 mg/kg) is generally consistent with the range of background chromium concentrations for the Bay Area presented in Table 4 (10 to 142 mg/kg) with the exception of two elevated detections (greater than 142 mg/kg) in the former vehicle maintenance center (AOC 5). No sources for chromium impacts in soil from OMC operations in AOC 5 were identified during ERM's review of the history and operations at the OMC, except for possibly aircraft wash water from the aircraft wash rack. The aircraft wash rack is located a significant distance from AOC 5 and no elevated chromium concentrations were detected in this area. Detections of chromium at 7 locations (W-B-1, W-B-2, W-B-3, W-B-5, W-B-12, W-B-23, and W-B-25) exceed the Tier-1 standard of 58 mg/kg; however, all of the chromium in soil at the site is interpreted to be related to background conditions. Chromium is a common constituent in Bay Area soils due to the presence of chromite ($FeCr_2O_4$) associated with serpentinite bodies in the Franciscan Formation (Davis, 1966).

Tier-3 Evaluation Summary – Construction Worker

Based on the comparison of the 95 percent UCL means of the arsenic, cadmium, and total chromium concentrations in soil to their Tier-1 (for total chromium) and Tier-2 (for arsenic and cadmium) standards for protection of construction workers, **the concentrations of these chemicals in site soil are not considered to pose an unacceptable health risk to construction workers at the OMC**. Isolated detections above Tier-1/2 standards are statistically insignificant for a construction scenario. For arsenic and chromium, the detected concentrations in soil are likely a result of background conditions at the OMC. The majority of cadmium detections in soil are also likely a result of background conditions at the OMC. Slightly elevated concentrations of cadmium in soil in AOC 3 may be a result of former operations in this area; however, the limited extent of these elevated detections and absence of an ongoing source indicates no further actions are needed to address the cadmium detections.

5.5 *ECOLOGICAL RECEPTORS*

Potential ecological receptors that were identified include off-site aquatic fauna and flora in San Francisco Bay and wetlands located in the vicinity of the OMC. As discussed previously, ground water containing COCs at the OMC may have the potential to migrate to the Bay or wetlands via utility conduits (storm sewer lines) that run from the OMC to the Bay and nearby wetlands.

The leaching of chemicals in OMC soils into ground water and subsequent migration into surface water via utility conduits is another potential pathway for ecological receptors to be exposed to site impacts. However, as described previously, little or no soil impacts were detected during investigation activities at the OMC. The absence of soil impacts is likely due to the presence of shallow ground water throughout the OMC and the absence of any continuing sources at the site. The incremental impacts due to the leaching of chemicals from soil to ground water is considered to be negligible compared to the concentrations of chemicals detected in OMC ground water. Therefore, to assess the ecological impacts in surface waters, the migration of chemicals detected in ground water to surface water is considered to include the soil to ground water pathway.

Based on the complete exposure pathway for ecological receptors in the Bay or wetlands, risk assessment for this exposure pathway was performed as described below.

5.5.1 *Tier-1 Evaluation*

The Tier-1 evaluation for exposures to ecological receptors consisted of a comparison of the detected chemical concentrations in ground water to generic ESLs for estuarine waters, as presented in Table F of the ESL Report, *Environmental Screening Levels, Surface Water Bodies.* The generic ESLs in Table F for estuarine waters are the more conservative of the generic ESLs developed for fresh and marine waters. These generic ESLs assume no dilution of chemicals in site ground water as it migrates and discharges to the Bay or wetlands. These ESLs include consideration of human consumption of aquatic fauna that have bioaccumulated chemicals in surface waters containing COCs.

Tables 13C through 13E present a comparison of the chemical concentrations in ground water to the Tier-1 values for ecological receptors. Chemical concentrations exceeding their respective Tier-1 values are highlighted in the tables. As shown, the chemicals detected in ground water at concentrations exceeding the Tier-1 values include:

- 1,1-DCA at one monitoring well location (ERM-MW-5 in AOC 1) during one of two sampling events at this well;
- 1,1-DCE at one monitoring well location (ERM-MW-5 in AOC 1) during one of two sampling events at this well and at another monitoring well location (ERM-MW-17 in AOC 7) in one of two samples collected during the same sampling event at this well;
- Naphthalene at two monitoring well locations (ERM-MW-1 in AOC 1 and ERM-MW-9 in AOC 2) during one of two sampling events at each well location;

- Xylenes at one monitoring well location (ERM-MW-9 in AOC 2) during one of two sampling events at this well;
- TPH as diesel at one monitoring well location (ERM-MW-9 in AOC 2) during one of two sampling events at this well;
- Arsenic at one grab ground water sampling location (W-B-16 in AOC 7) and two monitoring well locations (UAL-MW-1 and UAL-MW-4 in AOC 17) during two sampling events at these wells;
- Beryllium at one grab ground water sampling location (W-B-32 in AOC 14);
- Cadmium at one grab ground water sampling location (ERM-B-7 in AOC 2);
- Cobalt at one grab ground water sampling location (ERM-B-1 in AOC 1);
- Copper at two grab ground water sampling locations (ERM-B-7 in AOC 2 and W-B-32 in AOC 14) and one monitoring well location (ERM-MW-06 in AOC 2) during one sampling event at this well;
- Lead at one grab ground water sampling location (W-B-32 in AOC 14) and four monitoring well locations (ERM-MW-06, ERM-MW-07, ERM-MW-08, and ERM-MW-09 in AOC 2) during one of two sampling events at each of these wells;
- Nickel at 19 ground water sampling locations (see Table 13E for locations); and
- Zinc at one grab ground water sampling location (W-B-8 in AOC 2).

With the exception of nickel, these Tier-1 exceedances were generally at isolated locations. Nickel was detected at concentrations exceeding the Tier-1 standards at locations throughout the site. As discussed previously, no evaluation of soil concentrations for ecological receptors was conducted because this was not considered a complete exposure pathway (no on-site soil receptors) and because it was considered to be accommodated through the evaluation of ground water concentrations (for leaching of soil impacts into ground water).

5.5.2 *Tier-2 Evaluation*

For chemicals in ground water that were detected at a concentration that exceeded the Tier-1 standards, more site-specific Tier-2 standards were developed for comparison for ecological receptors. The development of the Tier-2 standards for ecological receptors consisted of first selecting the most conservative of the ESLs for surface water presented in Table F-4a of the ESL Report, *Summary of Selected Chronic Aquatic Habitat Goals*. This table accounts for chronic exposure to chemicals in surface water by ecological receptors for fresh and marine waters.

The selected ESL value for surface water selected above was then multiplied by a dilution attenuation factor (DAF) derived to account for dilution and attenuation of chemicals in ground water as they migrate to the nearest surface water discharge point in the vicinity of the OMC. The only pathway identified for chemicals in ground water at the OMC to reach surface water is via migration in utility conduits. Therefore, the DAF was required to account for migration of chemicals in ground water within utility conduits. The DAF equation used to account for this migration was the DAF equation derived by the RWQCB for preferential ground water flow in utility conduits at SFIA, as presented in *RWQCB Order 99-045, Revised Site Cleanup Requirements for the San Francisco International Airport, San Mateo County, California* (RWQCB, 1999).

As described in the Order, "...a fate and transport model was used to calculate the Dilution Attenuation Factor (DAF) a contaminant source would receive as it migrates via a preferential pathway to the Bay." The Order further states, "...the relation between a contaminant source's distance to the Bay and the allowable DAF can be approximated by the following simplified equation: DAF = (Distance in feet) divided by 100."

ERM believes this equation derived for SFIA is appropriate to use for calculating the DAF for chemical migration in utility conduits at the OMC because the site characteristics of SFIA and OMC are very similar, including:

- Both sites are used for similar airport-related activities.
- Each site is located in close proximity to the Bay.
- The surface features of both sites consist of paved surface areas and structures.
- The geology and hydrogeology of both sites consists of fill underlain by Bay Mud.
- Both sites contain shallow ground water with flow limited by the presence of varying fill materials such that preferential flow in utility conduits is the primary route for potential chemical migration toward surface water.

Using the RWQCB's DAF equation, ERM calculated a DAF value to be used for evaluating potential chemical migration from ground water at the OMC to surface water. Rather than evaluating different DAFs for migration from each area of concern at the OMC, ERM determined the shortest distance between COCs in ground water at the OMC exceeding Tier-1 standards and a surface water discharge point via migration in utility conduits leaving the OMC. This shortest route consisted of migration through the storm drain running from the west side of the OMC hangar building south, along Neil Armstrong Drive, to the Bay. This approach uses the most conservative DAF that can be derived for transport to surface water via storm sewers.

The distance between COCs in ground water at the OMC and the Bay via this migration route is approximately 2,750 feet. This results in a DAF of 27.5 using the RWQCB DAF equation. This DAF value of 27.5 was subsequently multiplied by the selected ESLs from Table F-4a to calculate the Tier-2 ground water concentrations for comparison to chemical concentrations in ground water at the OMC.

Table 17 presents a comparison of the chemical concentrations in ground water that exceeded their respective Tier-1 values to the Tier-2 values. As shown, the only chemical that was detected in ground water at a concentration that exceeded its respective Tier-2 value for ecological receptors was nickel at three monitoring well locations (ERM-MW-08, ERM-MW-09, and ERM-MW-14). At two of these monitoring wells (ERM-MW-08 and ERM-MW-09), nickel was only detected at a concentration exceeding the Tier-2 standard during one of two sampling events. At the third monitoring well location (ERM-MW-14), only one sampling event has been performed.

Due to the exceedance of the Tier-2 standard for protection of ecological receptors for nickel in ground water, a Tier-3 risk assessment was conducted to assess the risks posed to ecological receptors by nickel in OMC ground water.

5.5.3 *Tier-3 Evaluation*

ERM conducted a statistical analysis of the nickel concentrations in ground water to better assess the overall risks posed by nickel in site ground water. ERM also conducted a further evaluation of the dilution and attenuation that would occur to nickel in site ground water as it migrated toward potential receptors. These assessments are described below.

Tier-3 Statistical Evaluation

ERM calculated the 95^{th} percentile UCL mean of the nickel concentrations in ground water at the OMC. The 95 percent UCL mean concentration was calculated assuming normal, lognormal, and non-parametric distribution of the nickel concentrations at the site. Each of these potential distributions of nickel concentrations in ground water was evaluated to ensure that the proper distribution was accounted for in analyzing site conditions. The 95 percent UCL means of the nickel concentrations were then compared to the Tier-2 ground water standard for nickel to assess the risk posed by the presence of nickel for ecological receptors at the OMC. The calculation of the 95^{th} percentile UCL means of the nickel concentrations in ground water at the OMC is shown in Table 18.

As shown, the 95 percent UCL means of the nickel concentrations in ground water were calculated to range from 0.097 to 0.117 mg/L, all of which are less than the

Tier-2 standard for nickel of 0.240 mg/L. Therefore, the site-wide concentrations of nickel in ground water are below the Tier-2 standards.

Tier-3 Additional DAF Evaluation

As discussed in Section 5.5.2 above, the Tier-2 standards for protection of ecological receptors were derived assuming that chemical migration would occur in ground water via preferential flow within utility conduits from the shortest distance of COCs in ground water at the OMC to the nearest surface water discharge point. However, the DAF calculated for the derivation of the Tier-2 standards did not account for dilution and attenuation of chemical concentrations as they migrated through the aquifer to reach the nearest preferential pathway (utility conduit). Since none of the three locations where nickel was detected at a concentration exceeding the Tier-2 standards were immediately adjacent to a preferential pathway, additional assessment of the dilution and attenuation of nickel as it migrates toward the nearest preferential pathway was conducted.

For monitoring wells ERM-MW-08 and ERM-MW-09 in the aircraft wash rack area, the nearest preferential pathway for the elevated nickel detections to migrate to is the storm drain extending north from the northeast corner of the aircraft wash rack (Figure 29). As discussed in Section 4.1, the ground water flow direction measured in the aircraft wash rack area has been variable, but has included flow in the direction from the wells toward this storm drain. Therefore, migration toward this storm drain was evaluated. As discussed above, the nickel concentrations at ERM-MW-08 and ERM-MW-09 only exceeded the Tier-2 standard during one of two sampling events; therefore, migration behavior observed during the higher-concentration sampling event was assessed.

As shown in Figure 29, monitoring well ERM-MW-10 is located between ERM-MW-08 and ERM-MW-09 and this storm drain. During the monitoring event when elevated nickel detections were observed at ERM-MW-08 and ERM-MW-09, the concentration of nickel at ERM-MW-10 was 0.12 mg/L, which is less than the Tier-2 standard of 0.23 mg/L and the nickel concentrations measured at ERM-MW-08 and ERM-MW-09 (0.24 and 0.37 mg/L). Based on these data, it appears that during migration from beneath the aircraft wash rack toward the storm drain, the concentrations of nickel are reduced to below the Tier-2 standard due to attenuation in the aquifer. Therefore, the presence of nickel at concentrations exceeding the Tier-2 standards in ground water beneath the aircraft wash rack does not appear to result in ground water containing unacceptable nickel concentrations reaching the storm drain and thus resulting in potentially unacceptable exposures to ecological receptors.

For the elevated detection of nickel at ERM-MW-14 (0.59 mg/L), the nearest preferential migration conduit is the storm drain along the along the eastern side of the hangar building (see Figure 29). As discussed in Section 4.1, all ground water monitoring events at the OMC have indicated that ground water flow in the vicinity of the hangar building is toward the east. No monitoring wells are located between ERM-MW-14 and the storm drain to the east that would allow an empirical evaluation of the reduction of nickel concentrations as it migrates towards this potential preferential pathway. Therefore, modeling was used to estimate a DAF to account for the dilution and attenuation in nickel concentrations as it migrates towards the storm drain.

The dilution and attenuation modeling was conducted using the Domenico model (Louisiana Department of Environmental Quality, 2002). Table 19 includes the equations, assumptions, and inputs used to calculate the DAF using the Domenico model. As shown, to conduct the modeling ERM assumed the following:

- A single continuous source of one chemical compound dissolved in the ground water (only dissolved nickel was detected at elevated concentrations in ground water at ERM-MW-14);
- No initial ground water contamination (the current concentration at the storm drain is uncertain because no monitoring wells are located in this area; however, other monitoring wells in the vicinity of the east side of the hangar have non-detectable nickel concentrations in ground water);
- Chemical compound is non-reactive (this is considered a conservative assumption because there are potentially complex interactions between nickel and the other various metals in OMC ground water, which could reduce nickel migration);
- Ground water flow is in one direction (based on all monitoring events at the OMC, ground water flow in the hangar area is toward the east);
- Saturated zone is homogeneous and isotropic (based on the presence of fill throughout the saturated zone, this is likely not the case but is considered conservative as flow in other directions would reduce the concentration of nickel reaching the storm drain);
- Contaminant plume is a planar source spreading laterally infinitely in two directions and vertically finitely in one direction (no barriers to lateral migration exist in the immediate area of interest, but the Bay Mud beneath the site does act as an aquitard);
- The compliance point is within the maximum distance from when the source occurred and where it could have migrated at the ground water flow velocity (the source of nickel is unknown and likely related to filling of the site at the time of construction (background); therefore, the time that impacts have been present at the site is approximately 30 years indicating that sufficient time has

passed such that nickel could have migrated beyond the compliance point [i.e., storm drain east of the hangar building]);

- The DAF is based on the estimated contaminant concentration at the center line of the plume (this is the maximum concentration that would reach the storm drain and is therefore the concentration of interest);
- The plume's vertical depth is assumed to be the full thickness of the ground water stratum, which is approximately 10 feet based on the thickness of fill in the ground water aquifer (the presence of nickel was conservatively assumed to have already migrated to the base of the fill aquifer such that no dilution and attenuation in the vertical direction was included in the calculations);
- The distance from ERM-MW-14 to the storm drain along the eastern side of the hangar building is approximately 400 feet (this is the migration distance of interest for the model);
- The width of the source area plume for nickel is 80 feet (this is the distance to the nearest monitoring well); and
- The ground water flow velocity is 90 feet per year (this is the average ground water flow velocity at the site based on aquifer testing described in Section 4.1 and Appendix F).

As shown in Figure 30, using the Domenico model with the assumptions listed above a DAF of 3.32 was calculated for migration of nickel from ERM-MW-14 to the nearest storm drain. When this DAF is applied to the Tier-2 nickel standard of 0.23 mg/L, the resulting Tier-3 standard is 0.76 mg/L. A comparison of the nickel detection at ERM-MW-14 of 0.59 mg/L to this Tier-3 standard indicates that the presence of nickel at a concentration exceeding the Tier-2 standard in ground water beneath the hangar building will not result in ground water containing unacceptable nickel concentrations reaching the storm drain and potentially resulting in unacceptable exposures to ecological receptors.

Tier-3 Evaluation Summary - Ecological Receptor

Based on the comparison of the 95 percent UCL means of nickel concentrations in ground water to the Tier-2 standard for protection of ecological receptors, the limited extent of nickel impacts exceeding the Tier-2 standard, and the dilution and attenuation of nickel concentrations during migration within the aquifer to preferential flow pathways, the nickel concentrations in site ground water are not considered to pose an unacceptable health risk to ecological receptors at the OMC.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations of the site investigation and risk assessment are presented below.

6.1 CONCLUSIONS

The subsurface investigation addressed VOCs, SVOCs, TPH, polychlorinated biphenyls, and metals in soil and ground water. In addition, the Port of Oakland conducted its own soil and ground water investigation at the OMC. The analytical results generated during the Port of Oakland investigation are also included in this report to present a comprehensive evaluation of all relevant data. Between the two investigations, a total of 147 soil samples were collected and analyzed. Fifty-one grab ground water samples and 48 monitoring well samples were collected and analyzed during the investigations. The analytical results were compared to screening criteria and regulatory standards commonly used for sites under RWQCB and DTSC oversight to direct additional investigation and determine that investigation activities were adequately completed.

During the investigation, silts and fine sands comprising the artificial fill were encountered between ground surface and approximately 13 feet bgs. Young Bay Mud, an aquitard, was encountered below the artificial fill and was characterized by dark gray silts and clays with abundant shell fragments. The lower contact of the Young Bay Mud was not encountered during this investigation. The stratigraphy encountered during the investigation is consistent with the general geology of the East Bay Plain. Regional ground water flow in the aquifers beneath the Young Bay Mud generally follows topography with flow from the east to the west. Ground water at the site was encountered within the artificial fill at depths ranging from 2 to 8 feet bgs. Ground water monitoring events at the OMC indicate the variability of ground water flow direction and gradient within the fill unit. Sanitary and storm sewers occur at depths greater than 5 feet bgs and, therefore, possibly intersect the ground water table in a number of areas. It is possible that ground water could preferentially flow within the backfill of these sewers, although it is unknown whether the backfill is more permeable than the surrounding fill unit.

A water supply well survey was also performed as part of the investigation. The nearest water supply well locations are approximately 1 mile east of the OMC and are screened in aquifers below the Young Bay Mud. Given the distance of the identified water supply wells from the OMC and the lack of pumping from the artificial fill unit, it is unlikely that releases at the OMC have the potential to migrate to the water supply wells. In addition, ERM reviewed a RWQCB report on the beneficial uses of ground water within the OMC area. The report indicates that ground water within the shallow artificial fill along the Bay-front is unlikely to be used as a source of drinking water due to high TDS, the potential for saltwater intrusion, elevated levels of coliform from leaking sewer pipes, low yield, and the requirement for 50-foot well seals for new water supply wells.

Soil analytical results generated during this investigation indicated the presence of VOCs, TPH, and metals within soils at the OMC. VOCs were detected at low concentrations (below both residential and industrial PRGs established by USEPA) within 4 of the 19 AOCs (AOCs 1 through 3 and AOC 9). TPH was detected at generally low concentrations in samples collected from 10 of the 19 AOCs (AOCs 1 through 5, AOC 9, AOC 11, AOC 14, AOC18, and AOC 19). Only four samples from three AOCs (AOC 2, AOC 9, and AOC 19) contained concentrations in excess of their respective RWQCB ESL indicating that TPH above regulatory screening levels is isolated within the OMC. Metals, which occur naturally in soil, were detected in samples from all 13 AOCs (AOCs 1 through 3, AOC 5, AOCs 7 through 10, AOC 13, AOC 14, AOC 16, AOC 18, and AOC 19) that were investigated for metals. The majority of metals concentrations detected in soil sample were within the range of Bay Area background concentrations and none of the metals concentrations detected in soil exceeded their respective industrial PRGs.

Ground water results of samples collected during this investigation indicated the presence of VOCs, TPH, and metals in OMC ground water. VOCs were detected at low concentrations in samples collected from 8 of the 17 AOCs investigated for VOCs. Samples collected from 5 of the AOCs (AOC 1, AOC 5, AOC 7, AOC 17, and AOC 18) contained concentrations above California MCLs. VOC concentrations above MCLs in two of the AOCs are attributed to offsite sources (AOC 7 and AOC 18). TPH was detected at generally low concentrations in samples collected from 14 of the 17 AOCs (AOCs 1 through 7, AOC 9, AOC 11, AOC 12, and AOC 14 through 17) investigated for TPH. Concentrations of samples collected from 3 of the AOCs (AOC 2, AOC 3, and AOC 5) were in excess of their respective RWQCB ESL. Metals, which occur naturally in ground water, were detected in all 11 AOCs (AOCs 1 through 3, AOC 5, AOCs 7 through 9, AOC 14, AOCs 17 through 19) investigated for metals. Concentrations of samples collected in six of the AOCs exceeded their respective MCL. Metals detected above their MCLs may be attributed to background conditions.

A site-specific risk assessment was performed to evaluate the results of the subsurface investigation. A conceptual site model was developed to identify potential exposure routes and populations for media containing COCs at the OMC. The conceptual site model included an overview of site features, surface water hydrology, geology, and ground water flow, as well as the identification of potential receptor populations and an evaluation of exposure pathways to determine if they are complete. The CSM identified three potential receptor populations to be retained for the risk assessment: Indoor and Outdoor Airport Workers, Construction Workers, and Ecological Receptors. The risk assessment addressed the complete pathways for each of these receptor populations.

The risk assessment consisted of a three-step process. The first step (Tier-1) consisted of comparison of detected soil and/or ground water chemical concentrations to their RWQCB ESLs. If an ESL was not established for a compound, then PRGs or MCLs were used depending on the media. For chemicals that exceeded their Tier-1 standard, a Tier-2 risk assessment was conducted. The Tier-2 risk assessment consisted of the application of site-specific information to either select a more appropriate ESL for the particular receptor population and exposure pathway or to derive standards specific to the OMC. For chemicals that exceeded the Tier-2 standards for a particular receptor population and exposure pathway, a Tier-3 risk assessment was conducted. The Tier-3 risk assessment consisted of a statistical analysis of the chemical concentrations detected at the site, potential background evaluation for metals, and further evaluation of the exposure pathway in light of site-specific conditions.

As seen in Table ES-1, TPH and selected metals concentrations (arsenic, cadmium, chromium, copper, molybdenum, and nickel) in soil samples collected from 6 AOCs (AOC 1 through 3, AOC 5, AOC 9, and AOC 19) exceeded their Tier-1 standards for airport and/or construction workers. When compared with Tier-2 soil standards, only arsenic, cadmium, and chromium in soil samples from 5 AOCs (AOC 1, AOC 3, AOC 5, AOC 9, and AOC 19) exceed their Tier-2 standards for construction workers. The Tier-3 evaluation of these metals indicates that the Tier-2 exceedances are isolated outliers. In addition, the concentrations of arsenic and chromium detected were generally within the range of background concentrations.

VOCs, TPH, and selected metals in ground water samples collected from 6 (AOCs 1 through 3, AOC 7, AOC 14, and AOC 17) of the 19 AOCs contained concentrations in excess of their Tier-1 standards for airport workers, construction workers, and/or ecological receptors. When compared to Tier-2 standards, only concentrations of nickel in ground water from two AOCs (AOC 1 and 2) exceeded its Tier-2 standard for ecological receptors. The Tier-3 evaluation of nickel indicates that its Tier-2 exceedances are isolated outliers and could be related to background conditions due to the common occurrence of nickel within Bay Area soils and the presence of imported fill at the OMC. In addition, the Tier-2 standards for the protection of ecological receptors assumed preferential flow through utility corridors to the nearest surface water discharge point and did not account for dilution and attenuation of concentrations as they migrated through the aquifer to the nearest preferential pathway. Therefore, additional assessment of the dilution and attenuation was conducted as part of the Tier-3 evaluation.

This assessment indicates that the presence of nickel above Tier-2 standards at the OMC will not result in ground water containing unacceptable concentrations of nickel reaching surface water bodies.

6.2 *RECOMMENDATIONS*

The results of the subsurface investigation and risk assessment indicate that the concentrations of chemicals and metals detected in soil and ground water at the OMC do not pose an unacceptable risk to any of the proposed exposure populations considered including airport workers, construction workers, and ecological receptors. Therefore, no further action is recommended for the 19 AOCs investigated. UAL requests formal approval of the regulatory status of each AOC as recommended herein.

7.0 *REFERENCES*

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Project No. 5310.10
Date: 08/08/03
Drawn By: R. Olson
CAD File: g:\5310\10\SiteLocMap2.dwg

Figure 1

Site Location Map

Former United Airlines Oakland Maintenance Center

Oakland International Airport, Oakland, California

References:
TOPO!®Version 2.6.8 (2001)

ERM *08/03*

Project No. 5310.10
Date: 08/07/03
Drawn By: J. Estrada
CAD File: g:\\5310\10\531032.dwg

N

0 1200
Approx. Scale (feet)

Figure 2
July 2002 Aerial Photograph
of the OMC and Surrounding Area
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California

ERM 08/03

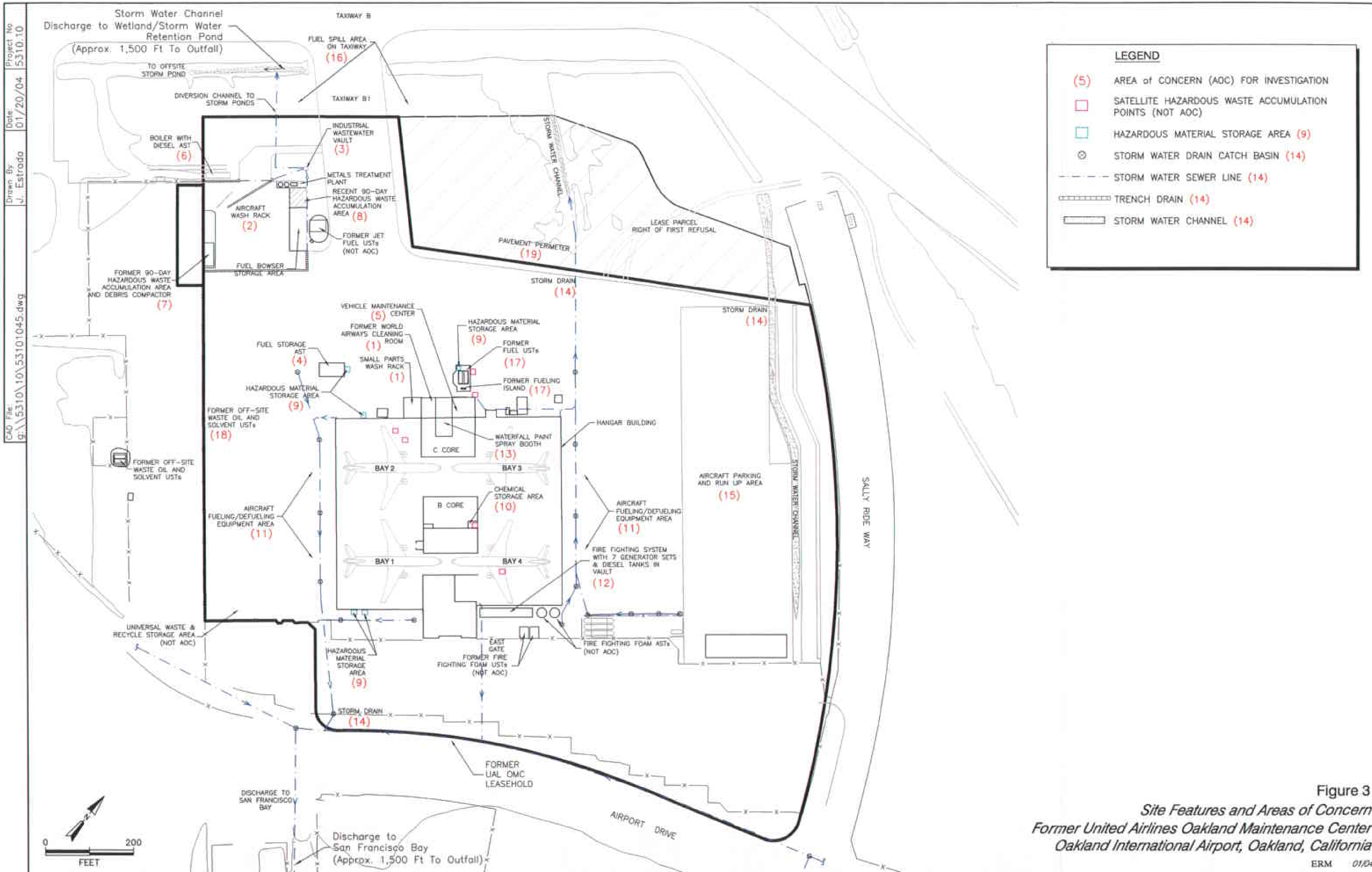

Figure 3
Site Features and Areas of Concern
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California
ERM 01/04

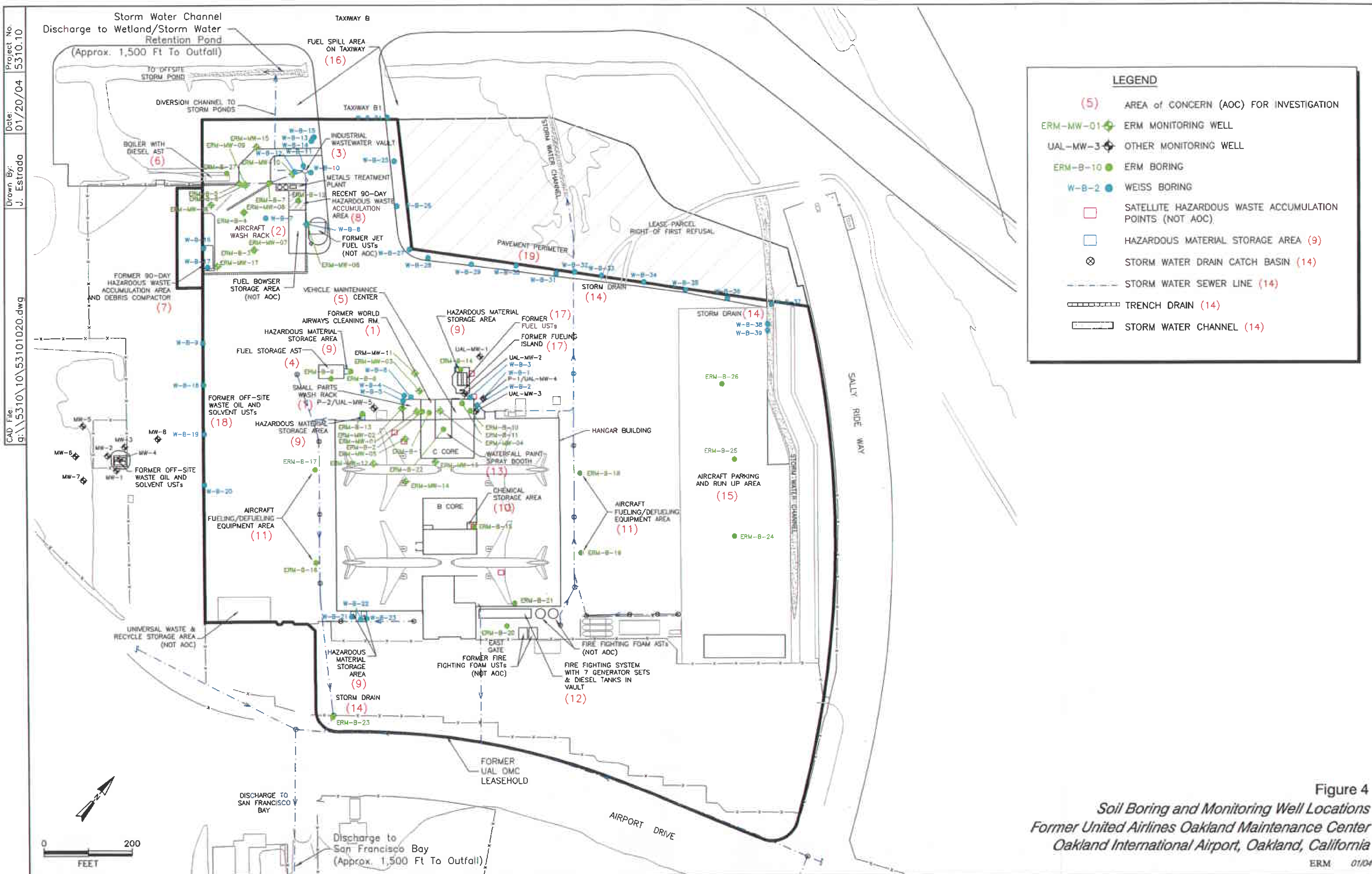

Figure 4
Soil Boring and Monitoring Well Locations
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California

ERM 01/04

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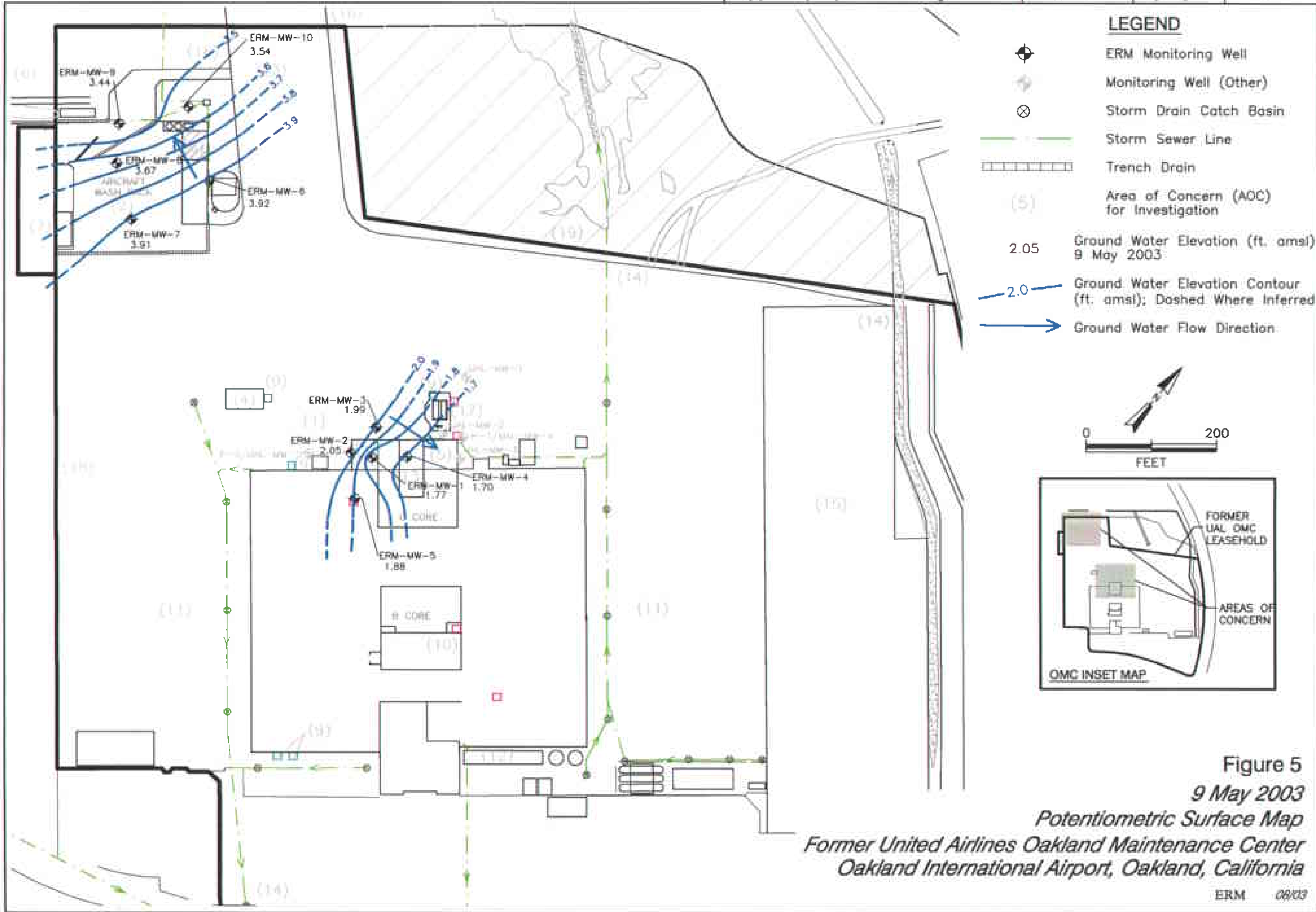

Figure 5
9 May 2003
Potentiometric Surface Map
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California

ERM 08/03

CAD File	Drawn By:	Date:	Project No
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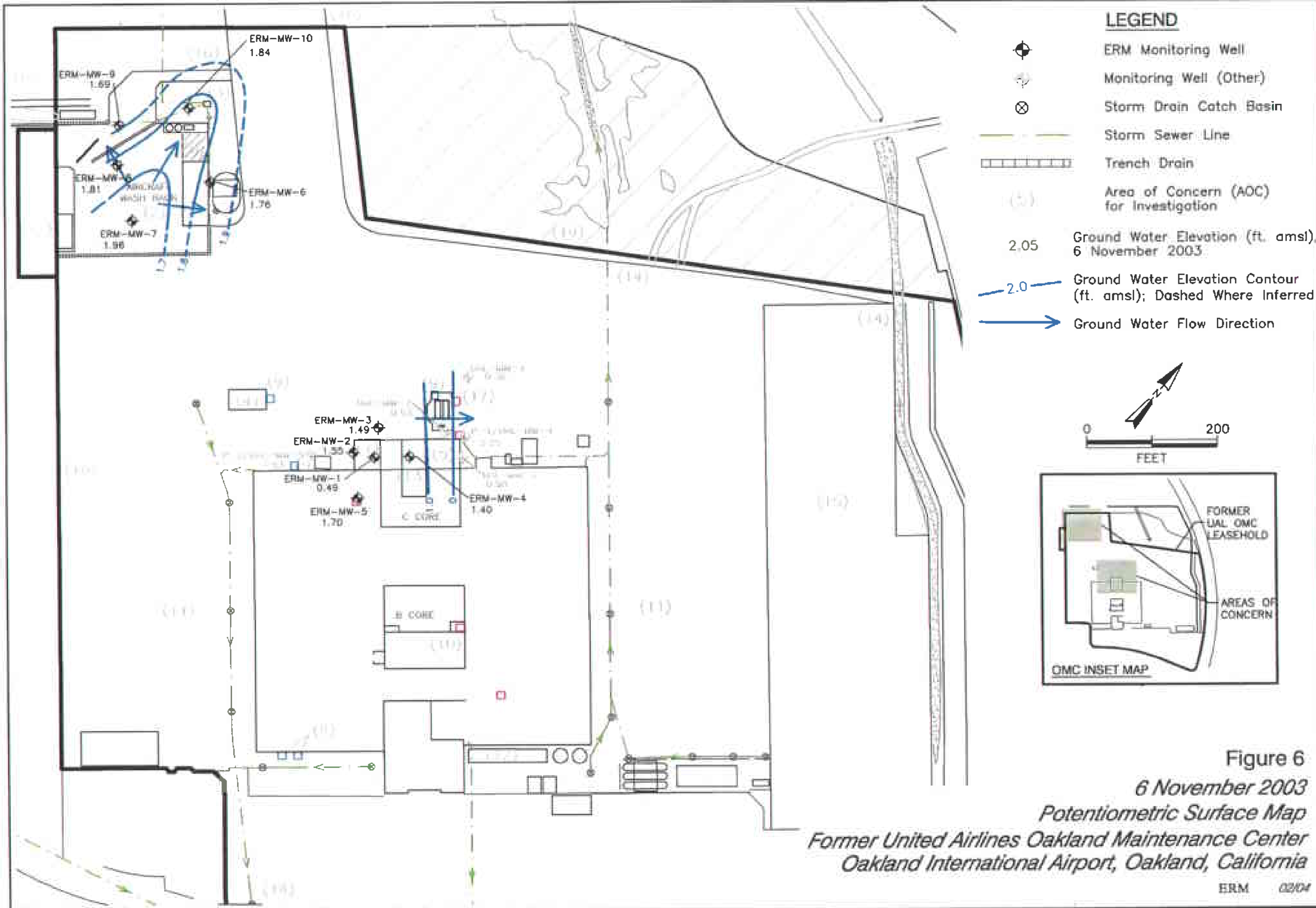

Figure 6

6 November 2003

Potentiometric Surface Map

Former United Airlines Oakland Maintenance Center

Oakland International Airport, Oakland, California

ERM 02/04

CAD File	Drawn By:	Date	Project No
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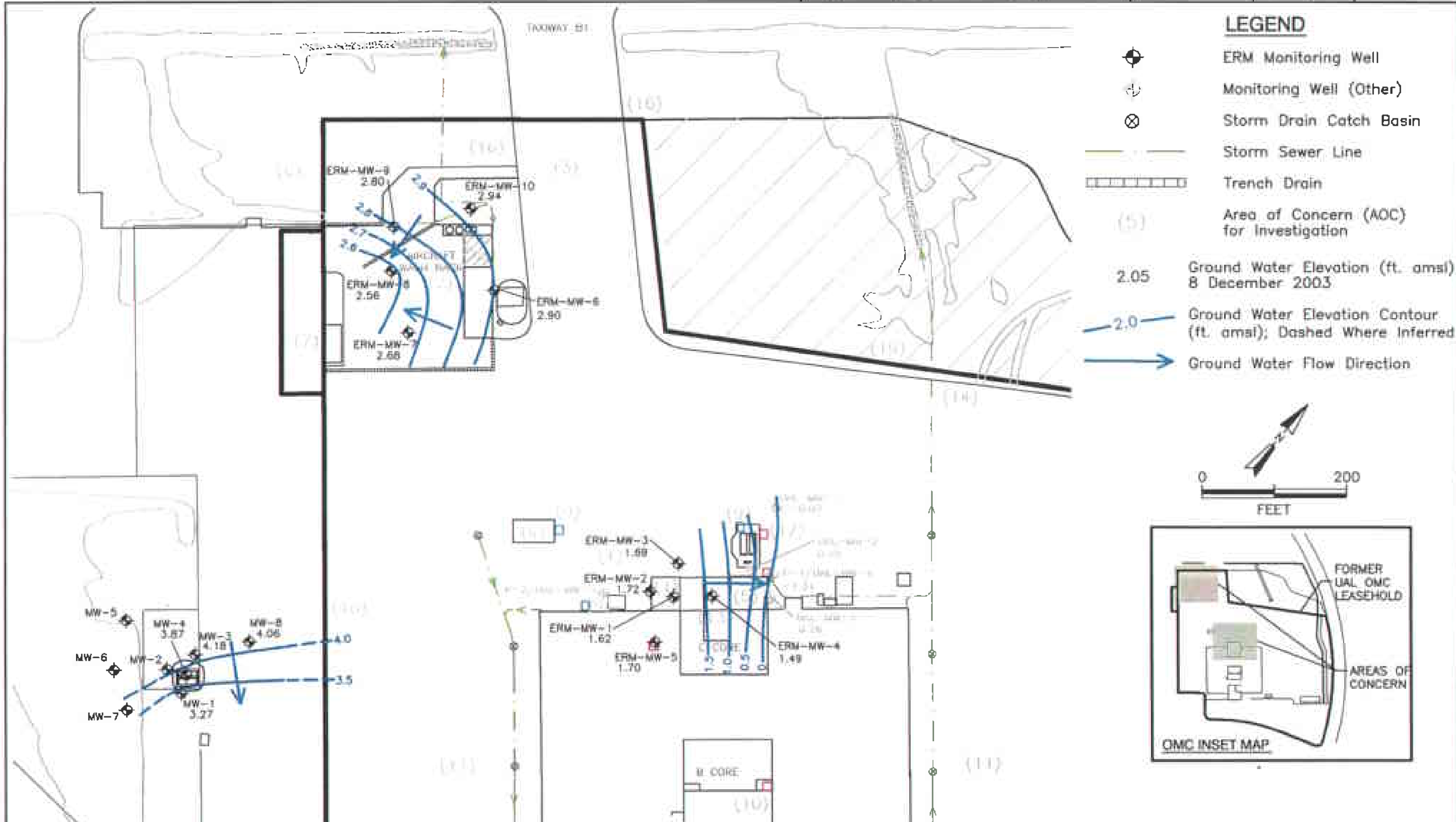

Figure 7

8 December 2003

Potentiometric Surface Map

Former United Airlines Oakland Maintenance Center

Oakland International Airport, Oakland, California

ERM 02/04

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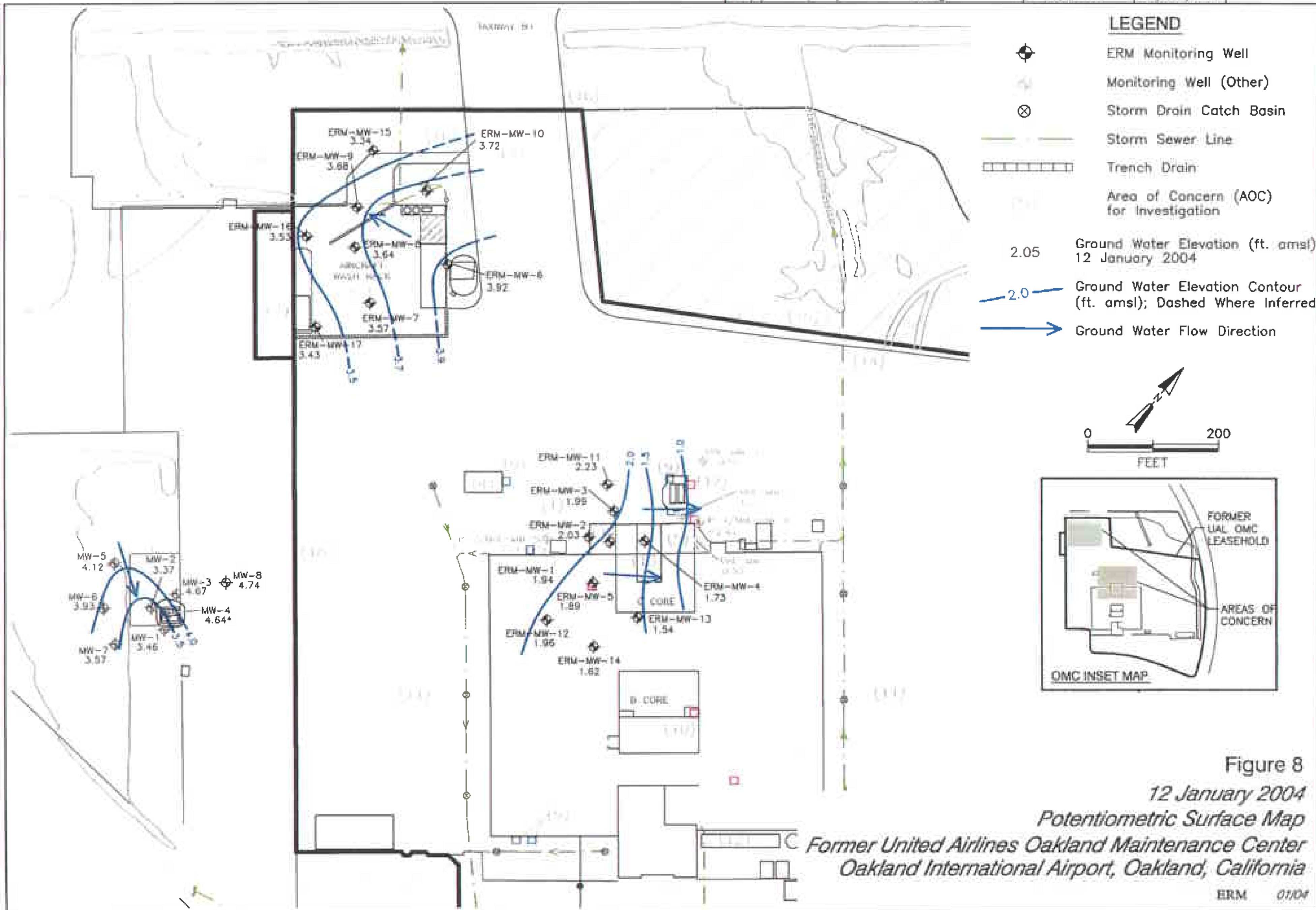


Figure 8

12 January 2004

Potentiometric Surface Map

Former United Airlines Oakland Maintenance Center

Oakland International Airport, Oakland, California

ERM 01/04

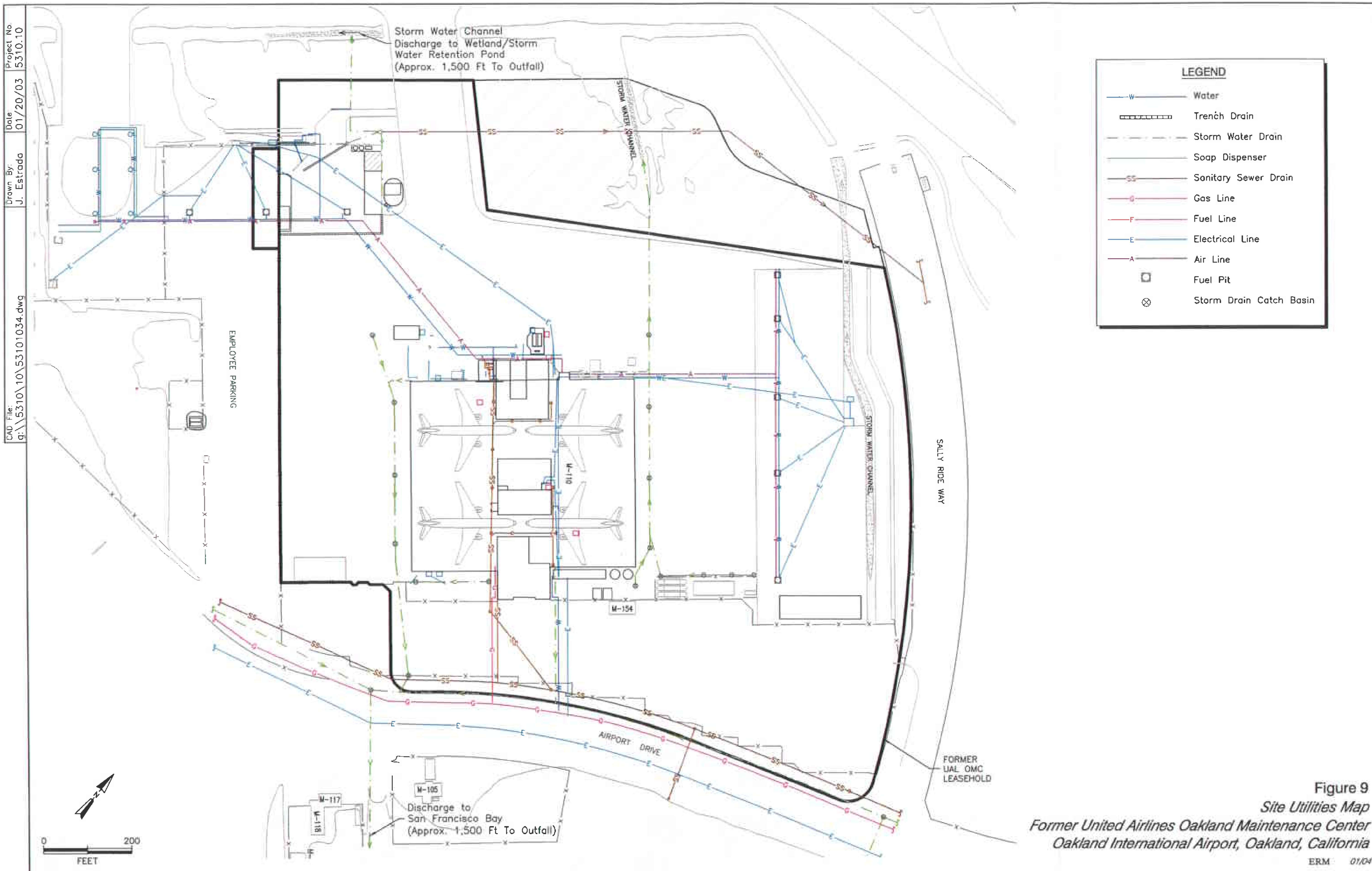
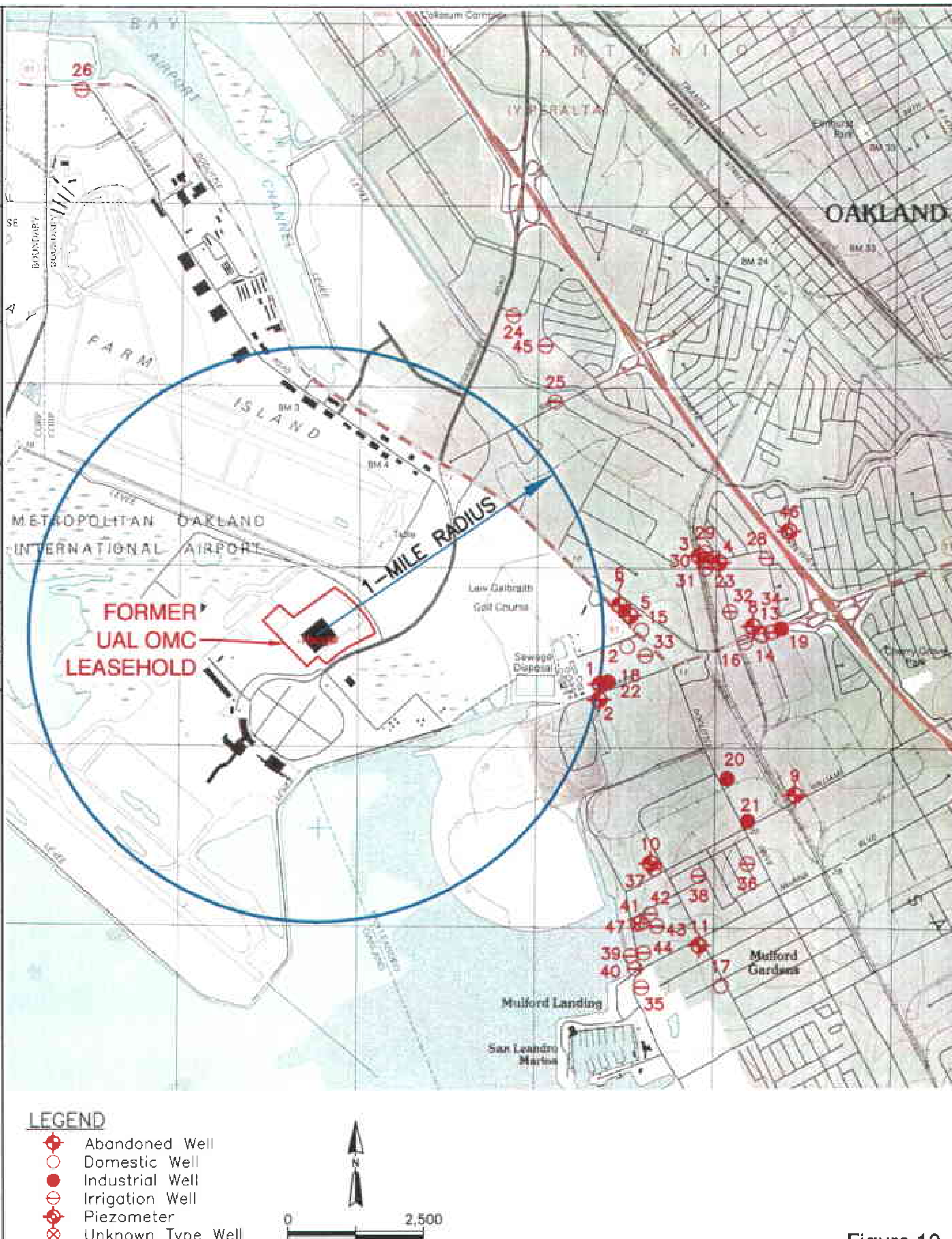


Figure 9
Site Utilities Map
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California
ERM 01/04



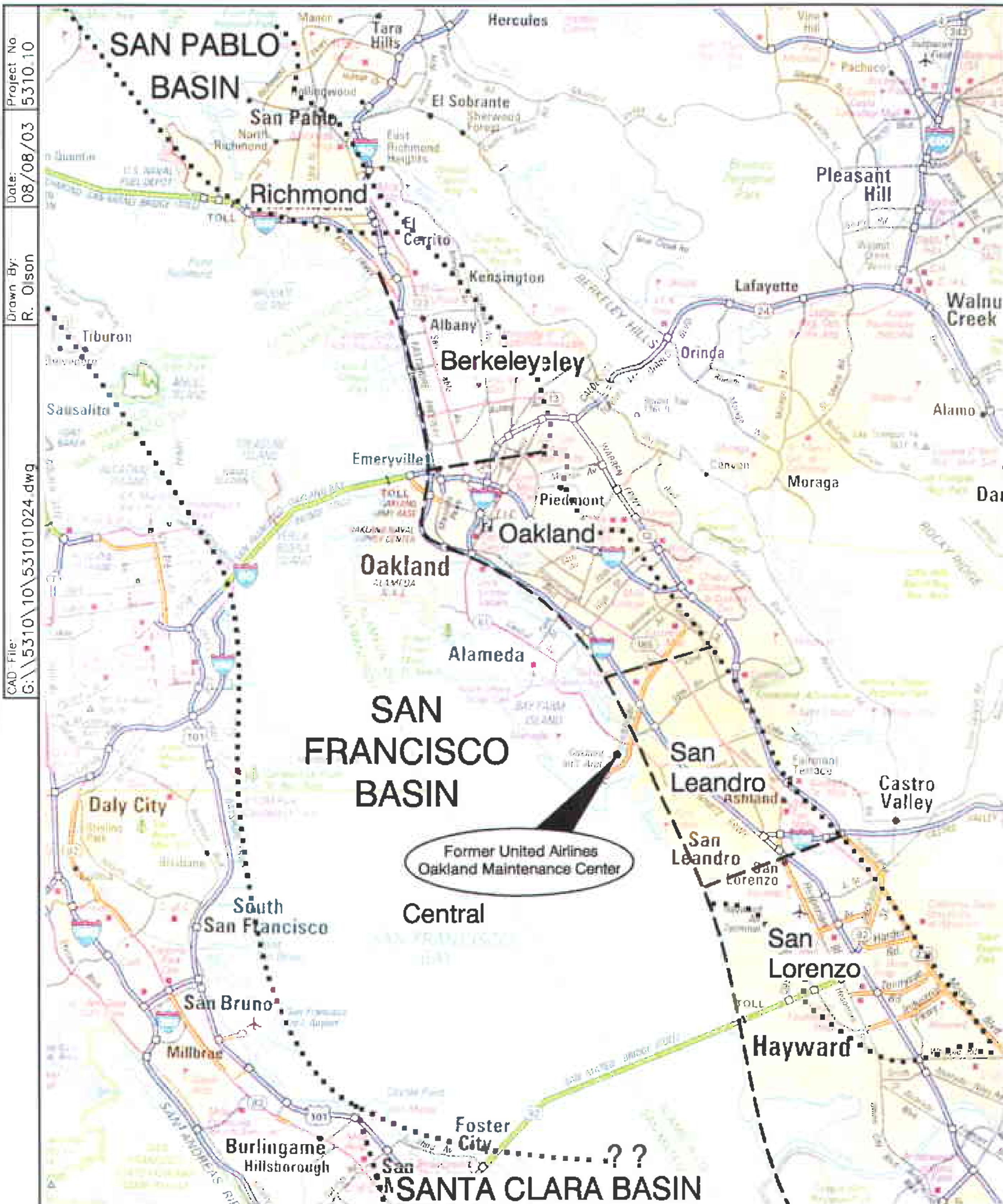
Project No. 5310.10
Date 08/08/03
Drawn By D. Ludlam
CAD File: G:\5310\10\53101025.dwg.dwg

Figure 10

Water Supply Well Locations
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California

ERM 07/03

References:
TOPO!® Version 2.6.8 (2001)



Sources: Rand McNally Road Atlas 1999.
East Bay Plain Groundwater Basin Beneficial Use Evaluation Report, Final Report, May 27, 2003, San Francisco Bay Regional Water Quality Control Board Groundwater Committee.

Figure 11

East Bay Plain Ground Water Basin Sub-Areas
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California

ERM *07/03*

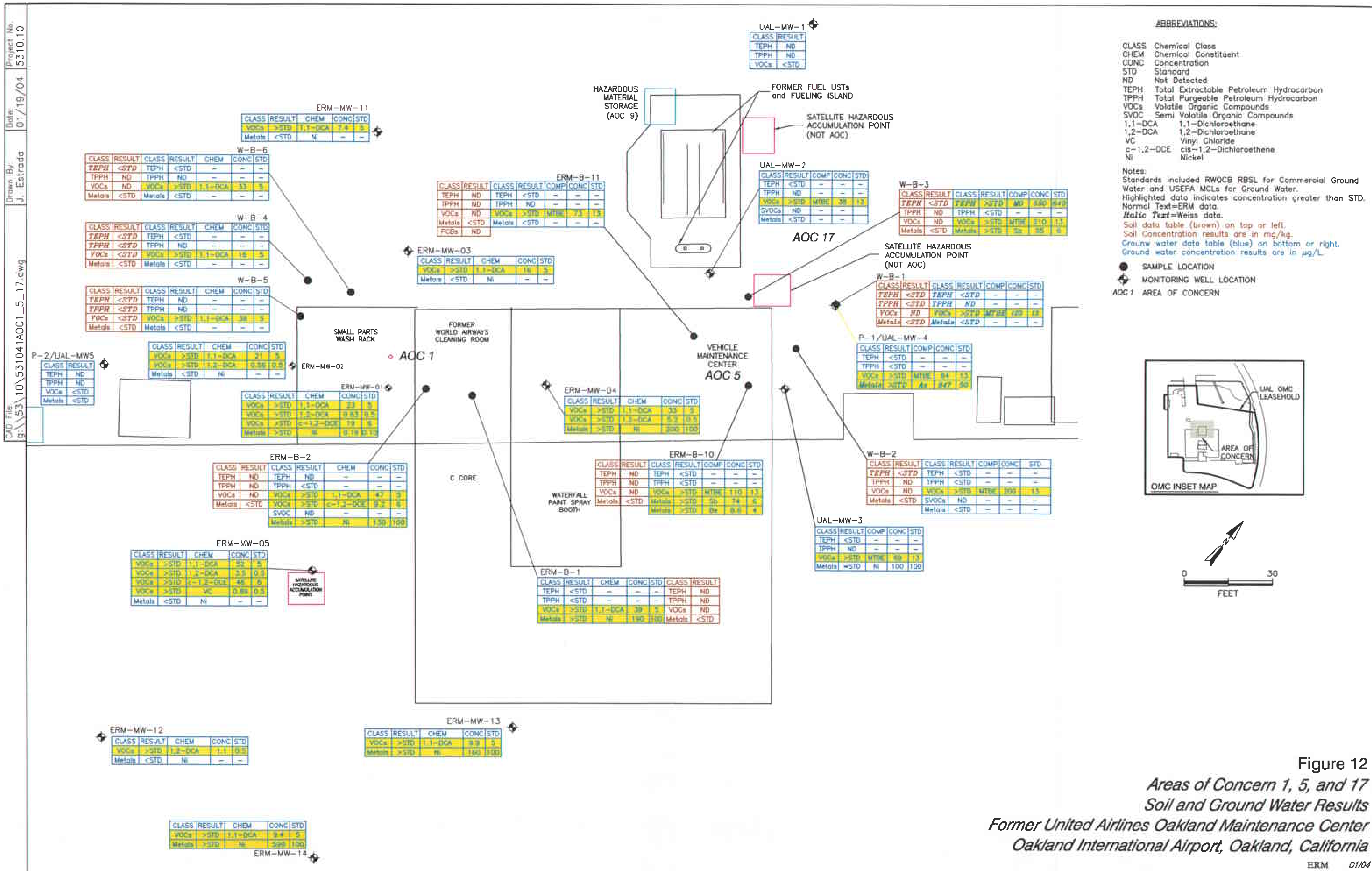


Figure 12

Areas of Concern 1, 5, and 17
Soil and Ground Water Results
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California

ERM 01/04

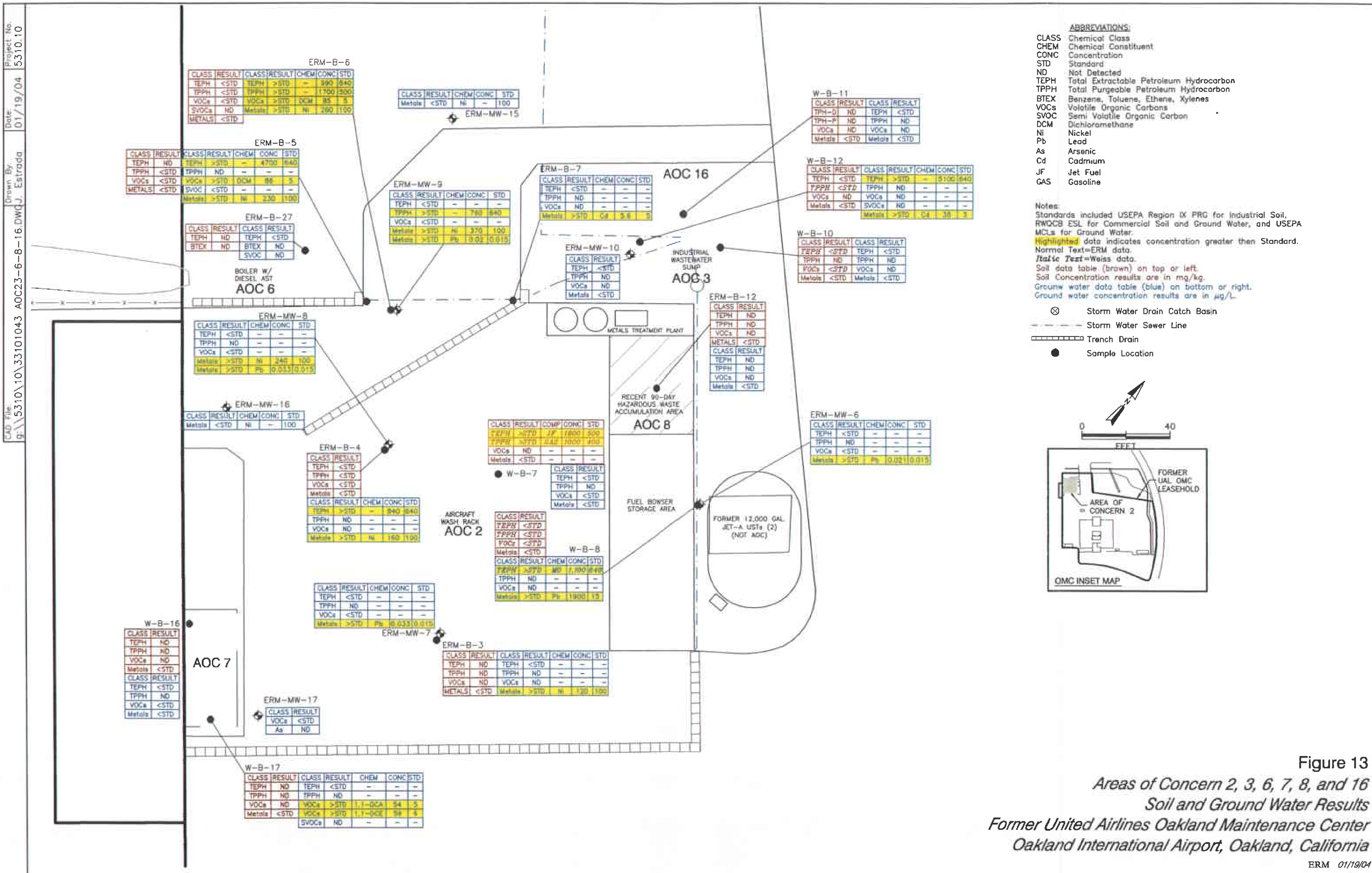
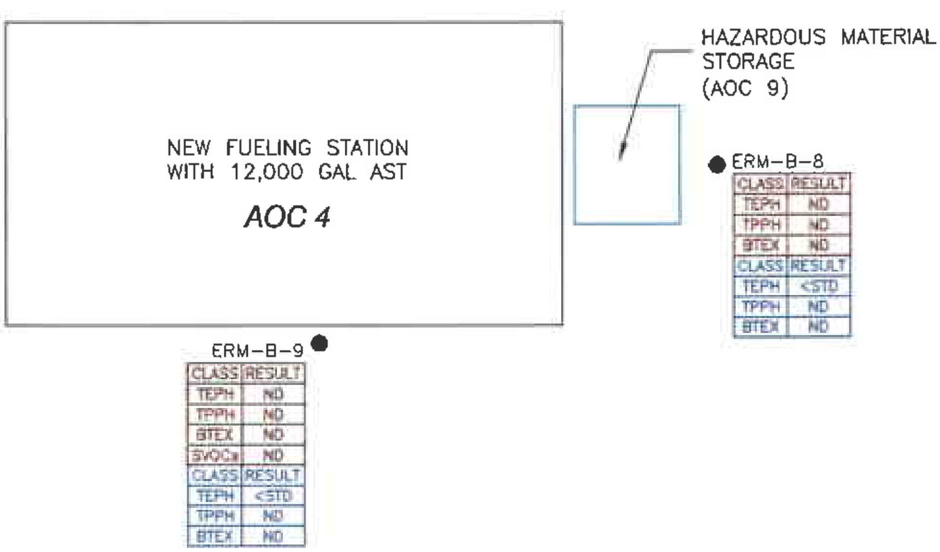


Figure 13
Areas of Concern 2, 3, 6, 7, 8, and 16
Soil and Ground Water Results
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California



ERM-B-8

CLASS	RESULT
TEPH	ND
TPPH	ND
BTEX	ND
CLASS	RESULT
TEPH	<STD
TPPH	ND
BTEX	ND

ERM-B-9

CLASS	RESULT
TEPH	ND
TPPH	ND
BTEX	ND
SVOCs	ND
CLASS	RESULT
TEPH	<STD
TPPH	ND
BTEX	ND

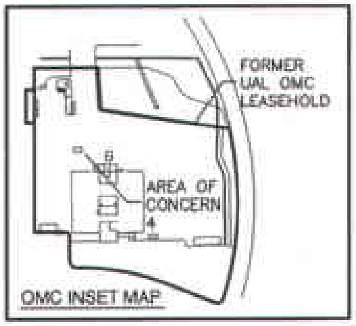
ABBREVIATIONS:

CLASS	Chemical Class
STD	Standard
ND	Not Detected
TEPH	Total Extractable Petroleum Hydrocarbon
TPPH	Total Purgeable Petroleum Hydrocarbon
BTEX	Benzene, Toluene, Ethene, Xylenes

Notes:
Standards included USEPA Region IX PRG for Industrial Soil, RWQCB ESL for Commercial Soil and Ground Water, and USEPA MCLs for Ground Water.
Soil data table (brown) on top.
Soil concentration results are in mg/kg.
Ground water data table (blue) on bottom.
Ground water concentration results are in μg/L.

● Sample Location

AOC 4 Area of Concern



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FEET

Figure 14

Area of Concern 4
Soil and Ground Water Results
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California

ERM 07/03

Project No. 5310.10
Date: 07/08/03
Drawn By: J. Estrada
CAD File: g:\\5310\10\53101007 AOC4.dwg

Project No	Date	Drawn By:	CAD File
5310.10	01/19/04	J. Estrada	g:\5310\10\53101042 AOC7_18.dwg

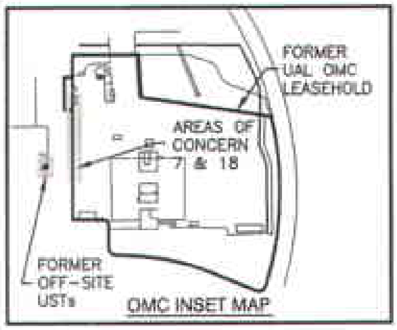
ABBREVIATIONS:

CLASS	Chemical Class
CHEM	Chemical Constituent
CONC	Concentration
STD	Standard
ND	Not Detected
EB	Ethylbenzene
VOCs	Volatile Organic Compounds
SVOCs	Semi Volatile Organic Compounds
1,2-DCE	1,2-Dichloroethene
c-1,2-DCA	cis-1,2-Dichloroethane
c-1,2-DCE	cis-1,2-Dichloroethene
TCE	Trichloroethene
TEPH	Total Extractable Petroleum Hydrocarbon
TPPH	Total Purgeable Petroleum Hydrocarbon
As	Arsenic

Notes:
Standards include USEPA Region IX PRG for Industrial Soil, RWQCB DSL for Commercial Soil and Ground Water, and USEPA MCLs for Ground Water.
Highlighted data indicates concentration greater than Standard.
Normal Text=ERM data.
Italic Text=Weiss data.
Soil data table (brown) on top or left.
Soil concentration results are in mg/kg.
Ground water data table (blue) on bottom or right.
Ground water concentration results are in µg/L.

● Sample Location
⌖ Monitoring Well
AOC 18 Area of Concern

* = Most recent ground water result from monitoring well (1/01).
Off-site data from "Site Closure Report, UST Sites MF25 and MF26, Economy Parking Co., Oakland International Airport".



FORMER 90-DAY HAZARDOUS WASTE ACCUMULATION AREA AND DEBRIS COMPACTOR
AOC 7

W-B-16

CLASS	RESULT
TEPH	ND
TPPH	ND
VOCs	ND
Metals	<STD
CLASS	RESULT
TEPH	<STD
TPPH	ND
VOCs	<STD
Metals	<STD

ERM-MW-17

CLASS	RESULT
VOCs	<STD
As	ND

W-B-17

CLASS	RESULT
TEPH	ND
TPPH	ND
VOCs	ND
Metals	<STD

CLASS	RESULT	CHEM	CONC	STD
TEPH	<STD	-	-	-
TPPH	ND	-	-	-
VOCs	>STD	1,1-DCA	54	5
VOCs	>STD	1,1-DCE	59	6
SVOCs	ND	-	-	-
Metals	*<STD*	-	-	-

W-B-9

CLASS	RESULT	CLASS	RESULT
TEPH	*ND*	*TEPH*	*ND*
TPPH	*ND*	*TPPH*	*ND*
VOCs	ND	VOCs	<STD
Metals	*<STD*	*Metals*	*<STD*

W-B-18

CLASS	RESULT	CLASS	RESULT
TEPH	*ND*	*TEPH*	*ND*
TPPH	*ND*	*TPPH*	*ND*
VOCs	ND	*VOCs*	*ND*
Metals	*<STD*	*Metals*	*<STD*

FORMER OFF-SITE WASTE OIL AND SOLVENT USTs
AOC 18

W-B-19

CLASS	RESULT
TEPH	*ND*
TPPH	*ND*
VOCs	ND
Metals	*<STD*

CLASS	RESULT	COMP	CONC	STD
TEPH	*ND*	-	-	-
TPPH	*ND*	-	-	-
Metals	*ND*	-	-	-
VOCs	>STD	c-1,2-DCE	6.4	6
VOCs	>STD	TCE	56	5

W-B-20

CLASS	RESULT	CLASS	RESULT
TEPH	*ND*	*TEPH*	*ND*
TPPH	*ND*	*TPPH*	*ND*
VOCs	*ND*	*VOCs*	*ND*
Metals	*<STD*	*Metals*	*<STD*

INITIAL TANK EXCAVATION SOIL RESULTS

CLASS	RESULT	CHEM	CONC	STD
TEPH	>STD	-	1,000	500
TPPH	>STD	-	11,000	400
VOCs	>STD	Benzene	190	1.3
VOCs	>STD	EB	150	20
VOCs	>STD	Toluene	580	520
VOCs	>STD	Xylenes	700	420
VOCs	>STD	1,2-DCA	30	6
VOCs	>STD	TCE	100	0.11
Metals	<STD	-	-	-

MW-3*

CLASS	RESULT	CHEM	CONC	STD
TEPH	>STD	-	7200	640
TPPH	>STD	-	2400	500
VOCs	>STD	Benzene	2.3	1

MW-8*

CLASS	RESULT	CHEM	CONC	STD
TEPH	<STD	-	-	-
TPPH	ND	-	-	-
VOCs	>STD	Benzene	1.6	1
VOCs	>STD	1,1-DCA	250	5
VOCs	>STD	1,1-DCE	290	6

MW-5*

CLASS	RESULT
TEPH	<STD
TPPH	<STD
VOCs	ND

MW-4*

CLASS	RESULT	CHEM	CONC	STD
TEPH	>STD	-	3,300	640
TPPH	>STD	-	500	500
VOCs	>STD	Benzene	15	1
VOCs	>STD	1,1-DCA	42	5
VOCs	>STD	1,2-DCE	25	6

MW-6*

CLASS	RESULT
TEPH	ND
TPPH	ND
VOCs	ND

MW-7*

CLASS	RESULT	CHEM	CONC	STD
TEPH	ND	-	-	-
TPPH	ND	-	-	-
VOCs	>STD	1,1-DCA	18	5
VOCs	>STD	1,1-DCE	7.5	6

FORMER OFF-SITE WASTE OIL AND SOLVENT USTs
APPROXIMATE EXTENT OF EXCAVATION

MW-2*

CLASS	RESULT	CHEM	CONC	STD
TEPH	>STD	-	21,000	640
TPPH	>STD	-	2700	500
VOCs	>STD	Benzene	45	1
VOCs	>STD	1,1-DCA	43	5
VOCs	>STD	1,2-DCE	80	6

MW-1*

CLASS	RESULT	CHEM	CONC	STD
TEPH	<STD	-	-	-
TPPH	<STD	-	-	-
VOCs	>STD	Benzene	3	1
VOCs	>STD	1,1-DCA	32	5
VOCs	>STD	1,2-DCE	11	6

N

0 80
FEET

Figure 15

Areas of Concern 7 and 18,
and Former Off-Site Waste Oil and Solvent USTs
Soil and Ground Water Results
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California

ERM *01/04*

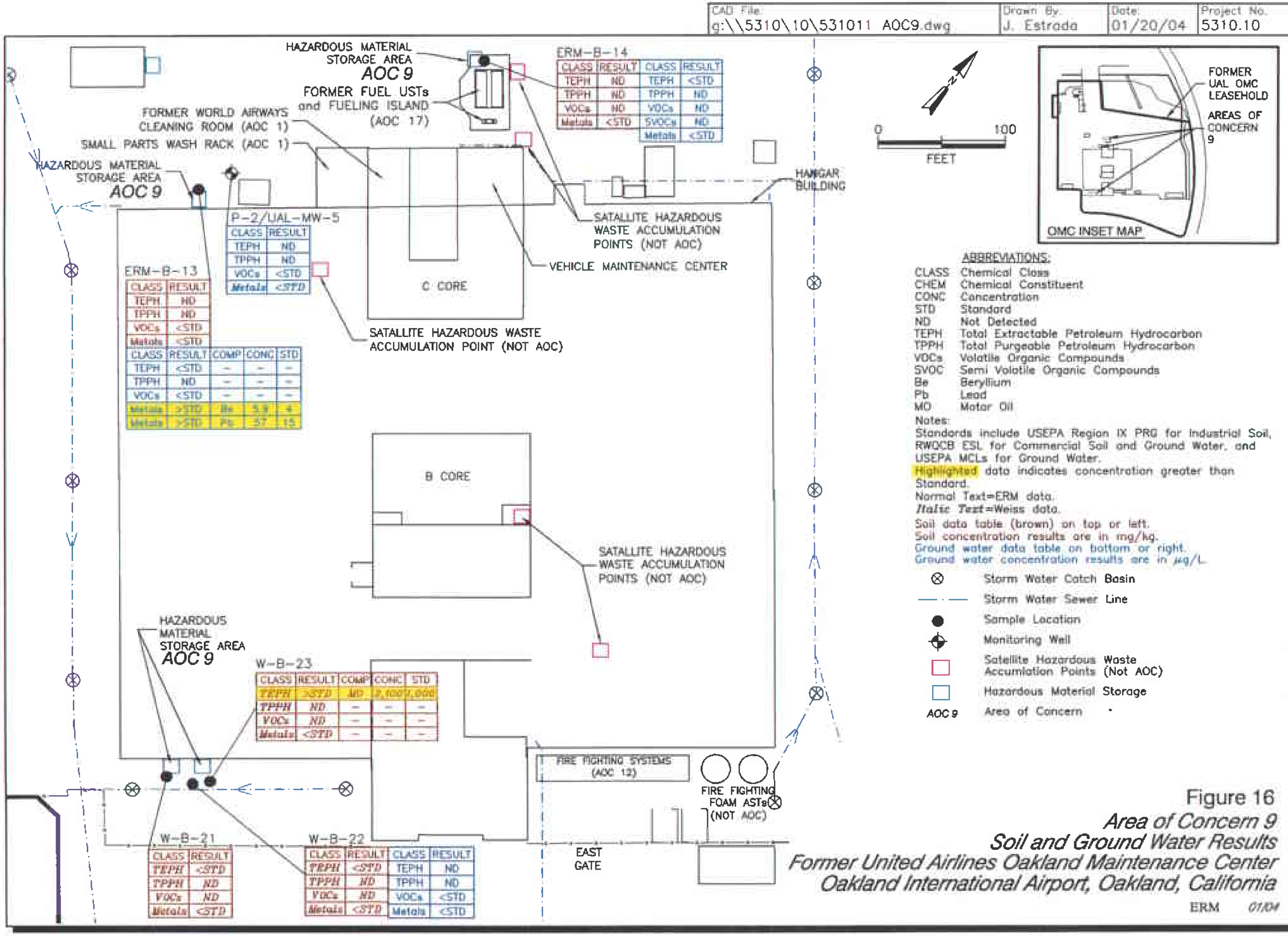


Figure 16
Area of Concern 9
Soil and Ground Water Results
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California

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Date 01/20/04
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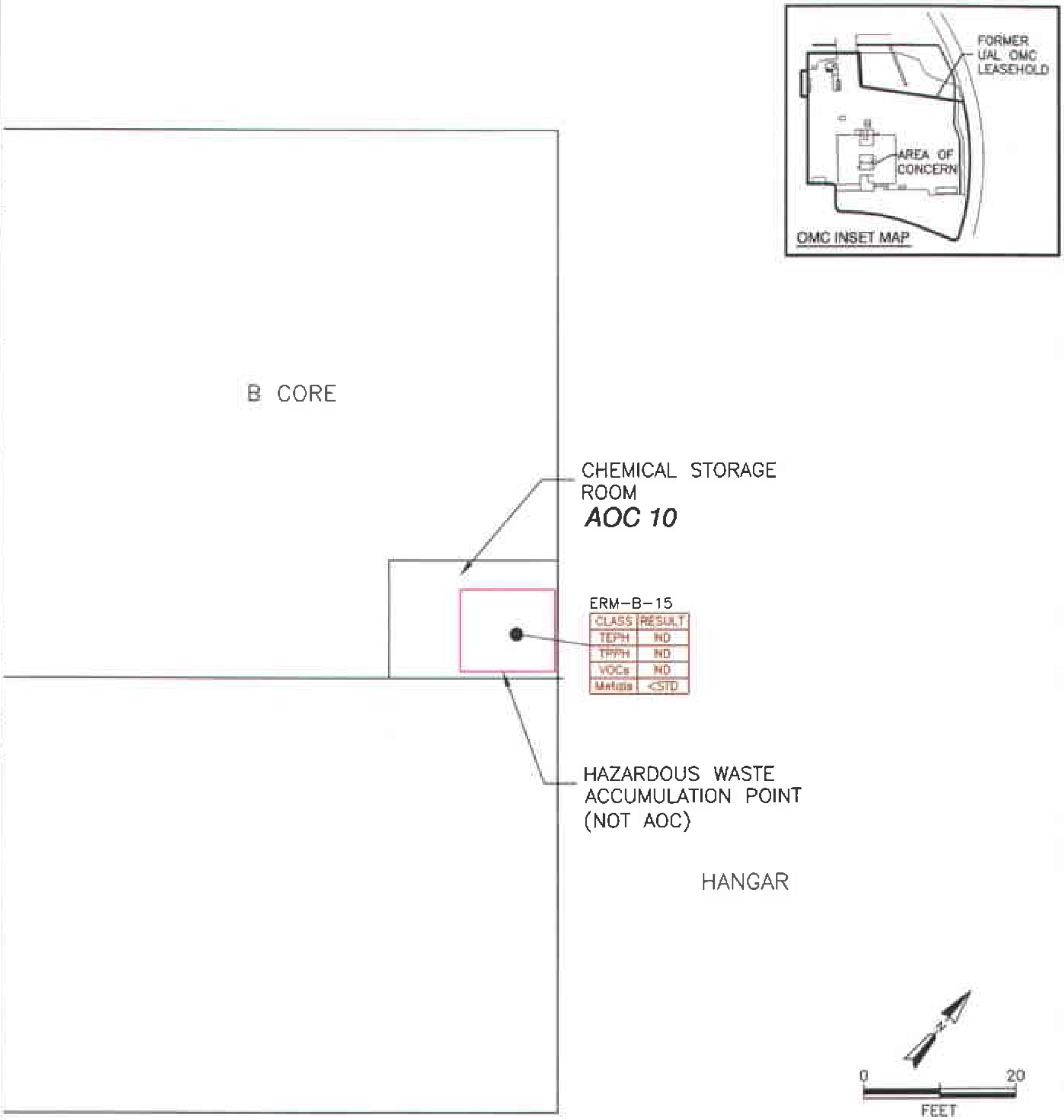

ABBREVIATIONS:

CLASS Chemical Class
STD Standard
ND Not Detected
TEPH Total Extractable Petroleum Hydrocarbon
TPPH Total Purgeable Petroleum Hydrocarbon
VOCs Volatile Organic Compounds

Notes:
Standards include USEPA Region IX PRG for Industrial Soil, RWQCB ESL for Commercial Soil and Ground Water, and USEPA MCLs for Ground Water.
Soil concentration results are in mg/kg.

● Sample Location

AOC 10 Area of Concern

Figure 17
Area of Concern 10
Soil Results
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California

ERM 01/04

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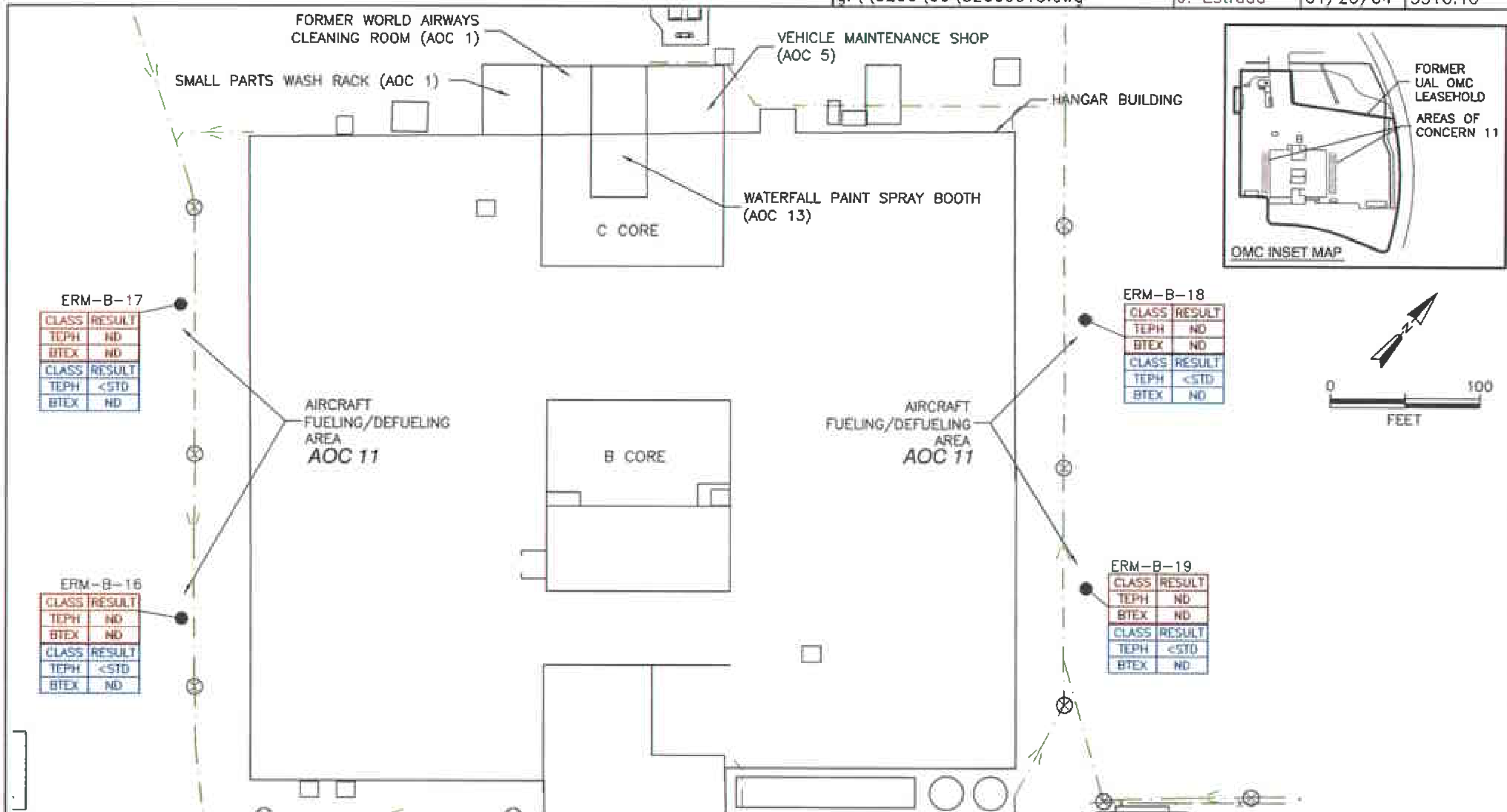

ABBREVIATIONS:

CLASS	Chemical Class
STD	Standard
ND	Not Detected
TEPH	Total Extractable Petroleum Hydrocarbon
BTEX	Benzene, Toluene, Ethene, Xylenes

Notes:
Standards include USEPA Region IX PRG for Industrial Soil, RWQCB ESL for Commercial Soil and Ground Water, and USEPA MCLs for Ground Water.
Soil data table (brown) on top.
Soil concentration results are in mg/kg.
Ground water data table (blue) on bottom.
Ground water concentration results are in µg/L.

⊗	Storm Water Drain Catch Basin
— · —	Storm Water Sewer Line
●	Sample Location
AOC 11	Area of Concern

Figure 18
Area of Concern 11
Soil and Ground Water Results
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California

ERM 01/04

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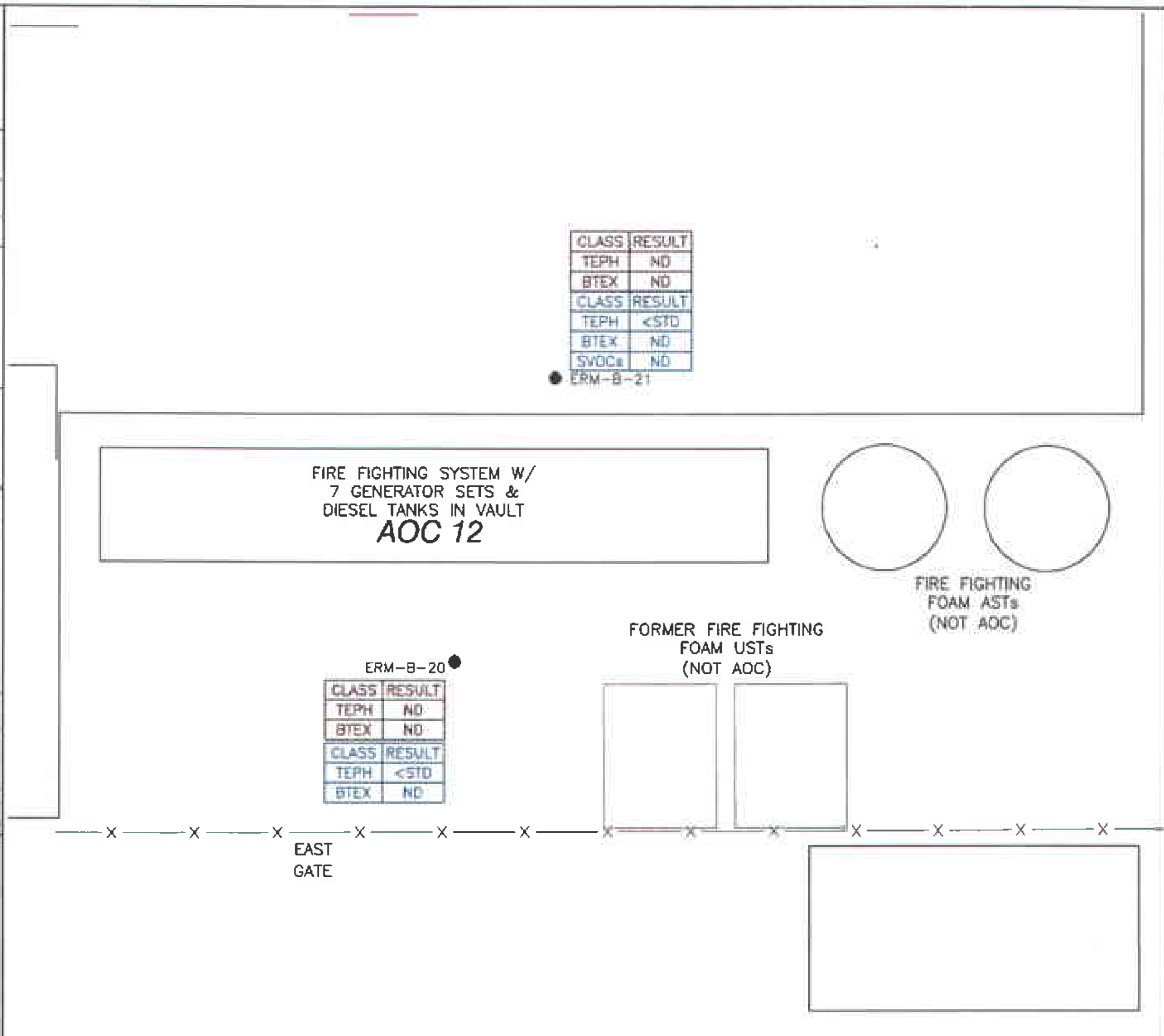


ERM-B-21

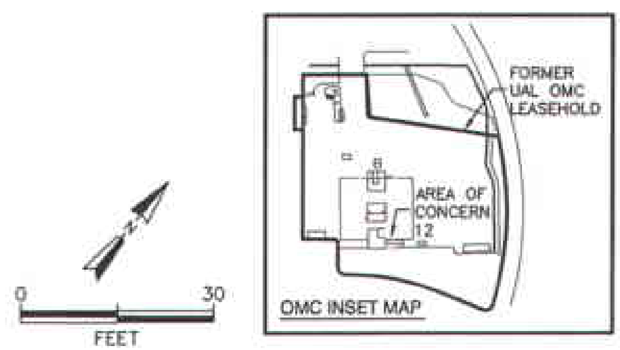
CLASS	RESULT
TEPH	ND
BTEX	ND

CLASS	RESULT
TEPH	<STD
BTEX	ND
SVOCs	ND

ERM-B-20

CLASS	RESULT
TEPH	ND
BTEX	ND

CLASS	RESULT
TEPH	<STD
BTEX	ND



ABBREVIATIONS:

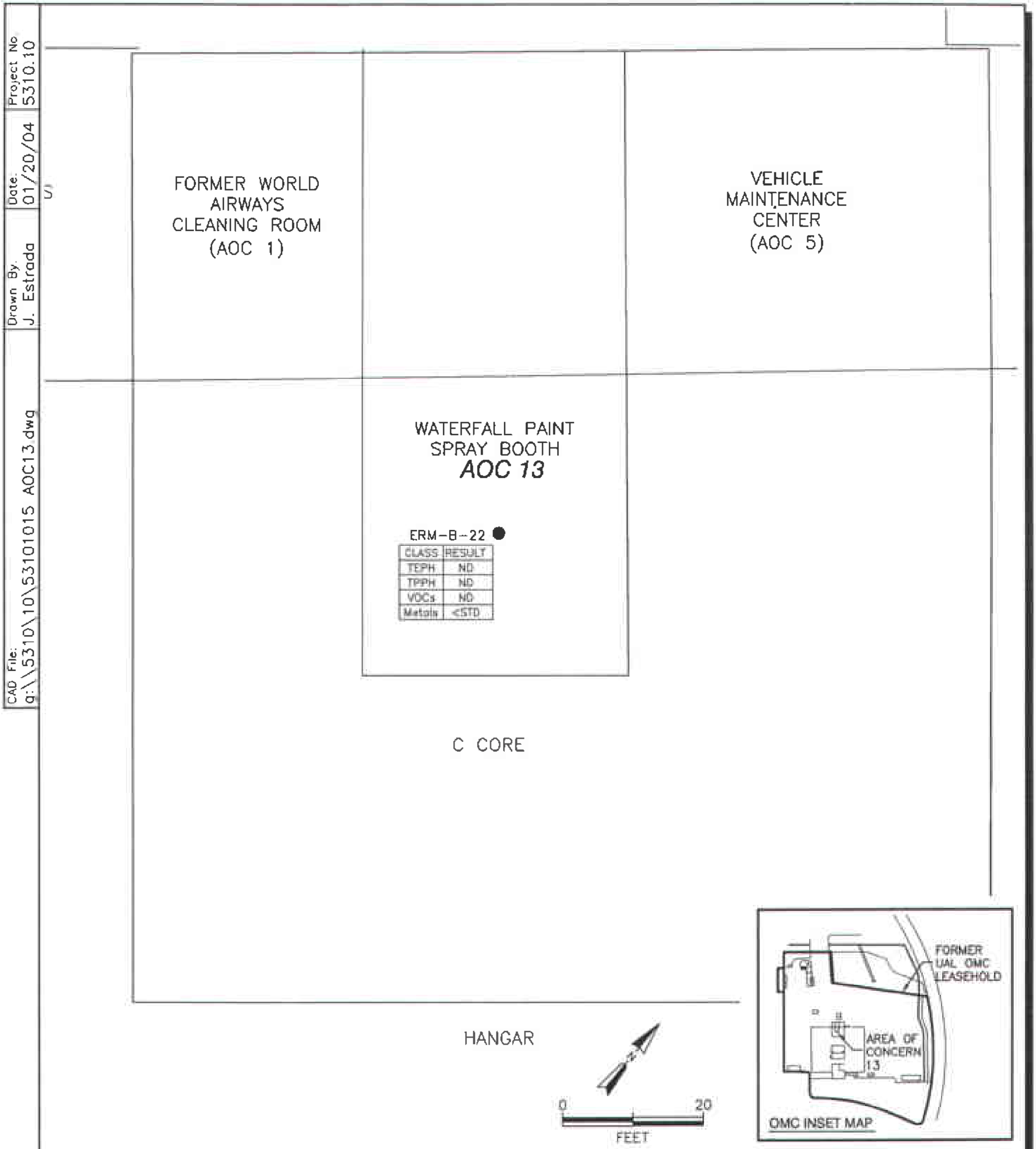
CLASS Chemical Class
STD Standard
ND Not Detected
TEPH Total Extractable Petroleum Hydrocarbon
SVOCs Semi Volatile Organic Compounds
BTEX Benzene, Toluene, Ethene, Xylenes

Notes:
Standards include USEPA Region IX PRG for Industrial Soil, RWQCB ESL for Commercial Soil and Ground Water, and USEPA MCLs for Ground Water.
Soil data table (brown) on top.
Soil concentration results are in mg/kg.
Ground water data table (blue) on bottom.
Groun water concentration results are in μg/L.

● Sample Location
AOC 12 Area of Concern

Figure 19
Area of Concern 12
Soil and Ground Water Results
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California

ERM 01/04



ABBREVIATIONS:

CLASS Chemical Class
STD Standard
ND Not Detected
TEPH Total Extractable Petroleum Hydrocarbon
TPPH Total Purgeable Petroleum Hydrocarbon
VOCs Volatile Organic Compounds

Notes:
Standards include USEPA Region IX PRG for Industrial Soil, RWQCB ESL for Commercial Soil and Ground Water, and USEPA MCLs for Ground Water.
Soil concentration results are in mg/kg.

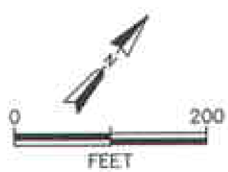
● Sample Location

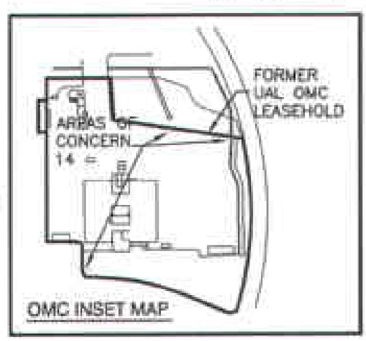
AOC 13 Area of Concern

Figure 20
Area of Concern 13
Soil Results
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California

ERM *01/04*

Project No. 5310.10 | Date: 01/20/04 | Drawn By: J. Estrada | CAD File: g:\\5310\10\53101016 AOC14.dwg





ABBREVIATIONS:

CLASS	Chemical Class
CHEM	Chemical Constituent
CONC	Concentration
STD	Standard
ND	Not Detected
TEPH	Total Extractable Petroleum Hydrocarbon
TPPH	Total Purgeable Petroleum Hydrocarbon
VOCs	Volatile Organic Compounds
SVOCs	Semi Volatile Organic Compounds
Be	Beryllium
Pb	Lead

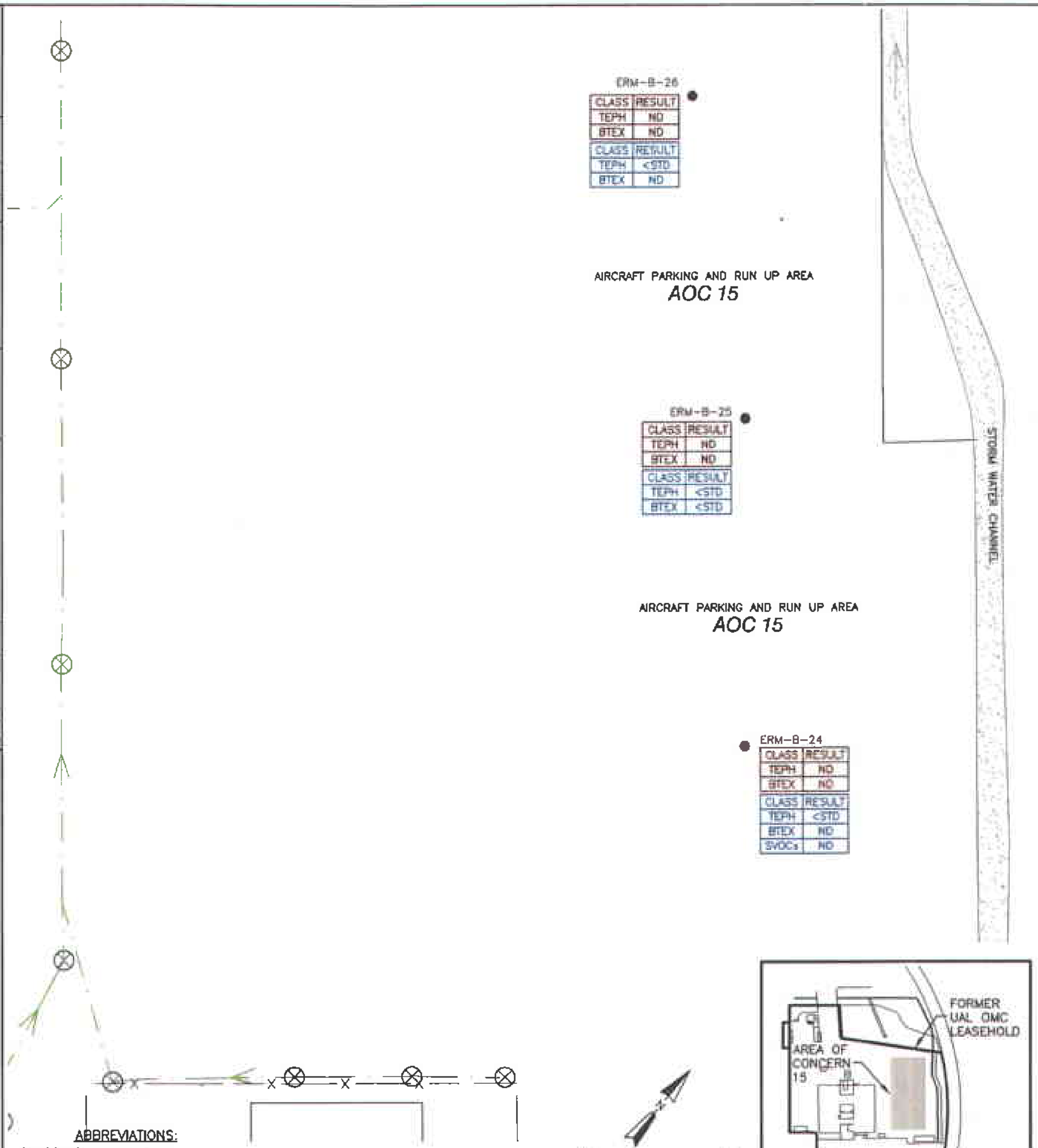
Notes:
Standards include USEPA Region IX PRG for Industrial Soil, RWQCB ESL for Commercial Soil and Ground Water, and USEPA MCLs for Ground Water.
Highlighted data indicates concentration greater than Standard.
Normal Text=ERM data.
Italic Text=Weiss data
Soil data table (brown) on left.
Soil concentration results are in mg/kg.
Ground water data table (blue) on right.
Ground water concentration results are in µg/L.

⊗ Storm Water Drain Catch Basin
Storm Water Sewer Line
Sample Location
● Area of Concern
AOC 14

Figure 21
Area of Concern 14
Soil and Ground Water Results
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California

ERM 01/04

Project No 5310.10
Date: 01/20/03
Drawn By: J. Estrada
CAD File: g:\\5310\10\53101017 AOC15.dwg



ABBREVIATIONS:

CLASS Chemical Class
STD Standard
ND Not Detected
TEPH Total Extractable Petroleum Hydrocarbon
BTEX Benzene, Toluene, Ethene, Xylenes
SVOCs Semi Volatile Organic Compounds

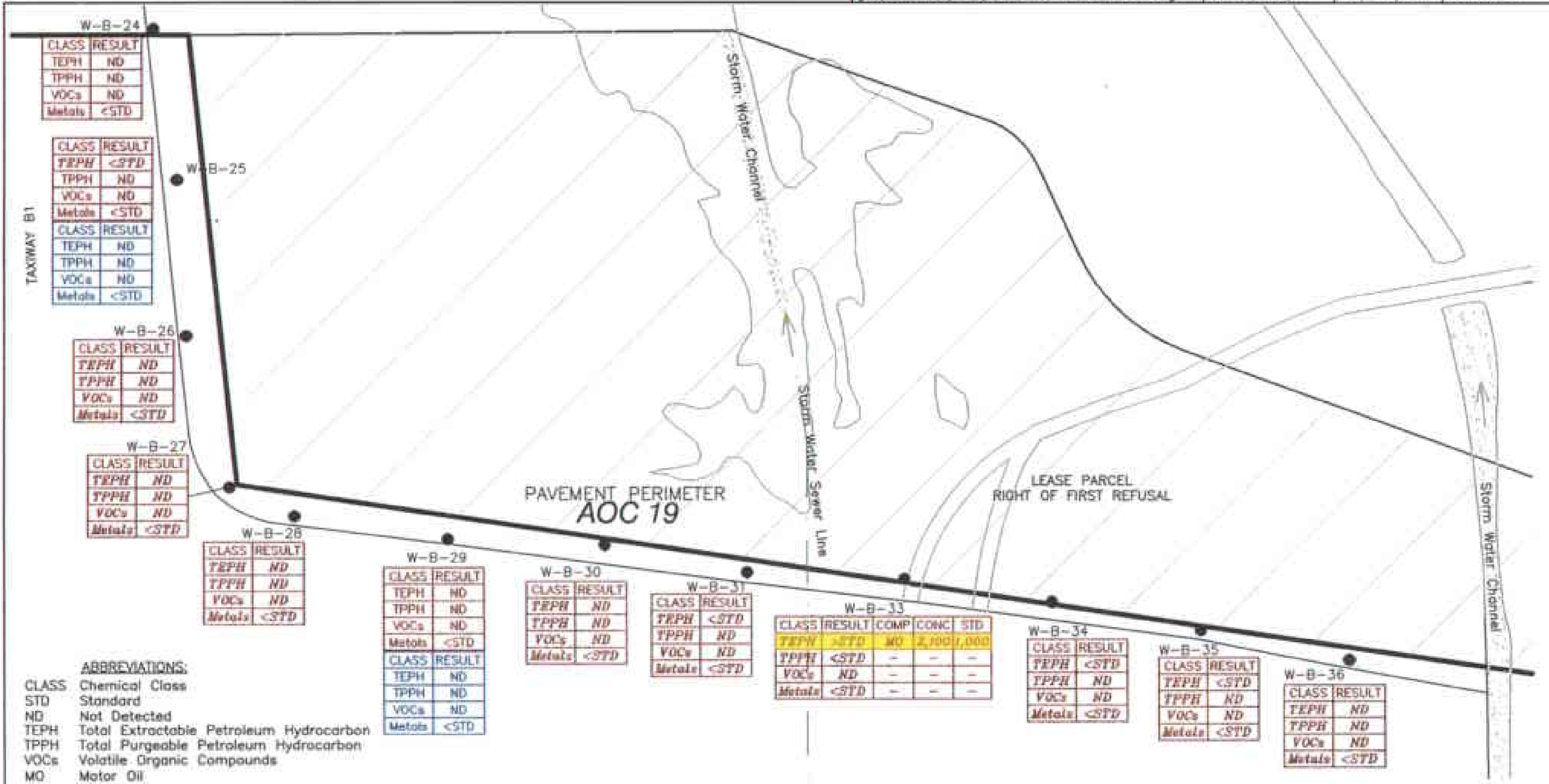
Notes:
Standards include USEPA Region IX PRG for Industrial Soil, RWQCB ESL for Commercial Soil and Ground Water, and USEPA MCLs for Ground Water.
Soil data table (brown) on top.
Soil concentration results are in mg/kg.
Ground water data table (blue) on bottom.
Ground water concentration results are in μg/L.

⊗ Storm Water Drain Catch Basin
— — — Storm Water Sewer Line
● Sample Location
AOC 15 Area of Concern

Figure 22
Area of Concern 15
Soil and Ground Water Results
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California

ERM 01/04

CAD File:	Drawn By:	Date:	Project No.
g:\\5310\10\53101019 AOC19.dwg	J. Estrada	01/20/01	5310.10



W-B-24

CLASS	RESULT
TEPH	ND
TPPH	ND
VOCs	ND
Metals	<STD

W-B-25

CLASS	RESULT
TEPH	*<STD*
TPPH	ND
VOCs	ND
Metals	<STD

CLASS	RESULT
TEPH	ND
TPPH	ND
VOCs	ND
Metals	<STD

W-B-26

CLASS	RESULT
TEPH	*ND*
TPPH	*ND*
VOCs	*ND*
Metals	*<STD*

W-B-27

CLASS	RESULT
TEPH	*ND*
TPPH	*ND*
VOCs	*ND*
Metals	*<STD*

W-B-28

CLASS	RESULT
TEPH	*ND*
TPPH	*ND*
VOCs	*ND*
Metals	*<STD*

W-B-29

CLASS	RESULT
TEPH	ND
TPPH	ND
VOCs	ND
Metals	<STD

CLASS	RESULT
TEPH	ND
TPPH	ND
VOCs	ND
Metals	<STD

W-B-30

CLASS	RESULT
TEPH	*ND*
TPPH	*ND*
VOCs	*ND*
Metals	*<STD*

W-B-31

CLASS	RESULT
TEPH	*<STD*
TPPH	*ND*
VOCs	*ND*
Metals	*<STD*

W-B-33

CLASS	RESULT	COMP	CONC	STD
TEPH	*>STD*	*MO*	*2,100*	*1,000*
TPPH	*<STD*	-	-	-
VOCs	*ND*	-	-	-
Metals	*<STD*	-	-	-

W-B-34

CLASS	RESULT
TEPH	*<STD*
TPPH	*ND*
VOCs	*ND*
Metals	*<STD*

W-B-35

CLASS	RESULT
TEPH	*<STD*
TPPH	*ND*
VOCs	*ND*
Metals	*<STD*

W-B-36

CLASS	RESULT
TEPH	*ND*
TPPH	*ND*
VOCs	*ND*
Metals	*<STD*

ABBREVIATIONS:

CLASS Chemical Class
STD Standard
ND Not Detected
TEPH Total Extractable Petroleum Hydrocarbon
TPPH Total Purgeable Petroleum Hydrocarbon
VOCs Volatile Organic Compounds
MO Motor Oil

Notes:
Standards include USEPA Region IX PRG for Industrial Soil, RWQCB ESL for Commercial Soil and Ground Water, and USEPA MCLs for Ground Water.
Highlighted data indicates concentration greater than Standard.
Normal Text=ERM data.
Italic Text=Weiss data.
Soil data table (brown) on top.
Soil concentration results are in mg/kg.
Ground water data table (blue) on bottom.
Ground water concentration results are in µg/L.

● Sample Location
AOC 19 Area of Concern

0 100
FEET

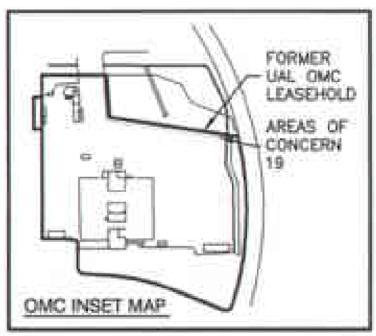


Figure 23
Area of Concern 19
Soil and Ground Water Results
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California

ERM *01/04*

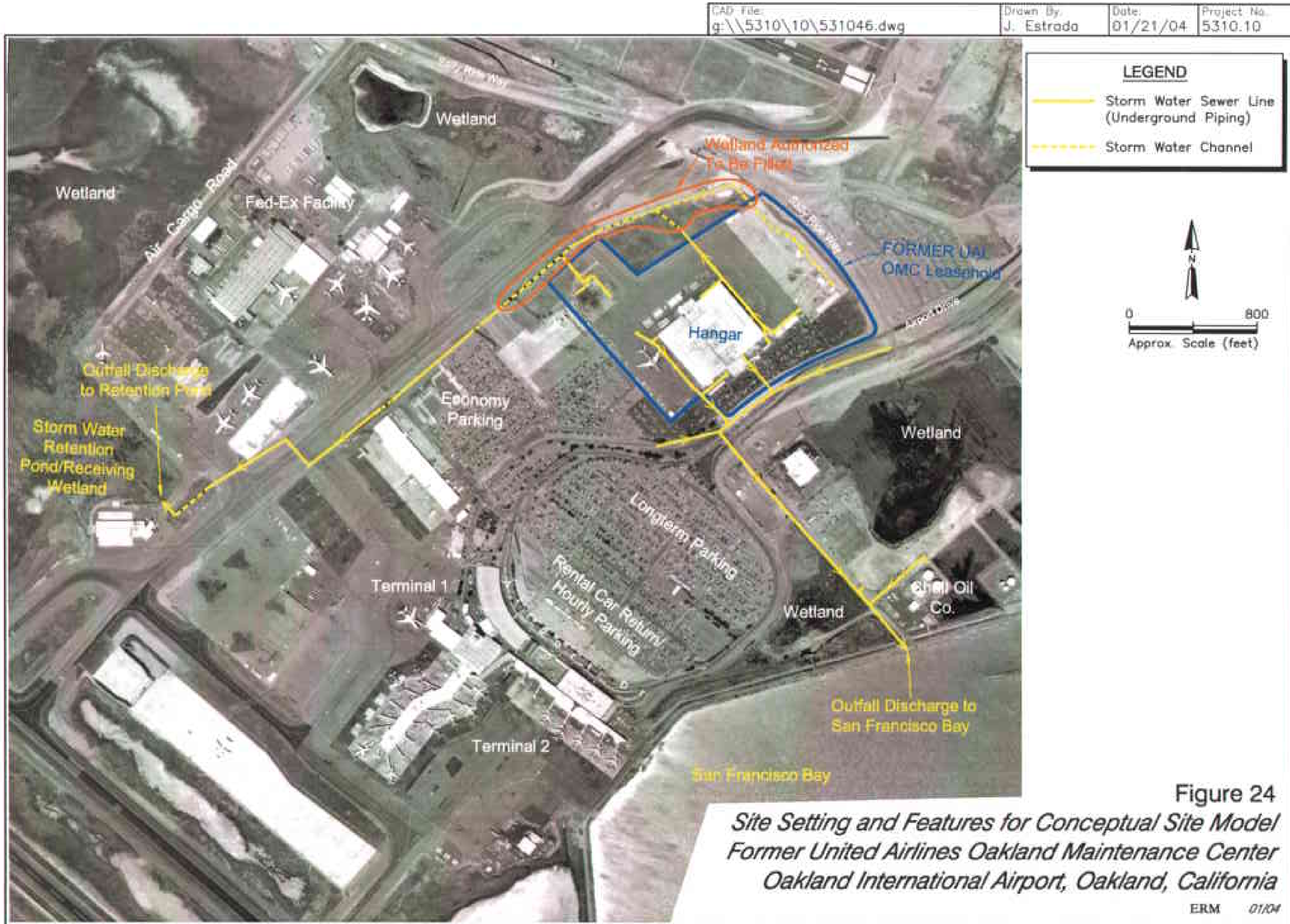


Figure 24

Site Setting and Features for Conceptual Site Model
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California

ERM 01/04

FIGURE 25

Summary of Potential Chemical Exposure Pathways and Receptor Populations
Former UAL Oakland Maintenance Center
Oakland, California

Source	Primary Inter-media Transfer	Primary Medium of Concern	Secondary Inter-media Transfer	Exposure Route	Potential Receptors: Resident	Traveler	Airport Worker	Construction Worker	Ecological
Former OMC Operations	Migration Through Pavement	Soil	On-site Dust Generation	Inhalation	□	□	□	■	□
		Soil	Uptake into Plants	Ingestion	□	□	□	□	□
		Soil		Ingestion	□	□	□	■	□
		Soil		Dermal Contact	□	□	□	■	□
		Soil	Volatilization into Indoor Air	Inhalation	□	□	■	■	□
		Soil	Migration to Groundwater	Ingestion	□	□	□	□†	□
		Soil	Migration to Groundwater	Dermal Contact	□	□	□	□†	□
Former OMC Operations	Leaks From Surface Water Drains	Ground Water	Migration to Groundwater	Ingestion	□	□	□	□†	□
		Ground Water	Migration to Groundwater	Dermal Contact	□	□	□	□†	□
		Ground Water	Volatilization into Indoor Air	Inhalation	□	□	■	□	□
		Ground Water	Migration to Surface Water	Ingestion	□	□	□	□	■
		Ground Water	Migration to Surface Water	Dermal Contact	□	□	□	□	■

■ - Complete exposure pathway.
□ - Incomplete or insignificant exposure pathway (see text for explanation).
† - Although a potentially complete exposure pathway, routine or prolonged contact with contaminated ground water is unlikely due to the typical practice of pumping out any collected water prior to construction activity in an excavation.

Figure 26

Concentrations of Arsenic in Soil
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California

ERM 01/04

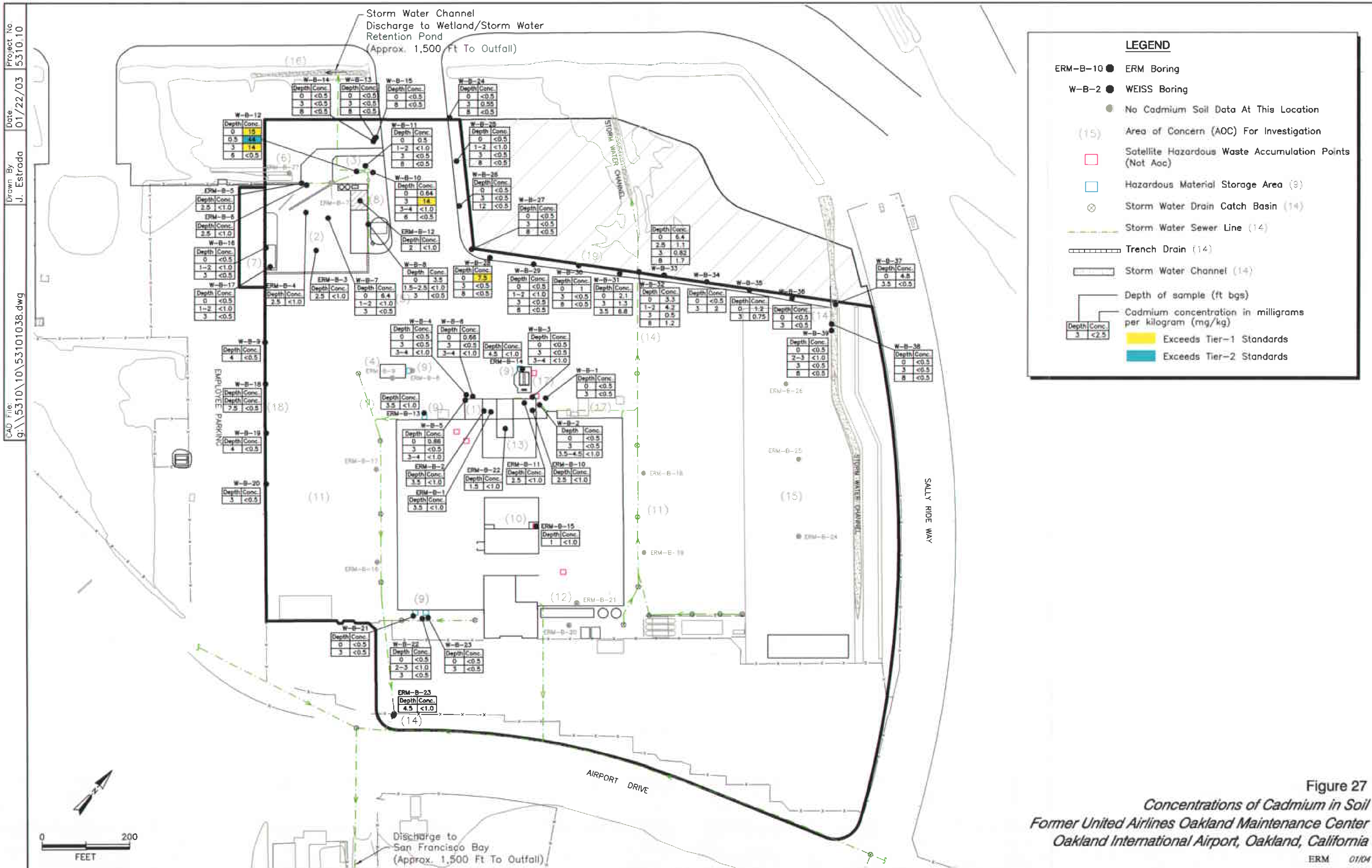


Figure 27

Concentrations of Cadmium in Soil

Former United Airlines Oakland Maintenance Center

Oakland International Airport, Oakland, California

ERM 01/04

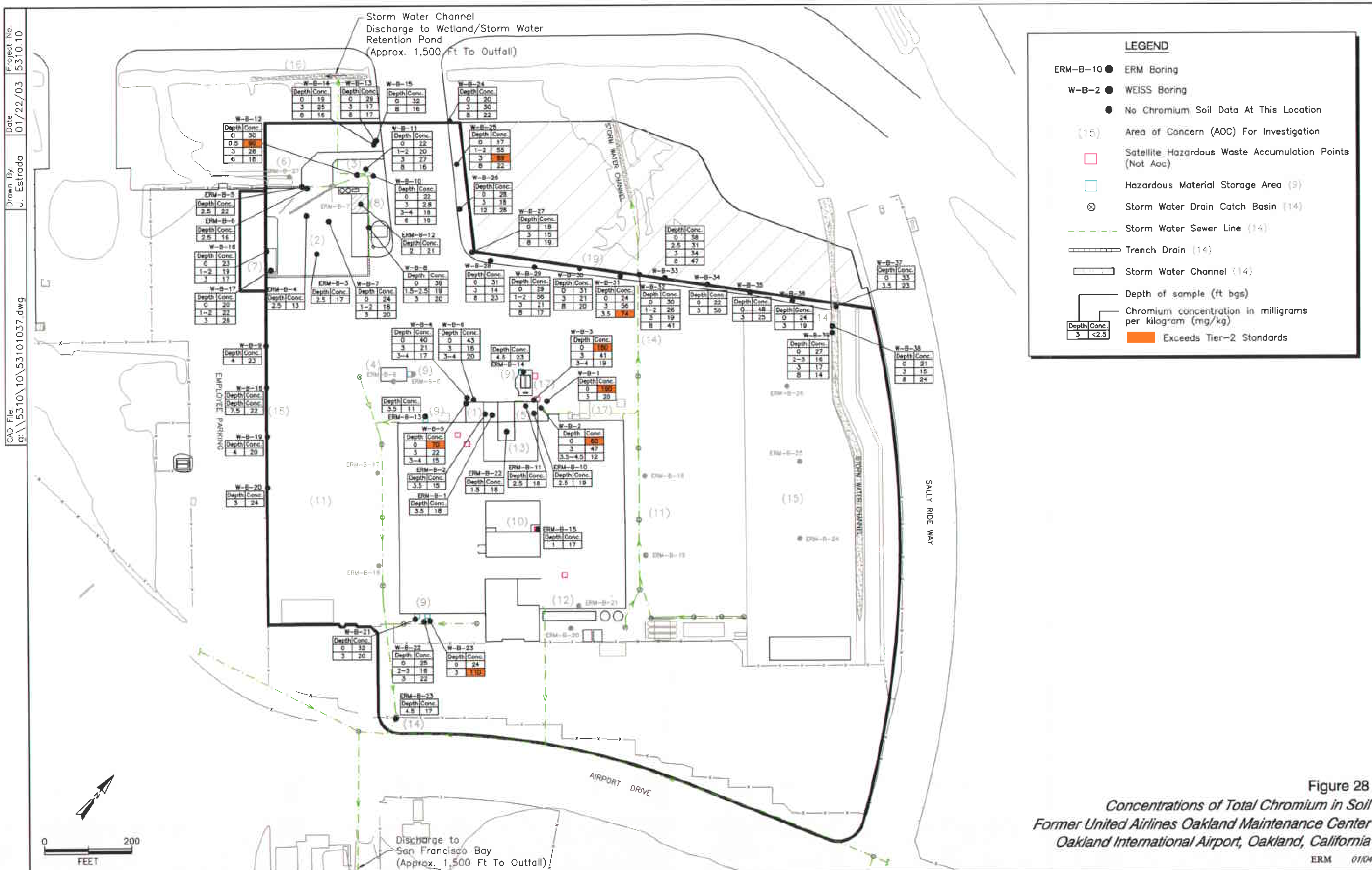


Figure 28

Concentrations of Total Chromium in Soil
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California

ERM 01/04

Figure 29

Concentrations of Nickel in Ground Water
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California

ERM 01/04

Sample Location	Sample Depth (feet bgs)	Sample Type	Date Sampled	VOCs	BTEX Only	MTBE Only	TPPH	TEPH	TPH Diesel	TPH Hydraulic Oil	TPH Motor Oil	TPH Jet Fuel	SVOCs	PCBs	Title 22 Metals	TDS
Area of Concern 1 - Small Parts Wash Rack/Former World Airways Cleaning Room																
ERM-B-1	3.5	Soil	15 Apr 03	X			X	X							X	
ERM-B-1	-	Water	15 Apr 03	X			X	X							X	
ERM-B-2	3.5	Soil	15 Apr 03	X			X	X							X	
ERM-B-2	-	Water	15 Apr 03	X			X	X					X		X	
W-B-4	3-4	Soil	14 Apr 03	X			X	X							X	
W-B-4	-	Water	15 Apr 03	X			X	X							X	
W-B-5	3-4	Soil	14 Apr 03	X			X	X							X	
W-B-5	-	Water	15 Apr 03	X			X	X							X	
W-B-6	3-4	Soil	14 Apr 03	X			X	X							X	
W-B-6	-	Water	15 Apr 03	X			X	X							X	
ERM-MW-01	-	Water	9 May 03	X											Ni	
ERM-MW-01	-	Water	6 Nov 03	X											Ni	
ERM-MW-02	-	Water	9 May 03	X											Ni	
ERM-MW-02	-	Water	6 Nov 03	X											Ni	
ERM-MW-03	-	Water	9 May 03	X											Ni	
ERM-MW-03	-	Water	6 Nov 03	X											Ni	
ERM-MW-04	-	Water	9 May 03	X											Ni	
ERM-MW-04	-	Water	7 Nov 03	X											Ni	
ERM-MW-05	-	Water	9 May 03	X											Ni	
ERM-MW-05	-	Water	7 Nov 03	X											Ni	
ERM-MW-11	-	Water	30 Dec 03	X											Ni	
ERM-MW-12	-	Water	29 Dec 03	X											Ni	
ERM-MW-13	-	Water	29 Dec 03	X											Ni	
ERM-MW-14	-	Water	29 Dec 03	X											Ni	
Area of Concern 2 - Aircraft Wash Rack																
ERM-B-3	2.5	Soil	15 Apr 03	X			X	X							X	
ERM-B-3	-	Water	15 Apr 03	X			X	X							X	
ERM-B-4	2.5	Soil	15 Apr 03	X			X	X							X	
ERM-B-4	-	Water	15 Apr 03	X			X	X							X	
ERM-B-5	2.5	Soil	15 Apr 03	X			X	X							X	
ERM-B-5	-	Water	15 Apr 03	X			X	X					X		X	
ERM-B-6	2.5	Soil	15 Apr 03	X			X	X					X		X	
ERM-B-6	-	Water	15 Apr 03	X			X	X							X	
ERM-B-7	-	Water	15 Apr 03	X			X	X							X	
W-B-7	1-2	Soil	17 Apr 03	X			X	X							X	
W-B-7	-	Water	17 Apr 03	X			X	X							X	
W-B-8	1.5-2.5	Soil	14 Apr 03	X			X	X							X	
W-B-8	-	Water	14 Apr 03	X			X	X							X	
ERM-MW-06	-	Water	9 May 03	X			X		X		X				Ni, Cd, Pb	
ERM-MW-06	-	Water	6 Nov 03	X			X		X	X	X	X			Ni, Cd, Pb	
ERM-MW-06	-	Water	30 Dec 03												Cu	
ERM-MW-07	-	Water	9 May 03	X			X		X		X				Ni, Cd, Pb	
ERM-MW-07	-	Water	6 Nov 03	X			X		X	X	X	X			Ni, Cd, Pb	
ERM-MW-08	-	Water	9 May 03	X			X		X		X				Ni, Cd, Pb	
ERM-MW-08	-	Water	6 Nov 03	X			X		X	X	X	X			Ni, Cd, Pb	
ERM-MW-09	-	Water	9 May 03	X			X		X		X				Ni, Cd, Pb	
ERM-MW-09	-	Water	6 Nov 03	X			X		X	X	X	X			Ni, Cd, Pb	
ERM-MW-15	-	Water	30 Dec 03												Ni	
ERM-MW-16	-	Water	30 Dec 03												Ni	
Area of Concern 3 - Industrial Wastewater Sump																
W-B-10	3-4	Soil	15 Apr 03	X			X	X							X	
W-B-10	-	Water	15 Apr 03	X			X	X							X	
W-B-11	1-2	Soil	15 Apr 03	X			X	X							X	
W-B-11	-	Water	15 Apr 03	X			X	X							X	
W-B-12	0.5	Soil	15 Apr 03	X			X	X							X	
W-B-12	-	Water	15 Apr 03	X			X	X					X		X	
ERM-MW-10	-	Water	9 May 03	X			X		X		X				Ni, Cd, Pb	
ERM-MW-10	-	Water	6 Nov 03	X			X		X	X	X	X			Ni, Cd, Pb	
ERM-MW-10	-	Water	30 Dec 03												Cu	
Area of Concern 4 - New Fueling Station with 12,000 Gallon AST																
ERM-B-8	4	Soil	16 Apr 03		X	X	X	X								
ERM-B-8	-	Water	16 Apr 03		X	X	X	X								
ERM-B-9	4.5	Soil	16 Apr 03		X	X	X	X					X			
ERM-B-9	-	Water	16 Apr 03		X	X	X	X								

Sample Location	Sample Depth (feet bgs)	Sample Type	Date Sampled	VOCs	BTEX Only	MTBE Only	TPPH	TEPH	TPH Diesel	TPH Hydraulic Oil	TPH Motor Oil	TPH Jet Fuel	SVOCs	PCBs	Title 22 Metals	TDS
Area of Concern 5 - Vehicle Maintenance Center																
ERM-B-10	2.5	Soil	17 Apr 03	X			X	X							X	
ERM-B-10	-	Water	17 Apr 03	X			X	X							X	
ERM-B-11	2.5	Soil	17 Apr 03	X			X	X						X	X	
ERM-B-11	6.5	Soil	17 Apr 03	X			X	X						X	X	
ERM-B-11	-	Water	17 Apr 03	X			X	X							X	
W-B-2	3.5-4.5	Soil	14 Apr 03	X			X	X							X	
W-B-2	-	Water	15 Apr 03	X			X	X					X		X	
W-B-3	3-4	Soil	14 Apr 03	X			X	X							X	
W-B-3	-	Water	15 Apr 03	X			X	X							X	
Area of Concern 6 - Boiler with Diesel AST																
ERM-B-27	2	Soil	17 Apr 03		X			X								
ERM-B-27	-	Water	17 Apr 03		X			X					X			
Area of Concern 7 - Former Hazardous Waste Accumulation Area																
W-B-16	1-2	Soil	17 Apr 03	X			X	X							X	
W-B-16	-	Water	17 Apr 03	X			X	X							X	
W-B-17	1-2	Soil	17 Apr 03	X			X	X							X	
W-B-17	-	Water	17 Apr 03	X			X	X					X		X	X
ERM-MW-17	-	Water	30 Dec 03	X											As	
Area of Concern 8 - Current Hazardous Waste Accumulation Area																
ERM-B-12	2	Soil	17 Apr 03	X			X	X							X	
ERM-B-12	-	Water	17 Apr 03	X			X	X							X	
Area of Concern 9 - Hazardous Materials Storage																
ERM-B-13	3.5	Soil	16 Apr 03	X			X	X							X	
ERM-B-13	-	Water	16 Apr 03	X			X	X							X	
ERM-B-14	4.5	Soil	17 Apr 03	X			X	X							X	
ERM-B-14	-	Water	17 Apr 03	X			X	X					X		X	X
W-B-22	2-3	Soil	18 Apr 03	X			X	X							X	
W-B-22	-	Water	18 Apr 03	X			X	X							X	
P-2/UAL-MW-5	-	Water	18 Apr 03	X			X	X								
P-2/UAL-MW-5	-	Water	6 Nov 03	X											Ni	
Area of Concern 10 - Chemical Storage (Chem Crib)																
ERM-B-15	1	Soil	17 Apr 03	X			X	X							X	
Area of Concern 11 - Fueling and Defueling Aircraft																
ERM-B-16	4.5	Soil	16 Apr 03		X			X								
ERM-B-16	-	Water	16 Apr 03		X			X								X
ERM-B-17	3.5	Soil	16 Apr 03		X			X								
ERM-B-17	-	Water	16 Apr 03		X			X								
ERM-B-18	4	Soil	16 Apr 03		X			X								
ERM-B-18	-	Water	16 Apr 03		X			X								
ERM-B-19	4.5	Soil	16 Apr 03		X			X								
ERM-B-19	-	Water	16 Apr 03		X			X								
Area of Concern 12 - Fire Systems																
ERM-B-20	3	Soil	16 Apr 03		X			X								
ERM-B-20	-	Water	17 Apr 03		X			X								X
ERM-B-21	2	Soil	17 Apr 03		X			X								
ERM-B-21	-	Water	17 Apr 03		X			X					X			
Area of Concern 13 - Paint Booth																
ERM-B-22	1.5	Soil	17 Apr 03	X			X	X							X	
Area of Concern 14 - Storm Drains																
ERM-B-23	4.5	Soil	17 Apr 03	X			X	X							X	
ERM-B-23	-	Water	17 Apr 03	X			X	X							X	
W-B-32	1-2	Soil	16 Apr 03	X			X	X							X	
W-B-32	-	Water	16 Apr 03	X			X	X					X		X	X
W-B-38	2-3	Soil	15 Apr 03	X			X	X							X	
W-B-38	-	Water	15 Apr 03	X			X	X							X	
Area of Concern 15 - Run-Up Area and Aircraft Parking																
ERM-B-24	2.5	Soil	15 Apr 03		X			X								
ERM-B-24	-	Water	15 Apr 03		X			X					X			X
ERM-B-25	3.5	Soil	15 Apr 03		X			X								
ERM-B-25	-	Water	15 Apr 03		X			X								
ERM-B-26	2	Soil	16 Apr 03		X			X								
ERM-B-26	-	Water	16 Apr 03		X			X								
Area of Concern 16 - Fueling Spill																
W-B-14	2-3	Soil	15 Apr 03		X			X								
W-B-14	-	Water	15 Apr 03		X			X								

Sample Location	Sample Depth (feet bgs)	Sample Type	Date Sampled	VOCs	BTEX Only	MTBE Only	TPPH	TEPH	TPH Diesel	TPH Hydraulic Oil	TPH Motor Oil	TPH Jet Fuel	SVOCs	PCBs	Title 22 Metals	TDS
Area of Concern 17 - Former Vehicle Fueling Area																
UAL-MW-1	-	Water	18 Apr 03	X			X	X								
UAL-MW-1	-	Water	6 Nov 03	X			X		X	X	X	X			Sb, As, Be	
UAL-MW-2	-	Water	18 Apr 03	X			X	X					X			
UAL-MW-2	-	Water	6 Nov 03	X			X		X	X	X	X			Sb, As, Be	
UAL-MW-3	-	Water	18 Apr 03	X			X	X								
UAL-MW-3	-	Water	7 Nov 03	X			X	X							Sb, As, Be	
P-1/UAL-MW-4	-	Water	18 Apr 03	X			X	X								
Area of Concern 18 - Offsite Solvent USTs																
W-B-9	3-3.5	Soil	18 Apr 03	X												
W-B-9	-	Water	18 Apr 03	X												
W-B-19	3-3.5	Soil	18 Apr 03	X												
W-B-19	-	Water	18 Apr 03	X												
Area of Concern 19 - Pavement Perimeter																
W-B-25	1-2	Soil	15 Apr 03	X			X	X							X	
W-B-25	-	Water	16 Apr 03	X			X	X							X	
W-B-29	1-2	Soil	16 Apr 03	X			X	X							X	
W-B-29	-	Water	16 Apr 03	X			X	X							X	

Notes:

This table only presents the sampling matrix for samples collected by ERM. The data used in this report includes this data as well as data collected by Weiss Associates.
ERM prefix indicates a boring/monitoring well completed by ERM
W prefix indicates a boring completed by Weiss Associates
UAL prefix indicates pre-existing monitoring well at the site
bgs = Below ground surface
VOCs = Volatile organic compounds
BTEX = Benzene, toluene, ethylbenzene, and xylenes
MTBE = Methyl tert-butyl ether
TPPH = Total purgeable petroleum hydrocarbons
TEPH = Total extractable petroleum hydrocarbons
TPH = Total petroleum hydrocarbons
SVOCs = Semivolatile organic compounds
PCBs = Polychlorinated biphenyls
TDS = Total dissolved solids
As = Arsenic
Be = Beryllium
Cd = Cadmium
Cu = Copper
Pb = Lead
Ni = Nickel
Sb = Antimony

Table 2
Ground Water Elevation Data
Former United Airlines Oakland Maintenance Center
Oakland International Airport

Well No.	Date	Time	Total Depth (feet bgs)	Screened Interval (feet bgs)	Top of Casing (feet above msl)	Depth to Water (feet below toc)	Ground Water Elevation (feet above msl)
ERM-MW-1	5/9/2003	14:40	16	6 - 16	10.39	8.62	1.77
	11/6/2003	8:57	16	6 - 16	10.39	9.90	0.49
	12/8/2003	9:28	16	6 - 16	10.39	8.77	1.62
	1/12/2004	8:10	16	6 - 16	10.39	8.45	1.94
ERM-MW-2	5/9/2003	14:30	17	7 - 17	9.85	7.80	2.05
	11/6/2003	8:52	17	7 - 17	9.85	8.30	1.55
	12/8/2003	9:30	17	7 - 17	9.85	8.13	1.72
	1/12/2004	8:00	17	7 - 17	9.85	7.82	2.03
ERM-MW-3	5/9/2003	15:20	15	5 - 15	9.79	7.80	1.99
	11/6/2003	8:49	15	5 - 15	9.79	8.30	1.49
	12/8/2003	9:26	15	5 - 15	9.79	8.10	1.69
	1/12/2004	7:57	15	5 - 15	9.79	7.73	2.06
ERM-MW-4	5/9/2003	15:10	16	6 - 16	10.50	8.80	1.70
	11/6/2003	8:41	16	6 - 16	10.50	9.10	1.40
	12/8/2003	9:18	16	6 - 16	10.50	9.01	1.49
	1/12/2004	8:36	16	6 - 16	10.50	8.77	1.73
ERM-MW-5	5/9/2003	13:50	14	4 - 14	9.85	7.97	1.88
	11/6/2003	9:05	14	4 - 14	9.85	8.15	1.70
	12/8/2003	9:23	14	4 - 14	9.85	8.15	1.70
	1/12/2004	8:32	14	4 - 14	9.85	7.96	1.89
ERM-MW-6	5/9/2003	11:55	12.5	2.5 - 12.5	8.91	4.99	3.92
	11/6/2003	9:10	12.5	2.5 - 12.5	8.91	7.15	1.76
	12/8/2003	8:52	12.5	2.5 - 12.5	8.91	6.01	2.90
	1/12/2004	7:22	12.5	2.5 - 12.5	8.91	4.99	3.92
ERM-MW-7	5/9/2003	10:00	14	4 - 14	6.16	2.25	3.91
	11/6/2003	9:17	14	4 - 14	6.16	4.20	1.96
	12/8/2003	9:01	14	4 - 14	6.16	3.48	2.68
	1/12/2004	7:24	14	4 - 14	6.16	2.59	3.57
ERM-MW-8	5/9/2003	11:00	13.5	3.5 - 13.5	5.46	1.79	3.67
	11/6/2003	9:12	13.5	3.5 - 13.5	5.46	3.65	1.81
	12/8/2003	8:59	13.5	3.5 - 13.5	5.46	2.90	2.56
	1/12/2004	7:42	13.5	3.5 - 13.5	5.46	1.82	3.64
ERM-MW-9	5/9/2003	12:00	13.5	3.5 - 13.5	5.49	2.05	3.44
	11/6/2003	9:14	13.5	3.5 - 13.5	5.49	3.80	1.69
	12/8/2003	8:57	13.5	3.5 - 13.5	5.49	2.69	2.80
	1/12/2004	7:44	13.5	3.5 - 13.5	5.49	1.81	3.68
ERM-MW-10	5/9/2003	13:25	10	3 - 10	7.54	4.00	3.54
	11/6/2003	9:15	10	3 - 10	7.54	5.70	1.84
	12/8/2003	8:54	10	3 - 10	7.54	4.60	2.94
	1/12/2004	7:19	10	3 - 10	7.54	3.82	3.72
ERM-MW-11	1/12/2004	7:54	15	5 - 15	9.31	7.08	2.23
ERM-MW-12	1/12/2004	8:24	15	5 - 15	8.93	6.97	1.96
ERM-MW-13	1/12/2004	8:16	15	5 - 15	10.36	8.82	1.54
ERM-MW-14	1/12/2004	8:20	15	5 - 15	9.71	8.09	1.62
ERM-MW-15	1/12/2004	7:15	12.5	2.5 - 12.5	7.99	4.65	3.34
ERM-MW-16	1/12/2004	7:35	12.5	2.5 - 12.5	5.77	2.24	3.53
ERM-MW-17	1/12/2004	7:29	12.5	2.5 - 12.5	5.96	2.53	3.43
UAL-MW-1	4/18/2003	10:02	24	4 - 24	8.17	11.69	-3.52
	11/6/2003	8:44	24	4 - 24	8.17	8.55	-0.38
	12/8/2003	9:10	24	4 - 24	8.17	8.20	-0.03
	1/12/2004	8:50	24	4 - 24	8.17	7.62	0.55

Well No.	Date	Time	Total Depth (feet bgs)	Screened Interval (feet bgs)	Top of Casing (feet above msl)	Depth to Water (feet below toc)	Ground Water Elevation (feet above msl)
UAL-MW-2	4/18/2003	9:57	24	4 - 24	10.10	12.32	-2.22
	11/6/2003	8:39	24	4 - 24	10.10	9.57	0.53
	12/8/2003	9:16	24	4 - 24	10.10	9.35	0.75
	1/12/2004	8:44	24	4 - 24	10.10	8.83	1.27
UAL-MW-3	4/18/2003	9:54	24	4 - 24	10.32	14.15	-3.83
	11/6/2003	8:35	24	4 - 24	10.32	11.30	-0.98
	12/8/2003	9:12	24	4 - 24	10.32	10.58	-0.26
	1/12/2004	8:41	24	4 - 24	10.32	9.79	0.53
UAL-MW-4	4/18/2003	10:05	37.5*	Unknown	10.05	15.80	-5.75
	11/6/2003	8:34	37.5*	Unknown	10.05	12.30	-2.25
	12/8/2003	8:14	37.5*	Unknown	10.05	11.36	-1.31
	1/12/2004	8:46	37.5*	Unknown	10.05	12.46	-2.41
UAL-MW-5	4/18/2003	10:10	15*	Unknown	9.38	7.10	2.28
	11/6/2003	9:00	15*	Unknown	9.38	7.45	1.93
	12/8/2003	9:33	15*	Unknown	9.38	7.37	2.01
	1/12/2004	8:56	15*	Unknown	9.38	7.11	2.27
Offsite Wells							
MW-1	12/8/2003	15:20	Unknown	Unknown	6.91	3.64	3.27
	1/12/2004	9:21	Unknown	Unknown	6.91	3.45	3.46
MW-2	12/8/2003	uto	Unknown	Unknown	6.58	-	-
	1/12/2004	9:15	Unknown	Unknown	6.58	3.21	3.37
MW-3	12/8/2003	15:11	Unknown	Unknown	7.36	3.18	4.18
	1/12/2004	9:26	Unknown	Unknown	7.36	2.69	4.67
MW-4	12/8/2003	15:09	Unknown	Unknown	6.92	3.05	3.87
	1/12/2004	9:24	Unknown	Unknown	6.92	2.28	4.64
MW-5	12/8/2003	uto	Unknown	Unknown	5.79	-	-
	1/12/2004	9:34	Unknown	Unknown	5.79	1.67	4.12
MW-6	12/8/2003	uto	Unknown	Unknown	6.39	-	-
	1/12/2004	9:38	Unknown	Unknown	6.39	2.46	3.93
MW-7	12/8/2003	uto	Unknown	Unknown	5.86	-	-
	1/12/2004	9:19	Unknown	Unknown	5.86	2.29	3.57
MW-8	12/8/2003	15:15	Unknown	Unknown	7.56	3.50	4.06
	1/12/2003	9:29	Unknown	Unknown	7.56	2.82	4.74

Notes:
* = Measured from top of casing. Construction depth unknown.
bgs - below ground surface
msl - mean sea level
toc - top of casing
uto - unable to open well

Map ID	Address	City	Owner	Update	Xcoord	Ycoord	Tsrqq	Drill Date	Elevation	Total Depth (feet)	Well Diameter (inches)	Use
	Abandoned Wells:											
1	2500 DAVIS ST	San Leandro	HOHENER PACKING CO.	8/1/1984	122188160	37715173	2S/3W 33H	/29	0	140	8	Abandoned
2	2615 DAVIS ST	San Leandro	BAY CITY PAPER STOCK CO.	8/1/1984	122188680	37714812	2S/3W 33J	?	0	0	15	Abandoned
3	669 TUDOR CT	San Leandro	ETHLY CORDAWAY	8/1/1984	122183000	37721059	2S/3W 34C	?	0	18	6	Abandoned
4	668 TUDOR CT	San Leandro	SCRIBNER REALTY	8/1/1984	122182800	37721059	2S/3W 34C	?	0	0	0	Abandoned
5	880 DOOLITTLE DR	San Leandro	KAISER AIRCRAFT & ELEC.	8/1/1984	122184945	37718781	2S/3W 34D	?	0	55	6	Abandoned
6	870 DOOLITTLE DR	San Leandro	JOHN JACKLICH	8/1/1984	122184945	37718781	2S/3W 34D	/10	0	38	6	Abandoned
7	870 DOOLITTLE DR	San Leandro	JOHN JACKLICK	8/1/1984	122184945	37718781	2S/3W 34D	5/34	0	120	12	Abandoned
8	1950 DAVIS ST	San Leandro	CHRYSLER CORP.	8/1/1984	122180781	37717444	2S/3W 34F	/39	0	285	10	Abandoned
9	2100 WILLIAMS ST	San Leandro	BETTS SPRING CO.	8/2/1984	122178798	37708542	2S/3W 34P	?	0	0	12	Abandoned
10	1717 AURORA DR	San Leandro	OREN THORKILDSEN	12/12/1984	122185009	37704351	3S/3W 3D	?	0	33	6	Abandoned
11	13205 AURORA DR	San Leandro	DICK WINSETT	8/15/1984	122183644	37702055	3S/3W 3E	?	2	7	0	Abandoned
	Domestic Wells:											
12	2650 EDEN RD	San Leandro	DOROTHY PELKEY	8/1/1984	122189482	37715111	2S/3W 33H	/41	0	54	12	Domestic
13	1889 DAVIS ST	San Leandro	MINNIE MELLO	8/1/1984	122178288	37717893	2S/3W 34C	?	0	0	0	Domestic
14	1887 DAVIS ST	San Leandro	CATHERINE NARANJO	8/1/1984	122178249	37717902	2S/3W 34C	?	0	0	0	Domestic
15	900 DOOLITTLE DR	San Leandro	SPEEDMASTER ENGINEERING	8/1/1984	122184945	37718781	2S/3W 34D	?	0	100	0	Domestic
16	1951 DAVIS ST	San Leandro	MAY CUNHA	8/1/1984	122181739	37716859	2S/3W 34F	/54	0	60	12	Domestic
17	SW COR. AURORA & 134 AV	San Leandro	V. B. HILL	9/24/1984	122185029	37700531	3S/3W 3E	?	0	0	0	Domestic
	Industrial Wells:											
18	2500 DAVIS ST	San Leandro	HOHENER MEAT CO.	8/1/1984	122188160	37715173	2S/3W 33H	4/78	0	173	0	Industrial
19	1883 DAVIS ST	San Leandro	CITY DRAYAGE CO.	8/1/1984	122178171	37717920	2S/3W 34C	/53	0	50	6	Industrial
20	1616 DOOLITTLE	San Leandro	MR. POLADIAN	7/30/1984	122182025	37709732	2S/3W 34P	/52	0	50	0	Industrial
21	2194 WILLIAM ST	San Leandro	INSURED TRANSPORTERS INC	8/2/1984	122180406	37707872	2S/3W 34P	?	0	90	0	Industrial
22	2500 DAVIS ST	San Leandro	HOHENER PACKING CO.	8/1/1984	122188160	37715173	2S/3W 33H	1/57	0	180	0	Industrial
	Irrigation Wells:											
23	692 TUDOR CT	San Leandro	RALPH BECKER	8/1/1984	122182800	37720940	2S/3W 27N	9/77	0	42	8	Irrigation
24	50 HEGENBURGER LOOP	Oakland	W.E. LYONS CONSTRUCTION	8/1/1984	122193938	37733121	2S/3W 28B	Oct-77	0	48	4	Irrigation
25	191 98TH AVE	Oakland	RATTO BROS INC.	12/16/1988	122193113	37728807	2S/3W 28G	Jun-88	0	305	10	Irrigation
26	EARHART & DOOLITTLE	Oakland	OAKLAND AIRPORT	8/1/1984	122218350	37739150	2S/3W 29H	4/42	5	350	12	Irrigation
27	ESTUDILLO	San Leandro	W. PAGANO	8/1/1984	122160900	37685250	2S/3W 31J	/46	28	375	0	Irrigation
28	741 WARDEN AVE	San Leandro	CHARLES TILDEN	8/1/1984	122179812	37721500	2S/3W 34C	/57	0	25	7	Irrigation
29	645 TUDOR CT	San Leandro	SPENCER REYNOLDS	8/1/1984	122183000	37721178	2S/3W 34C	/47	0	32	8	Irrigation
30	667 TUDOR CT	San Leandro	PRESTON GRIFFIN	8/1/1984	122183000	37721066	2S/3W 34C	/53	0	30	6	Irrigation
31	685 TUDOR CT	San Leandro	SAM ANGOTTI	8/1/1984	122183000	37720975	2S/3W 34C	/53	15	35	6	Irrigation
32	BEECHER ST	San Leandro	SIESTA CATERING	8/1/1984	122182050	37718400	2S/3W 34C	6/77	0	150	6	Irrigation
33	989 DOOLITTLE DR	San Leandro	PORT OF OAKLAND	8/1/1984	122184943	37715047	2S/3W 34E	?	0	26	7	Irrigation
34	1855 DAVIS ST	San Leandro	DOLORES TORRES	8/1/1984	122177638	37718043	2S/3W 34F	?	0	26	7	Irrigation
35	13060 NEPTUNE DR	San Leandro	LEO KIELMYR	8/15/1984	122187787	37702323	3S/3W 3E	/48	0	70	6	Irrigation
36	3072 JUNEAU ST	San Leandro	EARL SHAW	9/24/1984	122180491	37704343	3S/3W 3C	8/77	0	25	6	Irrigation
37	2505 WILLIAMS ST	San Leandro	MIKE COX	8/15/1984	122186181	37705347	3S/3W 3D	/55	0	33	5	Irrigation
38	2491 STATE ST	San Leandro	VAL VALENTINE	8/17/1984	122184682	37704477	3S/3W 3D	8/77	0	26	6	Irrigation
39	13145 NEPTUNE DR	San Leandro	J.B. LORD	8/15/1984	122187807	37701552	3S/3W 3E	/50	0	18	4	Irrigation
40	13165 NEPTUNE DR	San Leandro	JAMES THACKER	8/15/1984	122187765	37701377	3S/3W 3E	/55	0	25	6	Irrigation
41	2037 MARINE CT	San Leandro	ALBERS	8/15/1984	122185029	37700531	3S/3W 3E	/53	0	14	6	Irrigation
42	2034 MARINE CT	San Leandro	MERIAM JOHNSON	8/15/1984	122185029	37700531	3S/3W 3E	/57	0	25	4	Irrigation
43	2042 MARINE CT	San Leandro	MCKEE	8/15/1984	122185029	37700531	3S/3W 3E	/56	0	0	5	Irrigation
44	13120 NEPTUNE DR	San Leandro	G. BARRAGAN	8/15/1984	122187661	37701798	3S/3W 3E	/51	0	18	7	Irrigation

Map ID	Address	City	Owner	Update	Xcoord	Ycoord	Tsrqq	Drill Date	Elevation	Total Depth (feet)	Well Diameter (inches)	Use
45	190 TUNIS RD & 98TH AV	Oakland	RATTO BROTHER	7/30/1984	122193938	37729456	2S/3W 28G	Jul-56	10	250	12	Irrigation
	Piezometers:											
46	811 O'DONNELL AV	San Leandro	CATERPILLAR	12/26/1997	122178048	37722297	2S/3W 27P	Dec-96	0	66	1	Piezometer
	Unknown Use:											
47	13000 NEPTUNE DR	San Leandro	GOSSELIN	9/24/1984	122187913	37702848	3S/3W 3E	/49	0	32	0	?
	Exact Location Unknown:											
	OAKLAND AIRPORT	Oakland	PORT OF OAKLAND	8/1/1984	122221258	37729501	2S/3W 29E	27-Dec	0	352	0	Abandoned
	EARHART	Oakland	OAKLAND AIRPORT	8/1/1984	122218350	37739150	2S/3W 29M	?	0	350	0	Abandoned
	DAVIS ST	San Leandro	?	8/1/1984	122192400	37714500	2S/3W 34E	?	13	0	0	Abandoned
	?	San Leandro	J.A. JACKLICH	12/14/1984	122195300	37713650	2S/3W 33A	?	0	138	12	Domestic
	2675 W. 129 AV	San Leandro	BAY AREA GUN CLUB	9/24/1984	122189562	37704382	3S/3W 4A	/25	0	31	8	Domestic
	SAN LEANDRO CITY DUMP	San Leandro	K. PYATT	8/1/1984	122189482	37715111	2S/3W 33H	?	0	117	0	Industrial
	?	San Leandro	KNAPP	8/1/1984	122195300	37713650	2S/3W 31P	/41	22	85	0	Irrigation
	?	San Leandro	TWIN NURSERY	8/1/1984	122195300	37713650	2S/3W 31Q	?	22	325	0	Irrigation
	METRO GOLF LINKS	Oakland	METRO GOLF LINKS (PORT OF OAKLAND)	4/1/2003			2S/3W 33G	8/18/2002	0	634	12	Irrigation
	1111 JACKSON ST	San Leandro	SAN BREED JR.	8/1/1984	122189480	37711641	2S/3W 33J	?	13	118	14	Irrigation
	2524 W. 129 AV	San Leandro	PAIVA	8/15/1984	122185009	37704351	3S/3W 3D	?	0	0	0	Irrigation
	2552 W. 129 AV	San Leandro	G. JONES	8/15/1984	122185009	37704351	3S/3W 3D	?	0	86	7	Irrigation
	2566 W. 129 AV	San Leandro	BURKE	9/24/1984	122185009	37704351	3S/3W 3D	/50	0	30	12	Irrigation

Data obtained from the County of Alameda, Public Works Agency, Water Resources Section.
Tsrqq - Township, section, range

Table 4

Comparison of Concentrations of Commonly Detected Metals to Background Ranges
Former United Airlines Oakland Maintenance Center
Oakland International Airport

Metal	Low (mg/kg)	High (mg/kg)	Mean (mg/kg)	Background Range[1] (mg/kg)
Arsenic (Total)	< 2.5	82	15.1	1.2 - 31
Arsenic (ICP)	14	82	22	1.2 - 31
Arsenic (GF)	<2.5	32	5.6	1.2 - 31
Barium	< 0.5	150	44	40.6 - 411
Cadmium	< 0.5	44	5.2	0.27 - 3.3
Chromium	2.8	190	29.3	10 - 142
Cobalt	2.5	12	5	6.5 - 25.5
Copper	2.3	4,200	56.6	5.4 - 99.7
Nickel	14	340	31.9	16 - 144
Thallium (Total)	< 2.5	380	26.2	<0.25 - 42.5
Thallium (ICP)	50	380	101.1	<0.25 - 42.5
Thallium (GF)	<0.25	<0.25	NA	<0.25 - 42.5
Vanadium	7.6	54	16.3	22.2 - 90.1
Zinc	8.6	190	31.5	32.9 - 281

Notes:

[1]Refer to Table 5 for study details.

mg/kg - milligrams per kilogram

ICP - Inductively Coupled Plasma method

GF - Graphite Furnace method

Table 5
Comparison of Background Concentrations of Metals in Bay Area Soils
Former United Airlines Oakland Maintenance Center
Oakland International Airport

Study	Number of Samples	Formation	Calculation	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
LBNL, 1995	498	--	95% UCL	5.5	19.1	323.6	1.0	2.7	99.6	22.2	69.4	16.1	0.4	7.4	119.8	5.6	1.8	27.1	74.3	106.1
	97	Colluvium & Fill	95% UCL	5.9	14	358.8	0.9	1.5	91.4	22	59.6	14.5	0.3	3.2	120.2	5.6	1.7	42.5	78.2	91.5
	97	Great Valley Group	95% UCL	6.3	31	248.5	1.0	3.2	59	25.5	99.7	21.5	0.6	3.8	69.7	4.8	2.2	8.7	69.3	135.9
	101	Moraga Formation	95% UCL	6.1	9.3	154.1	0.8	2.6	142.2	23.1	54.1	8.9	0.3	3.8	100.4	4.7	2.0	38.9	90.1	84.7
	184	Orinda Formation	95% UCL	5.2	17.8	411.2	1.1	3.3	95.2	20.6	66.9	14.8	0.3	11.4	144.3	7.0	1.9	19.8	69.3	98.3
	13	San Pablo Group	95% UCL	7.1	15.7	280	0.8	2.9	78.6	22	40.9	10.3	0.4	3.7	125.9	4.9	1.5	10.9	36.2	97.7
BMWC, 1994	< 150	Fill	Geometric mean	1.98	4.32	40.6	0.29	0.43	16.32	6.45	5.44	4.79	0.07	0.76	42.85	1.36	0.35	--	22.19	32.90
		Fill	Geometric std. dev.	1.74	1.83	1.62	1.47	2.05	9.38	1.71	6.62	2.93	1.76	1.98	1.50	2.93	1.57	--	1.54	1.54
Scott, 1991	~150	Alluvium	Arithmetic mean	--	2.86	--	0.88	--	51.28	--	35.63	11.43	--	--	73.53	--	--	--	--	65.27
			Std. dev.	--	2.61	--	0.55	--	20.77	--	11.85	4.66	--	--	27.15	--	--	--	--	17.55
MLH, 1991	--	Off-Site Background (2 Rounds)	Arithmetic mean	--	8.3	--	--	1.0	10.0	--	22	32.4	0.14	--	16	--	--	--	--	65
	23			--	< 4.1	--	--	< 0.9	16.4	--	7.2	61	< 0.11	--	18	--	--	--	--	67.2
D&M, 1989a	4	Upgradient	Arithmetic mean	--	5.15	115	--	--	42.5	10	17.5	13.3	0.5	--	42.5	--	--	--	35	37.5
D&M, 1989b	26	Upgradient	Arithmetic mean	--	1.9	127.3	--	--	44.6	11.5	17.7	< 10	0.2	--	45.4	--	--	--	36.2	41.9
SECD, 1992	5	Clay / Loam	Arithmetic mean	2.5	8.48	228	0.5	0.83	72.6	9.53	37	65	0.14	1.74	43	< 0.25	< 0.25	< 0.25	46.9	281.6
PRC, 1996	20	Fill	95% UCL	1.5	8.4	145	0.72	0.27	95	16	72	59	0.6	0.33	96	--	0.2	--	70	152
Author Unknown	10	Background Soil	Arithmetic mean	--	1.2	125	0.35	--	33.4	8.8	22.7	7.4	--	--	22.5	--	--	--	27.8	39.9
			Std. dev.	--	1.8	145	0.17	--	6.5	3.1	16.7	2.1	--	--	15.7	--	--	--	6.3	16.4
Background Range	--	--	--	1.5 - 7.1	1.2 - 31	41 - 411	0.29 - 1.1	0.27 - 3.3	10 - 142	6.5 - 25.5	5.4 - 100	4.8 - 65	0.07 - 0.6	0.33 - 11.4	16 - 144	<0.25 - 7	0.2 - 2.2	<0.25 - 42.5	22 - 90	33 - 282

References:

LBNL = Lawrence Berkeley National Laboratory, University of California, Environmental Restoration Program. *Protocol for Determining Background Concentrations of Metals in Soil at Lawrence Berkeley National Laboratory.* August 1995.

BMWC = Burns and McDonnell Waste Consultants, Inc. *San Francisco International Airport Background Metals Concentrations in Soil.* December 1994.

Scott = Scott, Christina Marie. *Background Metals Concentrations in Northern Santa Clara County, California. Master's Thesis, University of San Francisco.* December 1991.

MLH = McLaren-Hart. *Remedial Investigation Report - Hercules Properties, Inc., Hercules, California.* 15 March 1991.

D&M = Dames and Moore, Inc. *Report - Phase II Remedial Investigation, 750 139th Avenue Site, San Leandro, California.* 13 October 1989.

D&M = Dames and Moore, Inc. *Report - Phase II Remedial Investigation, 1455 Factor Avenue Site, San Leandro, California.* 3 August 1989.

SECD = SEC Donahue Environment and Infrastructure. *Sitewide Remedial Investigation, Pacific States Steel Corporation, Union City, California.* 3 December 1992.

PRC = PRC Environmental Management. *Final Remedial Investigation Report - Fleet and Industrial Supply Center Oakland, Alameda Facility / Alameda Annex Site, Alameda California.* January 1996.

Author Unknown. *Results of Chemical Testing on Background Soil Samples, Area 2 Investigation Completion Report, Roberts Landing Development Site, San Leandro, California.* 1994

Table 6
Investigation Screening Criteria
Former United Airline Oakland Maintenance Center
Oakland International Airport

Compound	*Soil Standard (mg/kg)*	*GW Standard (µg/L)*	*Compound*	*Soil Standard (mg/kg)*	*GW Standard (µg/L)*
VOCs (Soil Criteria - USEPA Region 9 Industrial PRG; Ground Water Criteria – USEPA MCL)					
Chloroethane	6.5	None	Methyl tert-butyl ether	36	13
Chloroform	12	None	Naphthalene	190	None
Chloromethane	2.6	None	Styrene	1,700	100
1,2-Dichlorobenzene	370	600	Tetrachloroethylene	3.4	5
1,4-Dichlorobenzene	79	5	1,1,1-Trichloroethane	1,200	200
1,1-Dichloroethane	6.0	5	Trichloroethene	0.11	5
1,2-Dichloroethane	0.60	0.50	1,2,4-Trimethylbenzene	70	None
1,1-Dichloroethene	410	6	1,3,5-Trimethylbenzene	20	None
cis-1,2-Dichloroethene	150	6	Ethylbenzene	20	700
Trans-1,2-Dichloroethene	230	10	Toluene	520	150
Dichloromethane	21	5	Vinyl Chloride	0.079	0.50
Isopropylbenzene	2,000	None	Total Xylenes	420	1750
n-Butylbenzene	240	None	sec-Butylbenzene	220	None
p-Isopropyltoluene	170	None			
SVOCs (Soil Criteria - USEPA Region 9 Industrial PRG; Ground Water Criteria – USEPA MCL)					
4-Methylphenol	3,100	None			
Metals (Soil Criteria - USEPA Region 9 Industrial PRG; Ground Water Criteria – USEPA MCL)					
Antimony	410	0.006	Mercury	310	0.002
Arsenic	260	0.05	Molybdenum	5,100	0.05
Barium	67,000	1	Nickel	20,000	0.1
Beryllium	1,900	0.004	Selenium	5,100	0.05
Cadmium	450	0.005	Silver	5,100	0.1*
Chromium	450	0.05	Thallium	67	0.002
Cobalt	1,900	None	Vanadium	7,200	None
Copper	41,000	1.3	Zinc	100,000	5*
Lead	750	0.015	* - Secondary MCL		
Total Petroleum Hydrocarbons (Soil and Ground Water Criteria –Bay Area RWQCB Environmental Screening Levels)					
Extractable (Middle Distillates)	500	640	Purgeable	400	500
Extractables (Motor Oil)	1,000	640			

Notes:
The criteria listed in this table were used to assess the need for additional investigation prior to conducting the risk assessment activities described in Section 5 of the text.
mg/kg = milligrams per kilogram
µg/l = micrograms per liter

Sample Location	Sample Depth (feet bgs)	Date Sampled	Methods	VOCs: N-BB	SEC-BB	DCM	IPB	P-IPT	MTBE	NAP	PCE	1,1,1-TCA	1,2,4-TMB	1,3,5-TMB	BZ	EB	TOL	XYL	TPPH	TEPH	TEPH SGCU	TPH-D	TPH-JF	TPH-MO	SVOCs	PCBs
Residential ESL (Non-Potable Water) (mg/kg)				SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	100	500	500	500	500	500	SNA	SNA
Commercial ESL (Non-Potable Water) (mg/kg)				SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	400	500	500	500	500	1,000	SNA	SNA
Residential PRG (mg/kg)				240	220	9.1	NS	52	17	56	2	1200	21	8.9	0.60	8.9	520	270	NS	NS	NS	NS	NS	NS	-	0.22
Industrial PRG (mg/kg)				240	220	21	NS	170	36	190	3.4	1,200	70	20	1.3	20	520	420	NS	NS	NS	NS	NS	NS	-	0.74
Area of Concern 1 - Small Parts Wash Rack/Former World Airways Cleaning Room																										
ERM-B-1	3.5	4/15/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA	NA	NA
ERM-B-2	3.5	4/15/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA	NA	NA
W-B-4*	0	4/14/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.055	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	1.7 g	NA	NA	57 o	<50	560	NA	NA
W-B-4*	3	4/14/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1	NA	NA	<1	<1	<5	NA	NA
W-B-4	3-4	4/14/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA	NA	NA
W-B-5*	0	4/14/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	0.074	0.11	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.026	3.1 g	NA	NA	71 o	<50	810	NA	NA
W-B-5*	3	4/14/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1	NA	NA	<1	<1	<5	NA	NA
W-B-5	3-4	4/14/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA	NA	NA
W-B-6*	0	4/14/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1	NA	NA	4.1 o	1.8	31	NA	NA
W-B-6*	3	4/14/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1	NA	NA	<1	<1	<5	NA	NA
W-B-6	3-4	4/14/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA	NA	NA
Area of Concern 2 - Aircraft Wash Rack																										
ERM-B-3	2.5	4/15/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA	NA	NA
ERM-B-4	2.5	4/15/2003	8260	0.0098	0.0073	<0.025	<0.0050	0.012	<0.0050	0.013	<0.0050	<0.0050	0.05	0.024	<0.0050	<0.0050	<0.0050	<0.010	4.7	18 NJ	9.2 NJ	NA	NA	NA	NA	NA
ERM-B-5	2.5	4/15/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	0.015	<0.0050	<0.0050	0.014	0.0078	<0.0050	<0.0050	<0.0050	<0.010	1.4	43 NJ	<20	NA	NA	NA	NA	NA
ERM-B-6	2.5	4/15/2003	8260	0.092 J	0.094 J	<0.025	0.048 J	0.19 J	<0.0050	0.047 J	<0.0050	<0.0050	1.2 J	1.1 J	<0.0050	0.027 J	0.005 J	0.35 J	170	[redacted] J	410	NA	NA	NA	ND[1]	NA
W-B-7*	0	4/17/2003	8260	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.28	<0.1	<0.1	2.1	1.3	<0.1	<0.1	<0.1	<0.1	[redacted] g	NA	NA	[redacted] d	[redacted]	<500	NA	NA
W-B-7	1-2	4/17/2003	8260	<0.0050	<0.0050	<0.025	0.0085	0.017	<0.0050	0.047	<0.0050	<0.0050	0.09	0.045	<0.0050	<0.0050	<0.0050	<0.010	7.9	27 NJ	13 NJ	NA	NA	NA	NA	NA
W-B-7*	3	4/17/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.006	<0.0050	<0.0050	0.0059	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	2.6 g	NA	NA	3.3 b,f	2.3	<5	NA	NA
W-B-8*	0	4/14/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.03	1.1 a	NA	NA	<50	<50	390	NA	NA
W-B-8	1.5-2.5	4/14/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<100	NA	NA	NA	NA	NA	NA
W-B-8*	3	4/14/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	1.7 g	NA	NA	81 o	<50	700	NA	NA
Area of Concern 3 - Industrial Wastewater Vault																										
W-B-10*	0	4/15/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA
W-B-10*	3	4/15/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA
W-B-10*	6	4/15/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA
W-B-10*	0	4/15/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.039	<1	NA	NA	1.1 b	<1	<5	NA	NA
W-B-10*	3	4/15/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5	NA	NA
W-B-10	3-4	4/15/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA	NA	NA
W-B-10*	6	4/15/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5	NA	NA
W-B-11*	0	4/15/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5	NA	NA
W-B-11	1-2	4/15/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA	NA	NA
W-B-11*	3	4/15/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5	NA	NA
W-B-11*	7.5	4/15/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5	NA	NA
W-B-12*	0	4/15/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	3.3 g	NA	NA	34 b,o	9.9	100	NA	NA
W-B-12	0.5	4/16/2003	8260	<0.0050	<0.0050	<0.054 UJb	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	18 NJ	15 NJ	NA	NA	NA	NA	NA
W-B-12*	3	4/15/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	1.7 g	NA	NA	140 b,o	77	600	NA	NA
W-B-12*	5.5	4/15/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	7.4 b,o	3.9	22	NA	NA
Area of Concern 4 - Aboveground Fuel Storage Tank																										
ERM-B-8	4	4/16/2003	8015/8021	NA	NA	NA	NA	NA	<0.0050	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	<0.10	<5.0	NA	NA	NA	NA	NA	NA
ERM-B-9	4.5	4/16/2003	8015/8021	NA	NA	NA	NA	NA	<0.0050	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	<0.10	200 NJ	<20	NA	NA	NA	ND[1]	NA
Area of Concern 5 - Vehicle Maintenance Center																										
ERM-B-10	2.5	4/17/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA	NA	NA
ERM-B-11	2.5	4/17/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA	NA	ND[1]
ERM-B-11	6.5	4/17/2003	DHS LUFT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<5.0	NA	NA	NA	NA	NA	ND[1]
W-B-1*	0	4/14/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	13 o	<5	140	NA	NA
W-B-1*	3	4/14/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5	NA	NA
W-B-1*	10	4/14/2003	8260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1	NA	NA	<1	<1	<5	NA	NA
W-B-2*	0	4/14/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	6.3 o	<5	81	NA	NA
W-B-2*	3	4/14/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5	NA	NA
W-B-2	3.5-4.5	4/14/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA	NA	NA
W-B-2*	10	4/14/2003	8260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1	NA	NA	<1	<1	<5	NA	NA
W-B-3*	0	4/14/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	10 o	<5	93	NA	NA
W-B-3*	3	4/14/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5	NA	NA
W-B-3	3-4	4/14/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1.0	<5.0	NA	NA	NA	NA	NA	NA
W-B-3*	7	4/14/2003	8260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1	NA	NA	<1	<1	<5	NA	NA
Area of Concern 6 - Boiler and Aboveground Diesel Storage Tank																										
ERM-B-27	2	4/17/2003	DHS LUFT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<5.0	NA	NA	NA	NA	NA	NA

Sample Location	Sample Depth (feet bgs)	Date Sampled	Methods	VOCs N-BB	SEC-BB	DCM		IPB	P-IPT	MTBE	NAP	PCE	1,1,1-TCA	1,2,4-TMB	1,3,5-TMB	BZ	EB	TOL	XYL	TPPH	TEPH		TEPH SGCU		TPH-D		TPH-JF	TPH-MO	SVOCs	PCBs
Residential ESL (Non-Potable Water) (mg/kg)				SNA	SNA	SNA		SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	100	500		500		500		500	500	SNA	SNA
Commercial ESL (Non-Potable Water) (mg/kg)				SNA	SNA	SNA		SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	400	500		500		500		500	1,000	SNA	SNA
Residential PRG (mg/kg)				240	220	9.1		NS	52	17	56	2	1200	21	8.9	0.60	8.9	520	270	NS	NS		NS		NS		NS	NS	-	0.22
Industrial PRG (mg/kg)				240	220	21		NS	170	36	190	3.4	1,200	70	20	1.3	20	520	420	NS	NS		NS		NS		NS	NS	-	0.74
Area of Concern 7 - Former 90-Day Hazardous Waste Accumulation Area																														
W-B-16*	0	4/17/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<1		<1	<5	NA	NA
W-B-16	1-2	4/17/2003	8260	<0.0050	<0.0050	<0.025		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0		NA		NA		NA	NA	NA	NA
W-B-16*	3	4/17/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<1		<1	<5	NA	NA
W-B-17*	0	4/17/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<1		<1	<5	NA	NA
W-B-17	1-2	4/17/2003	8260	<0.0050	<0.0050	<0.025		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0		NA		NA		NA	NA	NA	NA
W-B-17*	3	4/17/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<1		<1	<5	NA	NA
Area of Concern 8 - Current 90-Day Hazardous Waste Accumulation Area																														
ERM-B-12	2	4/17/2003	8260	<0.0050	<0.0050	<0.025		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0		NA		NA		NA	NA	NA	NA
Area of Concern 9 - Hazardous Material Storage Areas																														
ERM-B-13	3.5	4/16/2003	8260	<0.0050	<0.0050	<0.047	UJb	<0.0050	<0.0050	<0.0050	0.0063	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0		NA		NA		NA	NA	NA	NA
ERM-B-14	4.5	4/17/2003	8260	<0.0050	<0.0050	<0.025		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<20		NA		NA		NA	NA	NA	NA
W-B-21*	0	4/17/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		1.9	o	1.2	6.2	NA	NA
W-B-21*	3	4/17/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<1		<1	<5	NA	NA
W-B-22*	0	4/18/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<5		<5	57	NA	NA
W-B-22	2-3	4/18/2003	8260	<0.0050	<0.0050	<0.025		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0		NA		NA		NA	NA	NA	NA
W-B-22*	3	4/18/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<1		<1	<5	NA	NA
W-B-23*	0	4/18/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<1		<1	<5	NA	NA
W-B-23*	3	4/18/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<200		<200	[redacted]	NA	NA
Area of Concern 10 - Chemical Storage Area																														
ERM-B-15	1	4/17/2003	8260	<0.0050	<0.0050	<0.025		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0		NA		NA		NA	NA	NA	NA
Area of Concern 11 - Aircraft Fueling/Defueling Equipment Areas																														
ERM-B-16	4.5	4/16/2003	DHS LUFT	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<5.0		NA		NA		NA	NA	NA	NA
ERM-B-17	3.5	4/16/2003	DHS LUFT	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	5.1	NJ	<5.0		NA		NA	NA	NA	NA
ERM-B-18	4	4/16/2003	DHS LUFT	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<5.0		NA		NA		NA	NA	NA	NA
ERM-B-19	4.5	4/16/2003	DHS LUFT	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<5.0		NA		NA		NA	NA	NA	NA
Area of Concern 12 - Fire System Motors and Associated Fuel Tanks																														
ERM-B-20	3	4/16/2003	DHS LUFT	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<5.0		NA		NA		NA	NA	NA	NA
ERM-B-21	2	4/17/2003	DHS LUFT	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<5.0		NA		NA		NA	NA	NA	NA
Area of Concern 13 - Paint Spray Booth																														
ERM-B-22	1.5	4/17/2003	8260	<0.0050	<0.0050	<0.025		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0		NA		NA		NA	NA	NA	NA
Area of Concern 14 - Storm Drains																														
ERM-B-23	4.5	4/17/2003	8260	<0.0050	<0.0050	<0.025		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<20		NA		NA		NA	NA	NA	NA
W-B-32*	0	4/16/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		3	b,o	<1	10	NA	NA
W-B-32	1-2	4/16/2003	8260	<0.0050	<0.0050	<0.025		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	23	NJ	22	NJ	NA		NA	NA	NA	NA
W-B-32*	3	4/16/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<1		<1	<5	NA	NA
W-B-32*	8	4/16/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		7.6	b,o	10	<25	NA	NA
W-B-38*	0	4/15/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<1		<1	<5	NA	NA
W-B-38	2-3	4/15/2003	8260	<0.0050	<0.0050	<0.025		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0		NA		NA		NA	NA	NA	NA
W-B-38*	3	4/14/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<1		<1	<5	NA	NA
W-B-38*	7.5	4/14/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<1		<1	<5	NA	NA
W-B-39*	0	4/14/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<1		<1	<5	NA	NA
W-B-39*	3	4/14/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<1		<1	<5	NA	NA
W-B-39*	8	4/14/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<1		<1	<5	NA	NA
Area of Concern 15 - Aircraft Parking and Run Up Area																														
ERM-B-24	2.5	4/15/2003	DHS LUFT	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<5.0		NA		NA		NA	NA	NA	NA
ERM-B-25	3.5	4/15/2003	DHS LUFT	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<5.0		NA		NA		NA	NA	NA	NA
ERM-B-26	2	4/16/2003	DHS LUFT	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<5.0		NA		NA		NA	NA	NA	NA
Area of Concern 16 - Reported Fuel Spill Area on Taxiway																														
W-B-13*	0	4/15/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<1		<1	<5	NA	NA
W-B-13*	3	4/15/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<1		<1	<5	NA	NA
W-B-13*	7.5	4/15/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<1		<1	<5	NA	NA
W-B-14*	0	4/15/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<1		<1	<5	NA	NA
W-B-14	2-3	4/15/2003	DHS LUFT	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<5.0		NA		NA		NA	NA	NA	NA
W-B-14*	3	4/15/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<1		<1	<5	NA	NA
W-B-14*	7.5	4/15/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<1		<1	<5	NA	NA
W-B-15*	0	4/15/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<1		<1	<5	NA	NA
W-B-15*	7.5	4/15/2003	8260	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA		NA		<1		<1	<5	NA	NA

Sample Location	Sample Depth (feet bgs)	Date Sampled	Methods	VOCs: N-BB	SEC-BB	DCM	IPB	P-IPT	MTBE	NAF	PCE	1,1,1-TCA	1,2,4-TMB	1,3,5-TMB	BZ	EB	TOL	XYL	TPPH		TEPH	TEPH SGCU	TPH-D		TPH-JF	TPH-MO	SVOCs	PCBs
Residential ESL (Non-Potable Water) (mg/kg)				SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	100		500	500	500		500	500	SNA	SNA
Commercial ESL (Non-Potable Water) (mg/kg)				SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	400		500	500	500		500	1,000	SNA	SNA
Residential PRG (mg/kg)				240	220	9.1	NS	52	17	56	2	1200	21	8.9	0.60	8.9	520	270	NS		NS	NS	NS		NS	NS	-	0.22
Industrial PRG (mg/kg)				240	220	21	NS	170	36	190	3.4	1,200	70	20	1.3	20	520	420	NS		NS	NS	NS		NS	NS	-	0.74
Area of Concern 18 - Migration of Offsite Solvent Plume Onto OMC Property																												
W-B-9	3-3.5	4/18/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	NA		NA	NA	NA		NA	NA	NA	NA
W-B-9*	4	4/18/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-18*	4.5	4/18/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	2	b,o	1.4	<5	NA	NA
W-B-18*	7.5	4/18/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-19	3-3.5	4/18/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	NA		NA	NA	NA		NA	NA	NA	NA
W-B-19*	4	4/18/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-20*	3	4/18/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
Area of Concern 19 - Runoff from Pavement to Unpaved Area North of OMC																												
W-B-24*	0	4/14/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-24*	3	4/14/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	1.4	b	<1	<5	NA	NA
W-B-24*	7.5	4/14/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	3.2	o	<1	17	NA	NA
W-B-25*	0	4/15/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-25	1-2	4/15/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1		<5.0	NA	NA		NA	NA	NA	NA
W-B-25*	3	4/15/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-25*	8	4/15/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	2	b,o	<1	7.9	NA	NA
W-B-26*	0	4/16/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-26*	3	4/16/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-26*	11.5	4/16/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-27*	0	4/16/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-27*	3	4/16/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-27*	8	4/16/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-28*	0	4/16/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-28*	3	4/16/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-28*	7.5	4/16/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-29*	0	4/16/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-29	1-2	4/16/2003	8260	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1		<5.0	NA	NA		NA	NA	NA	NA
W-B-29*	3	4/16/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-29*	8	4/16/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-30*	0	4/16/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-30*	3	4/16/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-30*	7.5	4/16/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-31*	0	4/16/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-31*	3	4/16/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	7.1	o	<2	27	NA	NA
W-B-31*	3.5	4/16/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	11	o	<5	42	NA	NA
W-B-33*	0	4/16/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	2.7	g	NA	NA	220	o	<200	[redacted]	NA	NA
W-B-33*	2.5	4/16/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	1.5	o	<1	8.8	NA	NA
W-B-33*	3	4/16/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-33*	8	4/16/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	12	b,o	10	27	NA	NA
W-B-34*	0	4/17/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<10		<10	100	NA	NA
W-B-34*	3	4/17/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	2.1	b,o	<1	7.9	NA	NA
W-B-35*	0	4/17/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	1.1	o	<1	<5	NA	NA
W-B-35*	3	4/17/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	6.8	c,m	1.1	12	NA	NA
W-B-36*	0	4/17/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-36*	3	4/17/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5	NA	NA
W-B-37*	0	4/17/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	5.5	o	<1	42	NA	NA
W-B-37*	3.5	4/17/2003	8260	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	15	b,o	4.6	17	NA	NA
Number of Samples				129	129	129	129	129	131	129	129	129	129	129	142	142	142	142	129		45	8	96		96	96	2	2
Number of Detections				2	2	0	2	3	0	7	1	2	6	5	0	1	1	4	13		8	5	30		12	27	0	0
Number of Detections above the PRG/ESL				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		1	0	1		1	2	0	0
Minimum Detection				0.0098	0.0073	na	0.0085	0.012	na	0.006	0.074	0.055	0.0059	0.0078	na	0.027	0.005	0.026	1.1		5.1	9.2	1.1		1.1	6.2	na	na
Maximum Detection				0.092	0.094	na	0.048	0.19	na	0.28	0.074	0.11	2.1	1.3	na	0.027	0.005	0.35	1000		1300	410	1,800		1,800	2,100	na	na
Median of Detections				0.051	0.051	na	0.028	0.017	na	0.015	0.074	0.083	0.070	0.045	na	0.027	0.005	0.035	2.7		25	15	6.95		4.25	42.0	na	na
Mean of Detections				0.051	0.051	na	0.028	0.073	na	0.059	0.074	0.083	0.577	0.495	na	0.027	0.005	0.111	92.5		204.3	93.8	84.4		160.3	300.3	na	na

Sample Location	Sample Depth (feet bgs)	Date Sampled	Methods	VOCs															TPPH	TEPH	TEPH SGCU	TPH-D	TPH-JF	TPH-MO	SVOCs	PCBs
				N-BB	SEC-BB	DCM	IPB	P-IPT	MTBE	NAP	PCE	1,1,1-TCA	1,2,4-TMB	1,3,5-TMB	BZ	EB	TOL	XYL								
Residential ESL (Non-Potable Water) (mg/kg)				SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	100	500	500	500	500	500	SNA	SNA
Commercial ESL (Non-Potable Water) (mg/kg)				SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	SNA	400	500	500	500	500	1,000	SNA	SNA
Residential PRG (mg/kg)				240	220	9.1	NS	52	17	56	2	1200	21	8.9	0.60	8.9	520	270	NS	NS	NS	NS	NS	NS	-	0.22
Industrial PRG (mg/kg)				240	220	21	NS	170	36	190	3.4	1,200	70	20	1.3	20	520	420	NS	NS	NS	NS	NS	NS	-	0.74

Notes:
Sample concentrations reported in milligrams per kilogram (mg/kg)
ERM prefix indicates a boring completed by ERM
W prefix indicates a boring completed by Weiss Associates
[1] Samples from location ERM-B-11 were analyzed for PCB-1016, -1221, -1232, -1242, -1248, -1254, and -1260; no PCB concentrations were detected. In addition, samples from locations ERM-B-6 and ERM-B-9 were analyzed for SVOCs, but none were detected.
* Data Obtained from "*United Maintenance Hanger Area, Metropolitan Oakland Airport*", Weiss Associates, 27 May 2003
Residential ESL (Non-Potable Water) = Environmental screening level for shallow soil where potentially impacted ground water is not a current or potential drinking water resource. (Table B of *Screening for Environmental Concerns At Sites With Contaminated Soil and Groundwater*, RWQCB, July 2003). This standard was initially used to assess the need for additional investigation for TPH in soil, prior to conducting the risk assessment activities described in Section 5 of the text.
Commercial ESL (Non-Potable Water) = Environmental screening level for shallow soil where potentially impacted ground water is not a current or potential drinking water resource. (Table B of *Screening for Environmental Concerns At Sites With Contaminated Soil and Groundwater*, RWQCB, July 2003). This standard was used to assess the need for additional investigation for TPH in soil, prior to conducting the risk assessment activities described in Section 5 of the text.
PRG = Preliminary remedial goal (*EPA Region 9 PRG Table*; 1 October 2002). These standards were used to assess the need for additional investigation activities for VOCs, SVOCs, and PCBs in soil, prior to conducting the risk assessment activities described in Section 5 of the text.
Bold values indicate concentrations detected above the laboratory method detection limit.

< 0.5	Compound not detected at or above the laboratory method detection limit
#	Indicates a concentration detected above the respective Commercial ESL
NS	PRG not established
NA	Not analyzed
na	Not applicable
SNA	Standard is not applicable because PRGs were used as the evaluation criteria. ESLs were only used for evaluation of TPH concentrations.
feet bgs	Feet below ground surface

Abbreviations:

VOCs = Volatile organic compounds
TPH = Total petroleum hydrocarbons
SVOCs = Semi-volatile organic compounds
PCBs = Polychlorinated biphenyls
N-BB = n-Butylbenzene
SEC-BB = sec-Butylbenzene
DCM = Dichloromethane
IPB = Isopropylbenzene
P-IPT = p-Isopropyltoluene
MTBE = Methyl tert-butyl ether
NAP = Naphthalene
PCE = Tetrachloroethene
1,1,1-TCA = 1,1,1-Trichloroethane
1,2,4-TMB = 1,2,4-Trimethylbenzene
BZ = Benzene
EB = Ethylbenzene
TOL = Toluene
XYL = Xylenes
TPPH = Total purgeable petroleum hydrocarbons
TEPH = Total extractable petroleum hydrocarbons
TEPH SGCU = Total extractable petroleum hydrocarbons - with silica gel cleanup
TPH-D = Total petroleum hydrocarbons as diesel
TPH-JF = Total petroleum hydrocarbons as jet fuel
TPH-MO = Total petroleum hydrocarbons as motor oil

McCampbell Analytical/Weiss Notes:

a= unmodified or weakly modified gasoline is significant
b= diesel range compounds are significant; no recognizable pattern
c= aged diesel is significant
d= gasoline range compounds are significant
f= one to a few isolated peaks present
g= strongly aged gasoline or diesel range compounds are significant
m= fuel oil
o= oil range compounds are significant

ERM Qualifiers:

J = Estimated value
UJb = Estimated non-detected value due to common laboratory contaminant
NJ = Tentative identification estimated

Sample Location	Sample Depth (feet bgs)	Date Sampled	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl		V	Zn	
	Residential PRG (mg/kg)		23	31	22	5,400	150	37	210	900	3100	150	390	1600	390	390	5.2		550	23,000	
	Industrial PRG (mg/kg)		310	410	260	67,000	1,900	450	450	1,900	41000	750	5,100	20,000	5,100	5,100	67		7,200	100,000	
Area of Concern 1 - Small Parts Wash Rack/Former World Airways Cleaning Room																					
ERM-B-1	3.5	4/15/2003	<0.020	<10	18 †	22	<1.0	<1.0	18	12	38	<10	<4.0	21	<10	<1.0	70 †	J	12	40	J
ERM-B-2	3.5	4/15/2003	<0.020	<10	20 †	22	<1.0	<1.0	15	<4.0	4.9	<10	<4.0	18	<10	<1.0	63 †	J	11	19	J
W-B-4*	0	4/14/2003	<0.06	<2.5	3.8	120	<0.5	<0.5	40	6.8	19	4.6	<2	51	<2.5	<1	<2.5		21	34	
W-B-4*	3	4/14/2003	<0.06	<2.5	3	82	<0.5	<0.5	21	3.7	4.3	<3	<2	21	<2.5	<1	<2.5		13	14	
W-B-4	3-4	4/14/2003	<0.020	<10	16 †	14	<1.0	<1.0	17	<4.0	3.2	<10	<4.0	17	<10	<1.0	63 †	J	12	14	
W-B-5*	0	4/14/2003	<0.06	<2.5	4.6	110	<0.5	0.86	70	8.4	23	3.5	<2	68	<2.5	<1	<2.5		26	42	
W-B-5*	3	4/14/2003	<0.06	<2.5	2.7	27	<0.5	<0.5	22	3.9	4.9	<3	<2	24	<2.5	<1	<2.5		15	16	
W-B-5	3-4	4/14/2003	<0.020	<10	17 †	13	<1.0	<1.0	15	<4.0	3.0	<10	<4.0	18	<10	<1.0	59 †	J	11	13	
W-B-6*	0	4/14/2003	<0.06	<2.5	4.2	98	<0.5	0.66	43	6.2	19	5.1	<2	47	<2.5	<1	<2.5		22	33	
W-B-6*	3	4/14/2003	<0.06	<2.5	2.8	31	<0.5	<0.5	16	3.3	2.9	<3	<2	19	<2.5	<1	<2.5		13	12	
W-B-6	3-4	4/14/2003	0.032	<10	30 †	65	<1.0	<1.0	20	5.9	14	<10	<4.0	35	<10	<1.0	140 †	J	13	26	
Area of Concern 2 - Aircraft Wash Rack																					
ERM-B-3	2.5	4/15/2003	<0.020	<10	19 †	21	<1.0	<1.0	17	<4.0	6.0	<10	<4.0	19	<10	<1.0	72 †	J	12	<14	UJ
ERM-B-4	2.5	4/15/2003	<0.020	<10	19 †	27	<1.0	<1.0	13	<4.0	6.4	<10	<4.0	17	<10	<1.0	55 †	J	10	<14	UJ
ERM-B-5	2.5	4/15/2003	<0.020	<10	21 †	26	<1.0	<1.0	22	<4.0	7.0	<10	<4.0	21	<10	<1.0	67 †	J	12	<21	UJ
ERM-B-6	2.5	4/15/2003	<0.020	<10	19 †	23	<1.0	<1.0	16	<4.0	9.0	<10	<4.0	17	<10	<1.0	62 †	J	11	<14	UJ
W-B-7*	0	4/17/2003	<0.06	<2.5	<2.5	35	<0.5	6.4	24	8.8	63	3.1	2.8	24	<2.5	<1	<2.5		16	18	
W-B-7	1-2	4/17/2003	<0.017	<10	21 †	31	<1.0	<1.0	18	<4.0	5.5	<10	<4.0	22	<10	<1.0	75 †	J	13	15	J
W-B-7*	3	4/17/2003	<0.06	<2.5	3	38	<0.5	<0.5	20	3.5	4.6	4.6	<2	20	<2.5	<1	<2.5		14	12	
W-B-8*	0	4/14/2003	0.087	3.5	11	140	<0.5	3.5	39	7.5	160	92	7.7	51	<2.5	<1	<2.5		30	110	
W-B-8	1.5-2.5	4/14/2003	0.16	<10	46 †	110	<1.0	<1.0	19	6.5	25	79	<4.0	32	<10	<1.0	200 †	J	23	94	
W-B-8*	3	4/14/2003	0.12	<2.5	12	110	<0.5	<0.5	20	6.9	18	90	<2	25	<2.5	<1	<2.5		23	100	
Area of Concern 3 - Industrial Wastewater Vault																					
W-B-10*	0	4/15/2003	<0.06	<2.5	<2.5	53	<0.5	0.64	22	3.9	9.1	4.2	<2	24	<2.5	<1	<2.5		13	22	
W-B-10*	3	4/15/2003	<0.06	<2.5	25	<0.5	<0.5	14	2.8	3.5	<3	<3	<2	19	<2.5	<1	<2.5		10	13	
W-B-10	3-4	4/15/2003	<0.020	<10	19 †	20	<1.0	<1.0	18	<4.0	3.6	<10	<4.0	19	<10	<1.0	60 †	J	12	15	
W-B-10*	6	4/15/2003	<0.06	<2.5	<2.5	35	<0.5	<0.5	16	2.7	3.8	<3	<2	17	<2.5	<1	<2.5		9.8	11	
W-B-11*	0	4/15/2003	<0.06	<2.5	<2.5	33	<0.5	0.5	22	4.3	7.6	3.6	<2	25	<2.5	<1	<2.5		15	19	
W-B-11	1-2	4/15/2003	0.022	<10	29 †	50	<1.0	<1.0	20	4.3	6.6	<10	<4.0	26	<10	<1.0	93 †	J	15	20	
W-B-11*	3	4/15/2003	<0.06	<2.5	<2.5	79	<0.5	<0.5	27	5.5	8.8	3	<2	34	<2.5	<1	<2.5		18	24	
W-B-11*	8	4/15/2003	<0.06	<2.5	<2.5	23	<0.5	<0.5	16	2.6	3.2	<3	<2	14	<2.5	<1	<2.5		9.8	9.7	
W-B-12*	0	4/15/2003	<0.06	11	<2.5	45	<0.5	15	30	2.9	690	7.8	19	51	<2.5	<1	<2.5		11	51	
W-B-12	0.5	4/16/2003	<0.020	25	33 †	150	<1.0	44	90	6.2	4,200	35	260	340	<10	2.7	160 †	J	19	190	
W-B-12*	3	4/15/2003	<0.06	3.3	12	51	<0.5	14	28	3.7	580	7.9	16	50	<2.5	<1	<2.5		11	51	
W-B-12*	6	4/15/2003	<0.06	<2.5	<2.5	21	<0.5	<0.5	18	3.2	12	<3	<2	20	<2.5	<1	<2.5		12	14	
Area of Concern 5 - Vehicle Maintenance Center																					
ERM-B-10	2.5	4/17/2003	<0.018	<10	23 †	28	<1.0	<1.0	19	4.0	4.7	<10	<4.0	21	<10	<1.0	77 †	J	13	15	J
ERM-B-11	2.5	4/17/2003	<0.018	<10	24 †	39	<1.0	<1.0	18	<4.0	4.1	<10	<4.0	20	<10	<1.0	75 †	J	13	16	J
W-B-1*	0	4/14/2003	<0.06	<2.5	2.6	100	<0.5	<0.5	190	5.9	16	4.7	<2	120	<2.5	<1	<2.5		20	33	
W-B-1*	3	4/14/2003	<0.06	<2.5	<2.5	91	<0.5	<0.5	20	5.9	13	4.1	<2	37	<2.5	<1	<2.5		14	27	
W-B-2*	0	4/14/2003	<0.06	<2.5	2.6	90	<0.5	<0.5	60	6.7	17	5.4	<2	51	<2.5	<1	<2.5		18	43	
W-B-2*	3	4/14/2003	<0.06	<2.5	<2.5	59	<0.5	<0.5	47	4.8	10	3.1	<2	42	<2.5	<1	<2.5		14	24	
W-B-2	3.5-4.5	4/14/2003	<0.020	<10	15 †	66	<1.0	<1.0	12	<4.0	2.6	<10	<4.0	15	<10	<1.0	50 †	J	8.9	11	
W-B-3*	0	4/14/2003	<0.06	<2.5	2.8	88	<0.5	<0.5	180	7.5	17	4.1	<2	120	<2.5	<1	<2.5		19	32	
W-B-3*	3	4/14/2003	<0.06	<2.5	<2.5	85	<0.5	<0.5	41	5.9	12	3.6	<2	43	<2.5	<1	<2.5		17	26	
W-B-3	3-4	4/14/2003	<0.020	<10	15 †	20	<1.0	<1.0	19	<4.0	4.6	<10	<4.0	21	<10	<1.0	74 †	J	12	18	

Sample Location	Sample Depth (feet bgs)	Date Sampled	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	V	Zn
	Residential PRG (mg/kg)		23	31	22	5,400	150	37	210	900	3100	150	390	1600	390	390	5.2	550	23,000
	Industrial PRG (mg/kg)		310	410	260	67,000	1,900	450	450	1,900	41000	750	5,100	20,000	5,100	5,100	67	7,200	100,000
Area of Concern 7 - Former 90-Day Hazardous Waste Accumulation Area																			
W-B-16*	0	4/17/2003	0.071	<2.5	<2.5	31	<0.5	<0.5	23	4.3	4.5	<3	<2	23	<2.5	<1	<2.5	15	13
W-B-16	1-2	4/17/2003	<0.019	<10	24 †	32	<1.0	<1.0	19	<4.0	4.9	<10	<4.0	22	<10	<1.0	80 † J	14	18 J
W-B-16*	3	4/17/2003	<0.06	<2.5	<2.5	12	<0.5	<0.5	17	3.2	3.6	<3	<2	19	<2.5	<1	<2.5	14	9.9
W-B-17*	0	4/17/2003	0.19	<2.5	<2.5	34	<0.5	<0.5	20	3.7	4.6	<3	<2	23	<2.5	<1	<2.5	15	13
W-B-17	1-2	4/17/2003	<0.017	<10	28 †	31	<1.0	<1.0	22	6.7	6.6	<10	<4.0	25	<10	<1.0	93 † J	15	18 J
W-B-17*	3	4/17/2003	0.13	<2.5	<2.5	29	<0.5	<0.5	26	7.3	5.8	<3	<2	25	<2.5	<1	<2.5	15	15
Area of Concern 8 - Current 90-Day Hazardous Waste Accumulation Area																			
ERM-B-12	2	4/17/2003	<0.018	<10	27 †	32	<1.0	<1.0	21	4.2	5.5	<10	<4.0	24	<10	<1.0	91 † J	15	19 J
Area of Concern 9 - Hazardous Material Storage Areas																			
ERM-B-13	3.5	4/16/2003	<0.020	<10	14 †	19	<1.0	<1.0	11	<4.0	4.0	<10	<4.0	15	<10	<1.0	59 † J	7.6	13
ERM-B-14	4.5	4/17/2003	0.028	<10	36 †	37	<1.0	<1.0	23	6.0	8.0	<10	<4.0	30	<10	<1.0	150 † J	16	28
W-B-21*	0	4/17/2003	0.075	<2.5	<2.5	47	<0.5	<0.5	32	4.9	7.2	4.5	<2	32	<2.5	<1	<2.5	16	18
W-B-21*	3	4/17/2003	0.071	<2.5	<2.5	29	<0.5	<0.5	20	4.0	4.3	<3	<2	24	<2.5	<1	<2.5	13	12
W-B-22*	0	4/18/2003	<0.06	<2.5	2.6	55	<0.5	<0.5	25	4.1	5.2	<3	<2	25	<2.5	<1	<2.5	15	16
W-B-22	2-3	4/18/2003	<0.017	<10	22 †	29	<1.0	<1.0	16	<4.0	3.8	<10	<4.0	18	<10	<1.0	76 † J	12	20 J
W-B-22*	3	4/18/2003	<0.06	<2.5	<2.5	28	<0.5	<0.5	22	3.6	4.9	<3	<2	24	<2.5	<1	<2.5	14	16
W-B-23*	0	4/18/2003	0.09	<2.5	<2.5	30	<0.5	<0.5	24	3.8	4.6	<3	<2	25	<2.5	<1	<2.5	16	16
W-B-23*	3	4/18/2003	<0.06	<2.5	2.6	86	<0.5	<0.5	110	6.4	16	7.2	<2	80	<2.5	<1	<2.5	21	35
Area of Concern 10 - Chemical Storage Area																			
ERM-B-15	1	4/17/2003	<0.019	<10	22 †	21	<1.0	<1.0	17	<4.0	3.9	<10	<4.0	21	<10	<1.0	83 † J	13	18 J
Area of Concern 13 - Paint Spray Booth																			
ERM-B-22	1.5	4/17/2003	<0.019	<10	25 †	21	<1.0	<1.0	18	<4.0	4	<10	<4.0	20	<10	<1.0	85 † J	13	15 J
Area of Concern 14 - Storm Drains																			
ERM-B-23	4.5	4/17/2003	0.024	<10	26 †	35	<1.0	<1.0	17	4.2	7.9	<10	<4.0	21	<10	<1.0	96 † J	15	31
W-B-32*	0	4/16/2003	<0.06	<2.5	3.1	33	<0.5	3.3	30	4.4	20	21	<2	26	<2.5	<1	<2.5	18	120
W-B-32	1-2	4/16/2003	0.029	<10	22 †	23	<1.0	4.2	26	<4.0	23	20	<4.0	17	<10	<1.0	78 † J	11	140
W-B-32*	3	4/16/2003	<0.06	<2.5	<2.5	22	<0.5	0.5	19	3.2	5.7	<3	<2	20	<2.5	<1	<2.5	13	29
W-B-32*	8	4/16/2003	<0.06	<2.5	4.1	42	<0.5	1.2	41	6.4	13	10	<2	40	<2.5	<1	<2.5	25	42
W-B-38*	0	4/15/2003	<0.06	<2.5	<2.5	38	<0.5	<0.5	27	5.2	7	<3	<2	32	<2.5	<1	<2.5	17	22
W-B-38	2-3	4/15/2003	<0.020	<10	21 †	11	<1.0	<1.0	16	<4.0	3.4	<10	<4.0	20	<10	<1.0	67 † J	12	14
W-B-38*	3	4/14/2003	<0.06	<2.5	<2.5	14	<0.5	<0.5	17	3.5	3.9	<3	<2	21	<2.5	<1	<2.5	13	13
W-B-38*	8	4/14/2003	<0.06	<2.5	<2.5	12	<0.5	<0.5	14	2.8	3.4	<3	<2	18	<2.5	<1	<2.5	9.3	12
W-B-39*	0	4/14/2003	<0.06	<2.5	<2.5	41	<0.5	<0.5	21	4.8	6.1	4.2	<2	27	<2.5	<1	<2.5	14	21
W-B-39*	3	4/14/2003	<0.06	<2.5	<2.5	10	<0.5	<0.5	15	3.2	3.9	<3	<2	20	<2.5	<1	<2.5	10	12
W-B-39*	8	4/14/2003	<0.06	<2.5	<2.5	31	<0.5	<0.5	24	4.2	5.6	<3	<2	28	<2.5	<1	<2.5	15	18
Area of Concern 16 - Reported Fuel Spill Area on Taxiway																			
W-B-13*	0	4/15/2003	<0.06	<2.5	2.8	58	<0.5	<0.5	29	5.5	9.4	<3	<2	34	<2.5	<1	<2.5	20	27
W-B-13*	3	4/15/2003	<0.06	<2.5	<2.5	26	<0.5	<0.5	17	2.9	3.5	<3	<2	18	<2.5	<1	<2.5	10	12
W-B-13*	8	4/15/2003	<0.06	<2.5	<2.5	36	<0.5	<0.5	17	2.5	3	<3	<2	15	<2.5	<1	<2.5	11	9.6
W-B-14*	0	4/15/2003	<0.06	<2.5	<2.5	26	<0.5	<0.5	19	3.7	4.6	<3	<2	23	<2.5	<1	<2.5	13	16
W-B-14*	3	4/15/2003	<0.06	<2.5	<2.5	51	<0.5	<0.5	25	4.4	17	<3	<2	28	<2.5	<1	<2.5	16	21
W-B-14*	8	4/15/2003	<0.06	<2.5	<2.5	26	<0.5	<0.5	16	3.1	3.7	<3	<2	18	<2.5	<1	<2.5	11	12
W-B-15*	0	4/15/2003	<0.06	<2.5	<2.5	53	<0.5	<0.5	32	5.6	8.6	<3	<2	39	<2.5	<1	<2.5	22	26
W-B-15*	8	4/15/2003	<0.06	<2.5	<2.5	39	<0.5	<0.5	16	3	3.7	<3	<2	18	<2.5	<1	<2.5	10	13

Sample Location	Sample Depth (feet bgs)	Date Sampled	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	V	Zn
		Residential PRG (mg/kg)	23	31	22	5,400	150	37	210	900	3100	150	390	1600	390	390	5.2	550	23,000
		Industrial PRG (mg/kg)	310	410	260	67,000	1,900	450	450	1,900	41000	750	5,100	20,000	5,100	5,100	67	7,200	100,000
Area of Concern 18 - Offsite Solvent USTs																			
W-B-9*	4	4/18/2003	0.064	<2.5	<2.5	27	<0.5	<0.5	23	3.3	4.5	<3	<2	21	<2.5	<1	<2.5	14	15
W-B-18*	4.5	4/18/2003	<0.06	<2.5	<2.5	48	<0.5	<0.5	25	4.4	6.2	<3	<2	26	<2.5	<1	<2.5	15	18
W-B-18*	7.5	4/18/2003	0.093	<2.5	<2.5	14	<0.5	<0.5	22	3.4	4	<3	<2	18	<2.5	<1	<2.5	13	11
W-B-19*	4	4/18/2003	<0.06	<2.5	<2.5	20	<0.5	<0.5	20	3.4	4.5	<3	<2	22	<2.5	<1	<2.5	13	15
W-B-20*	3	4/18/2003	<0.06	<2.5	<2.5	39	<0.5	<0.5	24	3.6	6.7	<3	<2	24	<2.5	<1	<2.5	14	21
Area of Concern 19 - Runoff from Pavement to Unpaved Area North of OMC																			
W-B-24*	0	4/14/2003	<0.06	<2.5	<2.5	41	<0.5	<0.5	20	2.7	18	25	<2	19	<2.5	<1	<2.5	10	38
W-B-24*	3	4/14/2003	<0.06	<2.5	<2.5	45	<0.5	0.55	30	5.3	9.3	4.3	<2	34	<2.5	<1	<2.5	18	33
W-B-24*	8	4/14/2003	<0.06	<2.5	<2.5	56	<0.5	<0.5	22	3.9	4.6	<3	<2	26	<2.5	<1	<2.5	16	19
W-B-25*	0	4/15/2003	<0.06	<2.5	<2.5	19	<0.5	<0.5	17	3.2	4.5	7.9	<2	18	<2.5	<1	<2.5	10	15
W-B-25	1-2	4/15/2003	<0.020	<10	82 †	120	<1.0	<1.0	55	11	29	<10	<4.0	22	<10	<1.0	380/<0.42 * † J	54	61
W-B-25*	3	4/15/2003	<0.06	<2.5	3.3	88	<0.5	<0.5	89	7.8	12	5.7	<2	71	<2.5	<1	<2.5	27	38
W-B-25*	8	4/15/2003	<0.06	<2.5	<2.5	23	<0.5	<0.5	22	4.1	6.2	3.3	<2	27	<2.5	<1	<2.5	15	20
W-B-26*	0	4/16/2003	<0.06	<2.5	<2.5	43	<0.5	<0.5	28	4.2	5.4	3.1	<2	29	<2.5	<1	<2.5	16	17
W-B-26*	3	4/16/2003	<0.06	<2.5	<2.5	18	<0.5	<0.5	18	3.4	3.6	<3	<2	21	<2.5	<1	<2.5	14	13
W-B-26*	12	4/16/2003	<0.06	<2.5	2.9	38	<0.5	<0.5	28	4.3	5.4	<3	<2	29	<2.5	<1	<2.5	19	19
W-B-27*	0	4/16/2003	<0.06	<2.5	<2.5	26	<0.5	<0.5	18	3.4	4.4	<3	<2	21	<2.5	<1	<2.5	13	13
W-B-27*	3	4/16/2003	<0.06	<2.5	<2.5	42	<0.5	<0.5	15	2.7	2.7	<3	<2	16	<2.5	<1	<2.5	10	9.5
W-B-27*	8	4/16/2003	<0.06	<2.5	<2.5	34	<0.5	<0.5	19	3.4	3.9	<3	<2	22	<2.5	<1	<2.5	14	14
W-B-28*	0	4/16/2003	<0.06	<2.5	3.2	38	<0.5	7.5	31	6.2	150	16	3.4	39	<2.5	<1	<2.5	16	41
W-B-28*	3	4/16/2003	<0.06	<2.5	3.8	18	<0.5	<0.5	14	2.9	2.3	<3	<2	14	<2.5	<1	<2.5	9.4	8.6
W-B-28*	8	4/16/2003	<0.06	<2.5	<2.5	27	<0.5	<0.5	23	3.7	4.3	<3	<2	24	<2.5	<1	<2.5	14	14
W-B-29*	0	4/16/2003	<0.06	<2.5	3.1	41	<0.5	<0.5	29	4.6	8.2	4.9	<2	31	<2.5	<1	<2.5	19	24
W-B-29	1-2	4/16/2003	0.039	<10	77 †	61	<1.0	<1.0	56	11	20	<10	<4.0	72	<10	<1.0	280 † J	33	52
W-B-29*	3	4/16/2003	<0.06	<2.5	<2.5	24	<0.5	<0.5	21	3.8	3.9	<3	<2	23	<2.5	<1	<2.5	14	15
W-B-29*	8	4/16/2003	<0.06	<2.5	2.9	21	<0.5	<0.5	17	2.8	2.8	<3	<2	17	<2.5	<1	<2.5	11	11
W-B-30*	0	4/16/2003	0.21	<2.5	3.7	48	<0.5	1	31	5.7	9.8	9.1	<2	32	<2.5	<1	<2.5	21	32
W-B-30*	3	4/16/2003	<0.06	<2.5	<2.5	20	<0.5	<0.5	21	3.8	3.9	<3	<2	24	<2.5	<1	<2.5	14	14
W-B-30*	8	4/16/2003	<0.06	<2.5	2.8	15	<0.5	<0.5	20	3.5	3.3	<3	<2	20	<2.5	<1	<2.5	13	12
W-B-31*	0	4/16/2003	<0.06	<2.5	2.8	30	<0.5	2.1	24	4.2	15	6	<2	25	<2.5	<1	<2.5	16	71
W-B-31*	3	4/16/2003	0.19	<2.5	9.4	34	<0.5	1.3	56	11	28	24	<2	56	<2.5	<1	<2.5	41	81
W-B-31-DUP*	3.5	4/16/2003	0.49	<2.5	6	34	<0.5	6.8	74	10	33	34	<2	53	<2.5	<1	<2.5	40	110
W-B-33*	0	4/16/2003	0.17	<2.5	3.9	74	<0.5	6.4	38	7.4	37	44	<2	43	<2.5	<1	<2.5	32	69
W-B-33-DUP*	2.5	4/16/2003	0.12	<2.5	4.3	29	<0.5	1.1	31	5.8	9.9	7.4	<2	34	<2.5	<1	<2.5	21	33
W-B-33*	3	4/16/2003	<0.06	<2.5	2.9	43	<0.5	0.82	34	5.7	8.3	3.8	<2	36	<2.5	<1	<2.5	22	25
W-B-33*	8	4/16/2003	0.068	<2.5	3.8	32	<0.5	1.7	47	7.6	18	16	<2	44	<2.5	<1	<2.5	30	60
W-B-34*	0	4/17/2003	0.42	<2.5	32	100	<0.5	<0.5	22	9.1	24	37	<2	17	<2.5	<1	<2.5	34	110
W-B-34*	3	4/17/2003	0.28	<2.5	6.1	46	<0.5	2	50	8.8	23	19	<2	52	<2.5	<1	<2.5	31	67
W-B-35*	0	4/17/2003	0.52	<2.5	5.9	110	<0.5	1.2	48	6.5	20	17	<2	43	<2.5	<1	<2.5	28	63
W-B-35*	3	4/17/2003	0.094	<2.5	2.5	39	<0.5	0.75	25	5.4	12	10	<2	24	<2.5	<1	<2.5	21	27
W-B-36*	0	4/17/2003	<0.06	<2.5	<2.5	47	<0.5	<0.5	24	4.1	6.1	3.5	<2	25	<2.5	<1	<2.5	15	18
W-B-36*	3	4/17/2003	<0.06	<2.5	<2.5	28	<0.5	<0.5	19	3	4.3	<3	<2	20	<2.5	<1	<2.5	13	12
W-B-37*	0	4/17/2003	0.1	<2.5	<2.5	76	<0.5	4.8	33	3.1	55	28	<2	21	<2.5	1	<2.5	14	180
W-B-37*	3.5	4/17/2003	0.088	<2.5	<2.5	16	<0.5	<0.5	23	3.8	4.9	<3	<2	23	<2.5	<1	<2.5	15	14

Sample Location	Sample Depth (feet bgs)	Date Sampled	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	V	Zn
Residential PRG (mg/kg)			23	31	22	5,400	150	37	210	900	3100	150	390	1600	390	390	5.2	550	23,000
Industrial PRG (mg/kg)			310	410	260	67,000	1,900	450	450	1,900	41000	750	5,100	20,000	5,100	5,100	67	7,200	100,000
Number of Samples			124	124	93	124	124	124	124	124	124	124	124	124	124	124	93	124	124
Number of Detections			29	4	38	123	0	28	124	105	123	48	6	124	0	2	0	124	120
Number of Detections above the PRG			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Detection			0.022	3.3	2.5	10	na	0.5	2.8	2.5	2.3	3	2.8	14	na	1	na	7.6	8.6
Maximum Detection			0.52	25	32	150	na	44	190	12	4,200	92	260	340	na	2.7	na	54	190
Median of Detections			0.093	7.25	3.25	34	na	1.85	22	4.2	6.1	6.6	11.85	24	na	1.85	na	14	18.5
Mean of Detections			0.14	10.70	5.595	44.01	na	5.2	29.3	5.0	56.6	15.9	51.5	31.9	na	1.9	na	16.3	31.5
East Bay Background Ranges			0.07 - 0.6	1.5 - 7.1	1.2 - 31	41 - 411	0.29 - 1.1	0.27 - 3.3	10 - 142	6.5 - 25.5	5.4 - 100	4.8 - 65	0.33 - 11.4	16 - 144	<0.25 - 7	0.2 - 2.2	<0.25 - 42.5	22 - 90	33 - 282

Notes:
Sample concentrations reported in milligrams per kilogram (mg/kg)
ERM prefix indicates a boring completed by ERM
W prefix indicates a boring completed by Weiss Associates
PRG = Preliminary remedial goal (*EPA Region 9 PRG Table*; 1 October 2002). These standards were used to assess the need for additional investigation activities for metals in soil, prior to conducting the risk assessment activities described in Section 5 of the text.
Bold values indicate concentrations detected above the laboratory method detection limit.
* Data Obtained from "United Maintenance Hanger Area, Metropolitan Oakland Airport", Weiss Associates, 27 May 2003
† Data not included in summary statistics due to probable interference with iron and aluminum, as discussed below

< 0.5	Compound not detected at or above the laboratory method detection limit
#	Shaded results exceed applicable industrial PRG
NA	Not Analyzed
na	Not applicable
feet bgs	Feet below ground surface
380/*<0.42**	Bold indicates the initial result by inductively coupled plasma/*Italicized* indicates the result after reanalysis by graphite furnace

The initial arsenic and thallium results were obtained using an inductively coupled plasma method. Concentrations of iron and aluminum within the samples can cause interferences for certain elements including arsenic and thallium. The reanalysis using the graphite furnace method indicates that this interference is occurring with the samples collected during this investigation and the samples most likely contain concentrations similar to that detected by the graphite furnace analysis.

Abbreviations:

Hg = Mercury
Sb = Antimony
As = Arsenic
Ba = Barium
Be = Beryllium
Cd = Cadmium
Cr = Chromium
Co = Cobalt
Cu = Copper
Pb = Lead
Mo = Molybdenum
Ni = Nickel
Se = Selenium
Ag = Silver
Tl = Thallium
V = Vanadium
Zn = Zinc

ERM Qualifiers:

J = Estimated value
UJ = Estimated non-detected value

Soil Analytical Results for Soluble Threshold Limit Concentration Testing for Metals
Former United Airlines Oakland Maintenance Center
Oakland International Airport

Sample Location	Depth (ft bgs)	Date Sampled	Constituent	Concentration[1] (mg/L)	STLC[2] (mg/L)
Area of Concern 5 - Vehicle Maintenance Center					
W-B-1*	0	4/14/2003	Chromium	0.13	5
W-B-3*	0	4/14/2003	Chromium	0.19	5
Area of Concern 1 - Small Parts Wash Rack/Former World Airways Cleaning Room					
W-B-5*	0	4/14/2003	Chromium	0.23	5
Area of Concern 2 - Aircraft Wash Rack					
W-B-8*	0	4/14/2003	Lead	2.7	5
W-B-8*	3	4/14/2003	Lead	2.9	5
Area of Concern 3 - Industrial Wastewater Vault					
W-B-12*	0	4/15/2003	Cadmium	1.1	1
W-B-12*	0	4/15/2003	Copper	46	25
W-B-12*	3	4/15/2003	Cadmium	0.89	1
W-B-12*	3	4/15/2003	Copper	16	25
Area of Concern 9 - Hazardous Materials Storage Areas					
W-B-23*	3	4/18/2003	Chromium	0.11	5
Area of Concern 19 - Runoff from Pavement to Unpaved Area North of OMC					
W-B-25*	3	4/15/2003	Chromium	0.21	5
W-B-31*	3	4/16/2003	Chromium	0.37	5
W-B-31*	3.5	4/16/2003	Chromium	0.53	5

Notes:

[1] Concentration determined using the California Waste Extraction Test.

[2] Samples with concentrations above this limit are considered hazardous waste.

Indicates that the sample concentration exceeded the STLC

*Data Obtained from "United Maintenance Hanger Area, Metropolitan Oakland Airport", Weiss Associates, 27 May 2003

Abbreviations:

ft bgs = Feet below ground surface
mg/L = milligrams per liter
STLC = Soluble threshold limit concentration

Ground Water Analytical Results for VOCs
Former United Airlines Oakland Maintenance Center
Oakland International Airport

Sample Location	Date Sampled	Methods	N-BB	T-BB	CE	CF	CM	1,2-DCB	1,4-DCB	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	DCM	IPB	P-IPT	MTBE	NAP	N-PB	STY	1,1,1-TCA	TCE	1,2,4-TMB	1,3,5-TMB	BZ	EB	TOL	VC	XYL
			VOCs																											
		MCL (µg/L)	NS	NS	NS	NS	NS	600	5	5	0.5	6	6	10	5	NS	NS	13	NS	NS	100	200	5	NS	NS	1	700	150	0.5	1750
Area of Concern 1 - Small Parts Wash Rack/Former World Airways Cleaning Room																														
ERM-B-1	4/15/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	[illegible] J	<0.50	3.2 J	3.1 J	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.5	0.75 J	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-B-2	4/15/2003	8260	<0.50	<0.50	1.4 J	<0.50	<0.50	<0.50	<0.50	[illegible] J	<0.50	3 J	[illegible] J	<0.50	<1.5 UJb	<0.50	<0.50	<0.50	<1.0	<0.50	0.73 J	<0.5	1.2 J	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-4	4/15/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	[illegible] J	<0.50	2.7 J	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	12 J	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-5	4/15/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	[illegible] J	<0.50	4.4 J	1.1 J	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	14 J	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-6	4/15/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	[illegible] J	<0.50	5 J	0.68 J	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	4.0 J	0.71 J	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-1	5/9/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	0.82	1.3	[illegible]	[illegible]	2	[illegible]	<0.50	<1.0	0.54	1.1	<0.50	26	1.1	<0.50	<0.50	1.3	6.9	4.1	<0.50	0.9	0.72	<0.50	4.9
ERM-MW-1D	5/9/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	0.76	<0.50	[illegible]	[illegible]	1.9	[illegible]	<0.50	<1.0	0.5	3.6	<0.50	17	0.99	<0.50	<0.50	1.2	6.1	3.4	<0.50	0.83	0.75	<0.50	4.3
ERM-MW-1	11/6/2003	8260	<0.50	<0.50	0.62	<0.50	<0.50	<0.5	<0.50	[illegible]	<0.5	1.1	[illegible]	<0.50	<5.0	<0.5	0.74	<0.50	16	0.6	<0.50	<0.50	1.3	1.5	1.7	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-2	5/9/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	[illegible]	[illegible]	2.8	4.7	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	2.6	0.8	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-2	11/6/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	[illegible]	<0.50	2.6	0.87	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.1	0.74	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-3	5/9/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	[illegible]	<0.50	1.1	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-3	11/6/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	[illegible]	<0.50	2.4	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-3DUP	11/6/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	[illegible]	<0.50	2.3	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-4	5/9/2003	8260	<0.50	<0.50	<0.50	1.4	<0.50	<0.50	<0.50	[illegible]	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.72	<0.50	<0.50
ERM-MW-4	11/7/2003	8260	<1	<1	<1	<0.50	<1	<1	<0.50	[illegible]	[illegible]	<0.5	<1	<1	<5.0	<1	<1	<1	<1.2	<1	<1	<1	<1	<1	<1	<0.50	<1	<1	<0.50	<1
ERM-MW-5	5/9/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	[illegible]	[illegible]	4.2	[illegible]	0.83	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	4.6	<0.50	<0.50	<0.50	<0.50	<0.50	[illegible]	<0.50
ERM-MW-5	11/6/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	[illegible]	[illegible]	3.1	[illegible]	0.75	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	4.1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.50
ERM-MW-11	12/30/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	[illegible]	<0.50	0.66	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.50
ERM-MW-12	12/29/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	[illegible]	<0.50	0.83	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.50
ERM-MW-13	12/29/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	[illegible]	<0.50	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.50
ERM-MW-14	12/29/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	[illegible]	<0.50	<0.50	0.81	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.50
Area of Concern 2 - Aircraft Wash Rack																														
ERM-B-3	4/15/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-B-4	4/15/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-B-5	4/15/2003	8260	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	[illegible] J	<5.0	<5.0	<5.0	28 J	<5.0	<5.0	<5.0	<5.0	60 J	12 J	<5.0	<5.0	<5.0	<5.0	14 J
ERM-B-6	4/15/2003	8260	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	[illegible] J	<5.0	6.6 J	<5.0	36 J	<5.0	<5.0	<5.0	<5.0	180 J	74 J	<5.0	<5.0	<5.0	<5.0	21 J
ERM-B-7	4/15/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-7	4/17/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	0.65 J	<0.50	<1.9 UJ	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-8*	4/14/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-8	4/14/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-6	5/9/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	1.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-6	11/6/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-7	5/9/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-7	11/6/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-8	5/9/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	1.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-8	11/6/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-9	5/9/2003	8260	4.9	1.2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	2.2	4.2	<0.50	29	2.4	<0.50	<0.50	<0.50	83	42	<0.50	1.6	0.61	<0.50	18
ERM-MW-9	11/6/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	9.8	<0.50	<0.50	<0.50	<0.50	14	5.7	<0.50	<0.50	<0.50	<0.50	<0.50
Area of Concern 3 - Industrial Wastewater Vault																														
W-B-10	4/15/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-11	4/15/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-12	4/15/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-10	5/9/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-10	11/6/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Area of Concern 4 - Aboveground Fuel Storage Tank																														
ERM-B-8	4/16/2003	8015/8021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2.0	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
ERM-B-9	4/16/2003	8015/8021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2.0	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
Area of Concern 5 - Vehicle Maintenance Center																														
ERM-B-10	4/17/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.61 J	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	[illegible] J	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-B-11	4/17/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.6 J	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	[illegible] J	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-1*	4/15/2003	8260	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	[illegible]	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
W-B-2*	4/15/2003	8260	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	[illegible]	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
W-B-2	4/15/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	[illegible] J	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-3*	4/15/2003	8260	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	[illegible]	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
W-B-3	4/15/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	[illegible] J	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Area of Concern 6 - Boiler and Aboveground Diesel Storage Tank																														
ERM-B-27	4/17/2003	DHS LUFT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
Area of Concern 7 - Former 90-Day Hazardous Waste Accumulation Area																														
W-B-16*	4/17/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.75 J	<0.50	0.56	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-16	4/17/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.75 J	<0.50	0.55 J	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-16-D	4/17/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.75 J	<0.50	0.59 J	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-17*	4/17/2003	8260	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	[illegible]	<1.2	[illegible]	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	1.5	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
W-B-17	4/17/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	[illegible] J	<0.50	[illegible] J	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	1.3 J	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-17	12/30/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.7	<0.50	3.9	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.68	<0.50	<0.50
ERM-MW-17D	12/30/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.3	<0.50	2.3	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.53	<0.50	<0.50
Area of Concern 8 - Current 90-Day Hazardous Waste Accumulation Area																														
ERM-B-12	4/17/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Area of Concern 9 - Hazardous Material Storage Areas																														
ERM-B-13	4/16/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	1.7 J	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-B-14	4/17/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-B-16-D	4/17/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-22	4/18/2003	8260	<0.50	<0.50	<0.50	<0.50	0.81 J	<0.50	<0.50	0.8 J	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-22-D	4/18/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.8 J	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
P-2/UAL-MW-5	4/18/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	1.7 J	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
P-2/UAL-MW-5*	4/22/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.50	<0.50	0.84	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
P-2/UAL-MW-5	11/6/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	0.99	<0.5	<0.50	<0.50	1.9	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

Sample Location	Date Sampled	Methods	N-BB	T-BB	CE	CF	CM	1,2-DCB	1,4-DCB	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	DCM	IPB	P-IPT	MTBE	NAP	N-PB	STY	1,1,1-TCA	TCE	1,2,4-TMB	1,3,5-TMB	BZ	EB	TOL	VC	XYL
			VOCs																											
		MCL (µg/L)	NS	NS	NS	NS	NS	600	5	5	0.5	6	6	10	5	NS	NS	13	NS	NS	100	200	5	NS	NS	1	700	150	0.5	1750
Area of Concern 11 - Aircraft Fueling/Defueling Equipment Areas																														
ERM-B-16	4/16/2003	DHS LUFT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
ERM-B-17	4/16/2003	DHS LUFT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
ERM-B-18	4/16/2003	DHS LUFT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
ERM-B-19	4/16/2003	DHS LUFT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
Area of Concern 12 - Fire System Motors and Associated Fuel Tanks																														
ERM-B-20	4/17/2003	DHS LUFT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
ERM-B-21	4/17/2003	DHS LUFT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
Area of Concern 14 - Storm Drains																														
ERM-B-23	4/17/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-32	4/16/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-38	4/15/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-38 DUP	4/15/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Area of Concern 15 - Aircraft Parking and Run Up Area																														
ERM-B-24	4/15/2003	DHS LUFT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
ERM-B-25	4/15/2003	DHS LUFT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	**1.5**
ERM-B-26	4/16/2003	DHS LUFT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
Area of Concern 16 - Reported Fuel Spill Area on Taxiway																														
W-B-14	4/15/2003	DHS LUFT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
Area of Concern 17 - Former Vehicle Fueling USTs																														
UAL-MW-1	4/18/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	**2.0** J	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
UAL-MW-1*	4/15/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**0.65**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
UAL-MW-1	11/6/2003	8260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
UAL-MW-2	4/18/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**3.4** J	<0.50	<0.50	**4.6** J	<0.50	<1.0	<0.50	<0.50	[illegible] J	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
UAL-MW-2*	4/15/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**2.1**	<0.50	<0.50	**3**	<0.50	<0.50	<0.50	<0.50	[illegible]	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
UAL-MW-2	11/6/2003	8260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	[illegible]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
UAL-MW-3	4/18/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**4.9** J	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	[illegible] J	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
UAL-MW-3*	4/15/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**3**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	[illegible]	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
UAL-MW-3	11/7/2003	8260	<1	<1	<1	<0.50	<1	<1	<0.50	**3.7**	<0.50	<0.50	<1	<1	<5.0	<1	<1	[illegible]	<1.2	<1	<1	<1	<1	<1	<1	<0.50	<1	<1	<0.50	<1
P-1/UAL-MW-4	4/18/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**1.3** J	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	[illegible] J	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
P-1/UAL-MW-4*	4/22/2003	8260	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	[illegible]	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
Area of Concern 18 - Migration of Offsite Solvent Plume Onto OMC Property																														
W-B-9*	4/18/2003	8260	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
W-B-9	4/18/2003	8260	<0.50	<0.50	<0.50	<0.50	**0.51** J	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-18*	4/18/2003	8260	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
W-B-19*	4/18/2003	8260	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**5**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	[illegible]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
W-B-19	4/18/2003	8260	<0.50	<0.50	<0.50	<0.50	**0.52** J	<0.50	<0.50	**0.59** J	<0.50	<0.50	[illegible] J	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	[illegible] J	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-20*	4/18/2003	8260	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
W-B-20-DUP*	4/18/2003	8260	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Area of Concern 19 - Runoff from Pavement to Unpaved Area North of OMC																														
W-B-25	4/16/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-29	4/16/2003	8260	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
		Number of Samples[1]	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	83	79	79	79	79	79	79	79	92	92	92	79	92
		Number of Detections[1]	1	1	2	1	3	1	1	33	6	19	16	2	2	3	4	21	6	3	1	11	11	8	6	0	2	4	1	5
		Number of Detections above the MCL[1]	0	0	0	0	0	0	0	20	6	2	6	0	2	0	0	15	0	0	0	0.0	2	0	0	0	0	0	1	0
		Minimum Detection[1]	4.9	1.2	0.62	1.4	0.51	0.82	1.3	0.59	0.56	0.55	0.68	0.75	85	0.54	0.74	0.65	9.8	0.6	0.73	1	0.71	1.3	1.7	na	0.9	0.61	0.89	1.5
		Maximum Detection[1]	4.9	1.2	1.4	1.4	0.52	0.82	1.3	54	5.2	59	46	0.83	86	2.2	6.6	210	36	2.4	0.73	14	56	180	74	na	1.6	0.72	0.89	21
		Median of Detections[1]	4.9	1.2	1.01	1.4	0.51	0.82	1.3	9.9	2.3	2.8	4.65	0.79	85.5	0.65	2.65	43	27	1.1	0.73	3.2	1.3	10.45	8.85	na	1.25	0.70	0.89	14
		Mean of Detections[1]	4.9	1.2	1.01	1.4	0.51	0.82	1.3	16.9	2.5	8.2	9.4	0.79	85.5	1.13	3.16	66.9	24.1	1.37	0.73	4.5	9.6	43.5	23.3	na	1.25	0.68	0.89	11.9

Notes:
Sample concentrations reported in micrograms per liter (µg/L)
ERM prefix indicates a boring completed by ERM
W prefix indicates a boring completed by Weiss Associates
MCL = California maximum contaminant level (*A Compilation of Water Quality Goals*, RWQCB, August 2000). These standards were used to assess the need for additional investigation activities for VOCs in ground water, prior to conducting the risk assessment activities described in Section 5 of the text.
[1] Duplicate samples not included in this count.
* Data Obtained from "United Maintenance Hanger Area, Metropolitan Oakland Airport", Weiss Associates, 27 May 2003
Bold values indicate concentrations detected above the laboratory method detection limit.
< 0.5 — Compound not detected at or above the laboratory method detection limit
(shaded) — Indicates a concentration detected above the respective MCL
NS — MCL not established
NA — Not analyzed
na — Not applicable

ERM Qualifiers:
J = Estimated value
UJ = Estimated non-detected value
UJb = Estimated non-detected value due to common laboratory contaminant

Abbreviations:
VOCs = Volatile organic compounds
N-BB = n-Butylbenzene
T-BB = tert-Butylbenzene
CE = Chloroethane
CF = Chloroform
CM = Chloromethane
1,2-DCB = 1,2-Dichlorobenzene
1,4-DCB = 1,4-Dichlorobenzene
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
1,1-DCE = 1,1-Dichloroethene
c-1,2-DCE = cis-1,2-Dichloroethene
t-1,2-DCE = trans-1,2-Dichloroethene
DCM = Dichloromethane
IPB = Isopropylbenzene
P-IPT = p-Isopropyltoluene
MTBE = Methyl tert-butyl ether
NAP = Naphthalene
N-PB = n-Propylbenzene
STY = Styrene
1,1,1-TCA = 1,1,1-Trichloroethane
TCE = Trichloroethene
1,2,4-TMB = 1,2,4-Trimethylbenzene
1,3,5-TMB = 1,3,5-Trimethylbenzene
BZ = Benzene
EB = Ethylbenzene
TOL = Toluene
VC = Vinyl chloride
XYL = Xylenes

Table 11
Ground Water Analytical Results for TPH and SVOCs
Former United Airlines Oakland Maintenance Center
Oakland International Airport

Sample Location	Date Sampled	Methods	TPPH	TEPH	TEPH SGCU	Diesel	Diesel SGCU	Hydraulic Oil	Hydraulic Oil SGCU	Motor Oil	Motor Oil SGCU	Jet Fuel	Jet Fuel SGCU	SVOCs 4-Methylphenol
		Non-Potable Water ESL (µg/L)	500	640	640	640	640	640	640	640	640	640	640	SNA
		MCL (µg/L)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Area of Concern 1 - Small Parts Wash Rack/Former World Airways Cleaning Room														
ERM-B-1	4/15/2003	8260	110	2,300 NJ	340 NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-2	4/15/2003	8260	71	5,500 NJ	<560	NA	NA	NA	NA	NA	NA	NA	NA	<50
W-B-4	4/15/2003	8260	<50	140 NJ	97 NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-B-5	4/15/2003	8260	<50	<500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-B-6	4/15/2003	8260	<50	520 NJ	260 NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 2 - Aircraft Wash Rack														
ERM-B-3	4/15/2003	8260	<50	930 NJ	200 NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-4	4/15/2003	8260	<50	4,500 NJ	840 NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-5	4/15/2003	8260	<500	12,000 NJ	4,700 NJ	NA	NA	NA	NA	NA	NA	NA	NA	34
ERM-B-6	4/15/2003	8260	1,700	7,700 NJ	990 NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-7	4/15/2003	8260	<50	1,900 NJ	150 NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-B-7	4/17/2003	8260	<50	83 NJ	79 NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-B-8*	4/14/2003	8260	NA	NA	NA	NA	210	NA	NA	NA	1,100	NA	210	NA
W-B-8	4/14/2003	8260	<50	91 NJ	100 NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-MW-6	5/9/2003	8260	<50	NA	NA	NA	<50	NA	NA	NA	<100	NA	NA	NA
ERM-MW-6	11/6/2003	8260/8015M	<50	NA	NA	390	110	<250	NA	<250	NA	<50	NA	NA
ERM-MW-7	5/9/2003	8260	<50	NA	NA	NA	89	NA	NA	NA	110	NA	NA	NA
ERM-MW-7	11/6/2003	8260/8015M	<50	NA	NA	<50	NA	<250	NA	<250	NA	<50	NA	NA
ERM-MW-8	5/9/2003	8260	<50	NA	NA	NA	170	NA	NA	NA	150	NA	NA	NA
ERM-MW-8	11/6/2003	8260/8015M	<50	NA	NA	1,100x	250x	1,900y	<250	<250	NA	<50	NA	NA
ERM-MW-9	5/9/2003	8260	220	NA	NA	NA	540	NA	NA	NA	270	NA	NA	NA
ERM-MW-9	11/6/2003	8260/8015M	210x	NA	NA	2,600x	760	1,300y	<250	<250	NA	<50	NA	NA
Area of Concern 3 - Industrial Wastewater Vault														
W-B-10	4/15/2003	8260	<50	160 NJ	93 NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-B-11	4/15/2003	8260	<50	140 NJ	120 NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-B-12	4/15/2003	8260	<50	4,100 NJ	5,100 NJ	NA	NA	NA	NA	NA	NA	NA	NA	<5.0
ERM-MW-10	5/9/2003	8260	<50	NA	NA	NA	75	NA	NA	NA	110	NA	NA	NA
ERM-MW-10	11/6/2003	8260/8015M	<50	NA	NA	140x	180	620y	<250	<250	NA	<50	NA	NA
Area of Concern 4 - Aboveground Fuel Storage Tank														
ERM-B-8	4/16/2003	8015/8021	<50	52 NJ	72 NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-9	4/16/2003	8015/8021	<50	120 NJ	150 NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Location	Date Sampled	Methods	TPPH	TEPH		TEPH SGCU		Diesel	Diesel SGCU		Hydraulic Oil	Hydraulic Oil SGCU	Motor Oil	Motor Oil SGCU	Jet Fuel	Jet Fuel SGCU	SVOCs 4-Methylphenol
		Non-Potable Water ESL (µg/L)	500	640		640		640	640		640	640	640	640	640	640	SNA
		MCL (µg/L)	NS	NS		NS		NS	NS		NS	NS	NS	NS	NS	NS	NS
Area of Concern 5 - Vehicle Maintenance Center																	
ERM-B-10	4/17/2003	8260	59	96	NJ	63	NJ	NA	NA		NA	NA	NA	NA	NA	NA	NA
ERM-B-11	4/17/2003	8260	<50	110	NJ	66	NJ	NA	NA		NA	NA	NA	NA	NA	NA	NA
W-B-1*	4/15/2003	8260	<50	NA		NA		NA	110	o	NA	NA	NA	540	NA	<50	NA
W-B-2*	4/15/2003	8260	<50	NA		NA		NA	<50		NA	NA	NA	<250	NA	<50	NA
W-B-2	4/15/2003	8260	90	200	NJ	88	NJ	NA	NA		NA	NA	NA	NA	NA	NA	<5.0
W-B-3*	4/15/2003	8260	<50	NA		NA		NA	98	o	NA	NA	NA	650	NA	<50	NA
W-B-3	4/15/2003	8260	85	120	NJ	77	NJ	NA	NA		NA	NA	NA	NA	NA	NA	NA
Area of Concern 6 - Boiler and Aboveground Diesel Storage Tank																	
ERM-B-27	4/17/2003	DHS LUFT	NA	550	NJ	180	NJ	NA	NA		NA	NA	NA	NA	NA	NA	<5.0
Area of Concern 7 - Former 90-Day Hazardous Waste Accumulation Area																	
W-B-16*	4/17/2003	8260	<50	NA		NA		NA	<50		NA	NA	NA	<250	NA	<50	NA
W-B-16	4/17/2003	8260	<50	57	NJ	69	NJ	NA	NA		NA	NA	NA	NA	NA	NA	NA
W-B-17*	4/17/2003	8260	<50	NA		NA		NA	<50		NA	NA	NA	<250	NA	<50	NA
W-B-17	4/17/2003	8260	<50	660	NJ	220	NJ	NA	NA		NA	NA	NA	NA	NA	NA	<5.0
Area of Concern 8 - Current 90-Day Hazardous Waste Accumulation Area																	
ERM-B-12	4/17/2003	DHS LUFT	<50	<50		NA		NA	NA		NA	NA	NA	NA	NA	NA	NA
Area of Concern 9 - Hazardous Material Storage Areas																	
ERM-B-13	4/16/2003	8260	<50	86	NJ	77	NJ	NA	NA		NA	NA	NA	NA	NA	NA	NA
ERM-B-14	4/17/2003	8260	<50	110	NJ	170	NJ	NA	NA		NA	NA	NA	NA	NA	NA	<5.0
W-B-22	4/18/2003	8260	<50	<50		NA		NA	NA		NA	NA	NA	NA	NA	NA	NA
P-2/UAL-MW-5*	4/22/2003	8260	<50	NA		NA		NA	<50		NA	NA	NA	<250	NA	<50	NA
P-2/UAL-MW-5	4/18/2003	8260	<50	<50		NA		NA	NA		NA	NA	NA	NA	NA	NA	NA
Area of Concern 11 - Aircraft Fueling/Defueling Equipment Areas																	
ERM-B-16	4/16/2003	DHS LUFT	NA	59	NJ	82	NJ	NA	NA		NA	NA	NA	NA	NA	NA	NA
ERM-B-17	4/16/2003	DHS LUFT	NA	51	NJ	80	NJ	NA	NA		NA	NA	NA	NA	NA	NA	NA
ERM-B-18	4/16/2003	DHS LUFT	NA	96	NJ	100	NJ	NA	NA		NA	NA	NA	NA	NA	NA	NA
ERM-B-19	4/16/2003	DHS LUFT	NA	80	NJ	100	NJ	NA	NA		NA	NA	NA	NA	NA	NA	NA
Area of Concern 12 - Fire System Motors and Associated Fuel Tanks																	
ERM-B-20	4/17/2003	DHS LUFT	NA	61	NJ	83	NJ	NA	NA		NA	NA	NA	NA	NA	NA	NA
ERM-B-21	4/17/2003	DHS LUFT	NA	130	NJ	130	NJ	NA	NA		NA	NA	NA	NA	NA	NA	<5.0
Area of Concern 14 - Storm Drains																	
ERM-B-23	4/17/2003	8260	<50	<50		NA		NA	NA		NA	NA	NA	NA	NA	NA	NA
W-B-32	4/16/2003	8260	<50	250	NJ	160	NJ	NA	NA		NA	NA	NA	NA	NA	NA	<5.0
W-B-38	4/15/2003	8260	<50	230	NJ	120	NJ	NA	NA		NA	NA	NA	NA	NA	NA	NA

Table 11
Ground Water Analytical Results for TPH and SVOCs
Former United Airlines Oakland Maintenance Center
Oakland International Airport

Sample Location	Date Sampled	Methods	TPPH	TEPH		TEPH SGCU		Diesel	Diesel SGCU	Hydraulic Oil	Hydraulic Oil SGCU	Motor Oil	Motor Oil SGCU	Jet Fuel	Jet Fuel SGCU	SVOCs 4-Methylphenol
		Non-Potable Water ESL (µg/L)	500	640		640		640	640	640	640	640	640	640	640	SNA
		MCL (µg/L)	NS	NS		NS		NS	NS	NS	NS	NS	NS	NS	NS	NS
Area of Concern 15 - Aircraft Parking and Run Up Area																
ERM-B-24	4/15/2003	DHS LUFT	NA	**620**	NJ	**160**	NJ	NA	NA	NA	NA	NA	NA	NA	NA	<56
ERM-B-25	4/15/2003	DHS LUFT	NA	**370**	NJ	**140**	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-26	4/16/2003	DHS LUFT	NA	**360**	NJ	**140**	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 16 - Reported Fuel Spill Area on Taxiway																
W-B-14	4/15/2003	DHS LUFT	NA	**67**	NJ	**69**	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 17 - Former Vehicle Fueling USTs																
UAL-MW-1	4/18/2003	8260	<50	<50		NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
UAL-MW-1*	4/15/2003	8260	<50	NA		NA		NA	<50	NA	NA	NA	<250	NA	<50	NA
UAL-MW-1	11/6/2003	8260	<50	NA		NA		<50	NA	<250	NA	<250	NA	<50	NA	NA
UAL-MW-2	4/18/2003	8260	<50	**280**	NJ	**120**	NJ	NA	NA	NA	NA	NA	NA	NA	NA	<5.0
UAL-MW-2*	4/15/2003	8260	<50	NA		NA		NA	<50	NA	NA	NA	<250	NA	<50	NA
UAL-MW-2	11/6/2003	8260	<50	NA		NA		<50	NA	<250	NA	<250	NA	<50	NA	NA
UAL-MW-3	4/18/2003	8260	<50	**86**	NJ	**78**	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
UAL-MW-3*	4/15/2003	8260	<50	NA		NA		NA	<50	NA	NA	NA	<250	NA	<50	NA
UAL-MW-3	11/7/2003	8260	<50	<50		NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
P-1/UAL-MW-4*	4/22/2003	8260	<50	NA		NA		NA	<50	NA	NA	NA	<250	NA	<50	NA
P-1/UAL-MW-4	4/18/2003	8260	<50	**82**	NJ	**100**	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 18 - Migration of Offsite Solvent Plume Onto OMC Property																
W-B-9*	4/18/2003	8260	<50	NA		NA		NA	<50	NA	NA	NA	<250	NA	<50	NA
W-B-9	4/18/2003	8260	NA	NA		NA		NA	NA	NA	NA	NA	NA	NA	<50	NA
W-B-18*	4/18/2003	8260	<50	NA		NA		NA	<50	NA	NA	NA	<250	NA	<50	NA
W-B-19*	4/18/2003	8260	<50	NA		NA		NA	<50	NA	NA	NA	<250	NA	<50	NA
W-B-19	4/18/2003	8260	NA	NA		NA		NA	NA	NA	NA	NA	NA	NA	<50	NA
W-B-20*	4/18/2003	8260	<50	NA		NA		NA	<50	NA	NA	NA	<250	NA	<50	NA
W-B-20-DUP*	4/18/2003	8260	<50	NA		NA		NA	<50	NA	NA	NA	<250	NA	<50	NA
Area of Concern 19 - Runoff from Pavement to Unpaved Area North of OMC																
W-B-25	4/16/2003	8260	<50	<50		NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
W-B-29	4/16/2003	8260	<50	<50		NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
		Number of Samples[1]	64	49		40		7	24	7	3	7	20	7	17	11
		Number of Detections[1]	8	40		39		4	11	3	0	0	7	0	1	1
		Number of Detections above the MCL/ESL[1]	1	9		4		2	1	2	0	0	2	0	0	0
		Minimum Detection[1]	59	51		63		140	75	620	na	na	110	na	210	34
		Maximum Detection[1]	1,700	12,000		5,100		2,600	760	1,900	na	na	1,100	na	210	34
		Median of Detections[1]	100	140		120		745	170	1300	na	na	270	na	210	34
		Mean of Detections[1]	318	1,126		409		1058	236	1273	na	na	419	na	210	34

Sample Location	Date Sampled	Methods	TPPH	TEPH	TEPH SGCU	Diesel	Diesel SGCU	Hydraulic Oil	Hydraulic Oil SGCU	Motor Oil	Motor Oil SGCU	Jet Fuel	Jet Fuel SGCU	SVOCs 4-Methylphenol
		Non-Potable Water ESL (µg/L)	500	640	640	640	640	640	640	640	640	640	640	SNA
		MCL (µg/L)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Notes:

Sample concentrations reported in micrograms per liter (µg/L)

ERM prefix indicates a boring completed by ERM

W prefix indicates a boring completed by Weiss Associates

Non-Potable Water ESL = Environmental screening level for ground water that is not a current or potential drinking water resource. (Table B of *Screening For Environmental Concerns At Sites With Contaminated Soil and Groundwater, RWQCB, July 2003).*
These standards were used to assess the need for additional investigation for TPH in ground water, prior to conducting the risk assessment activities described in Section 5 of the text.

MCL = California maximum contaminant level (*A Compilation of Water Quality Goals*, RWQCB, August 2000). These standards were used to assess the need for additional investigation for SVOCs in ground water, prior to conducting the risk assessment activities described in Section 5 of the text

[1] Duplicate samples not included in this count.

* Data Obtained from "United Maintenance Hanger Area, Metropolitan Oakland Airport", Weiss Associates, 27 May 2003

Bold values indicate concentrations detected above the laboratory method detection limit.

< 0.5	Compound not detected at or above the laboratory method detection limit
#	Indicates a concentration detected above the respective ESL
NS	MCL not established
NA	Not analyzed
na	Not applicable
x	Not a TPH-Diesel pattern.
y	Final result elevated due to presence of discrete peaks in the hydraulic oil range.

ERM Qualifiers:

NJ = Tentative identification estimated

McCambell Analytical/Weiss Notes:

o = Oil range compounds are significant

Abbreviations:

SVOCs = Semi-volatile organic compounds
TPH = Total petroleum hydrocarbons
TPPH = Total purgeable petroleum hydrocarbons
TEPH = Total extractable petroleum hydrocarbons
SGCU = Silica gel cleanup

Table 12
Ground Water Analytical Results for Dissolved Metals
Former United Airlines Oakland Maintenance Center
Oakland International Airport

Sample Location	Date Sampled	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	V	Zn	TDS
	MCL (mg/L)	0.002	0.006	0.05	1.0	0.004	0.005	0.05	NS	1.3	0.015	NS	0.1	0.05	0.1**	0.002	NS	5.0**	NS
Area of Concern 1 - Small Parts Wash Rack/Former World Airways Cleaning Room																			
ERM-B-1	4/15/2003	<0.0002	<0.05	<0.05	**0.18**	<0.005	<0.005	<0.005	**0.02**	<0.005	<0.05	<0.02	**0.19**	<0.05	<0.005	<0.05	<0.02	**0.0065**	NA
ERM-B-2	4/15/2003	<0.0002	<0.05	<0.05	**0.6**	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	**0.13**	<0.05	<0.005	**0.21/<0.005 *†** J	<0.02	<0.005	NA
W-B-4	4/15/2003	<0.0002	<0.05	<0.05	**0.064**	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	**0.082 †** J	<0.02	<0.02	NA
W-B-5	4/15/2003	<0.0002	<0.05	<0.05	**0.21**	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	**0.064**	<0.05	<0.005	<0.05	<0.02	<0.02	NA
W-B-6	4/15/2003	<0.0002	<0.05	<0.05	**0.19**	<0.0055 UJ	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	**0.031**	<0.05	<0.005	<0.05	<0.02	<0.02	NA
ERM-MW-01	5/9/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.09**	NA	NA	NA	NA	NA	NA
ERM-MW-01	11/6/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.19**	NA	NA	NA	NA	NA	NA
ERM-MW-02	5/9/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.036**	NA	NA	NA	NA	NA	NA
ERM-MW-02	11/6/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.015**	NA	NA	NA	NA	NA	NA
ERM-MW-03	5/9/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.03	NA	NA	NA	NA	NA	NA
ERM-MW-03	11/6/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.049**	NA	NA	NA	NA	NA	NA
ERM-MW-04	5/9/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.062**	NA	NA	NA	NA	NA	NA
ERM-MW-04	11/7/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.2**	NA	NA	NA	NA	NA	NA
ERM-MW-05	5/9/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.03	NA	NA	NA	NA	NA	NA
ERM-MW-05	11/6/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.045**	NA	NA	NA	NA	NA	NA
ERM-MW-11	12/30/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.014**	NA	NA	NA	NA	NA	NA
ERM-MW-12	12/29/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.010**	NA	NA	NA	NA	NA	NA
ERM-MW-13	12/29/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.16**	NA	NA	NA	NA	NA	NA
ERM-MW-14	12/29/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.59**	NA	NA	NA	NA	NA	NA
Area of Concern 2 - Aircraft Wash Rack																			
ERM-B-3	4/15/2003	<0.0002	<0.05	<0.05	**0.29**	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	**0.12**	<0.05	<0.005	<0.05	<0.02	<0.005	NA
ERM-B-4	4/15/2003	<0.0002	<0.05	<0.05	**0.3**	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	**0.16**	<0.05	<0.005	<0.05	<0.02	<0.005	NA
ERM-B-5	4/15/2003	<0.0002	<0.05	<0.05	**0.16**	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	**0.051**	**0.23**	<0.05	<0.005	**0.074 †** J	<0.02	**0.0066**	NA
ERM-B-6	4/15/2003	<0.0002	<0.05	<0.05	**0.33**	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	**0.028**	**0.26**	<0.05	<0.005	**0.081 †** J	<0.02	<0.005	NA
ERM-B-7	4/15/2003	<0.0002 UJ	<0.05	<0.05	**0.13**	<0.005	**0.0056**	**0.0075**	<0.02	**0.0054**	<0.05	**0.12**	**0.092**	<0.05	<0.005	<0.05	<0.02	**0.014**	NA
W-B-7	4/17/2003	<0.0002	<0.05	<0.05	**0.28**	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	<0.02	NA
W-B-8	4/14/2003	<0.0002	<0.05	<0.05	**0.37**	<0.005	<0.005	**0.047**	<0.02	**0.048**	**1.9**	<0.02	**0.052**	<0.05	<0.005	**0.15 †** J	<0.02	**0.79**	NA
W-B-8*	4/14/2003	<0.0008	<0.06	<0.05	**0.44**	<0.004	<0.005	**0.092**	<0.05	**0.094**	**0.96**	<0.05	**0.1**	<0.5	<0.01	<0.05	<0.05	**0.14**	NA
ERM-MW-06	5/9/2003	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	<0.05	NA	<0.03	NA	NA	NA	NA	NA	NA
ERM-MW-06	11/6/2003	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	**0.021**	NA	**0.01**	NA	NA	NA	NA	NA	NA
ERM-MW-06	12/30/2003	NA	NA	NA	NA	NA	NA	NA	NA	**0.017**	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-MW-07	5/9/2003	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	<0.05	NA	**0.084**	NA	NA	NA	NA	NA	NA
ERM-MW-07	11/6/2003	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	**0.033**	NA	**0.07**	NA	NA	NA	NA	NA	NA
ERM-MW-08	5/9/2003	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	<0.05	NA	**0.11**	NA	NA	NA	NA	NA	NA
ERM-MW-08	11/6/2003	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	**0.033**	NA	**0.24**	NA	NA	NA	NA	NA	NA
ERM-MW-09	5/9/2003	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	<0.05	NA	**0.23**	NA	NA	NA	NA	NA	NA
ERM-MW-09	11/6/2003	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	**0.02**	NA	**0.37**	NA	NA	NA	NA	NA	NA
ERM-MW-15	12/30/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.006**	NA	NA	NA	NA	NA	NA
ERM-MW-16	12/30/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.013**	NA	NA	NA	NA	NA	NA
Area of Concern 3 - Industrial Wastewater Vault																			
W-B-10	4/15/2003	<0.0002	<0.05	<0.05	**0.068**	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	<0.02	NA
W-B-11	4/15/2003	<0.0002	<0.05	<0.05	**0.086**	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	<0.02	NA
W-B-12	4/15/2003	<0.0002	<0.05	<0.05	<0.05	<0.005	**0.038**	<0.005	<0.02	**0.22**	<0.05	**0.085**	**0.063**	<0.05	<0.005	<0.05	<0.02	**0.036**	NA
ERM-MW-10	5/9/2003	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	<0.05	NA	**0.082**	NA	NA	NA	NA	NA	NA
ERM-MW-10	11/6/2003	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	<0.015	NA	**0.12**	NA	NA	NA	NA	NA	NA
ERM-MW-10	12/30/2003	NA	NA	NA	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 5 - Vehicle Maintenance Center																			
ERM-B-10	4/17/2003	<0.0002 UJ	**0.074**	<0.05	**0.1**	**0.0086**	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	<0.02	NA
ERM-B-11	4/17/2003	<0.0002 UJ	<0.05	<0.05	**0.076**	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	**0.064 †** J	<0.02	<0.02	NA
W-B-1*	4/15/2003	<0.0008	<0.06	<0.005	**0.07**	<0.004	<0.005	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	NA
W-B-2*	4/15/2003	<0.0008	<0.06	<0.005	<0.05	<0.004	<0.005	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	NA
W-B-2	4/15/2003	<0.0002	<0.05	<0.05	**0.054**	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	<0.02	NA
W-B-3*	4/15/2003	<0.0008	<0.06	<0.005	**0.083**	<0.004	<0.005	**0.04**	<0.05	<0.05	<0.05	<0.05	**0.06**	<0.05	<0.01	<0.05	<0.05	<0.05	NA
W-B-3	4/15/2003	<0.0002	**0.055**	<0.05	**0.12**	<0.0061 UJ	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	**0.0063**	NA

Ground Water Analytical Results for Dissolved Metals
Former United Airlines Oakland Maintenance Center
Oakland International Airport

Sample Location	Date Sampled	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	V	Zn	TDS
	MCL (mg/L)	0.002	0.006	0.05	1.0	0.004	0.005	0.05	NS	1.3	0.015	NS	0.1	0.05	0.1**	0.002	NS	5.0**	NS
Area of Concern 7 - Former 90-Day Hazardous Waste Accumulation Area																			
W-B-16	4/17/2003	<0.0002 UJ	<0.05	<0.05	<0.05	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	**0.022**	**0.054**	<0.05	<0.005	<0.05	<0.02	<0.02	NA
W-B-16*	4/17/2003	<0.0008	<0.006	**0.0055**	<0.004	<0.005	<0.005	<0.02	<0.05	<0.05	<0.05	**0.13**	**0.054**	<0.05	<0.01	<0.005	<0.05	<0.05	NA
W-B-17	4/17/2003	<0.0002 UJ	<0.05	<0.05	<0.05	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	<0.02	**1,300**
W-B-17*	4/17/2003	<0.0008	<0.006	**0.012**	<0.004	<0.005	<0.005	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.005	<0.05	<0.05	NA
ERM-MW-17	12/30/2003	NA	NA	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-MW-17D	12/30/2003	NA	NA	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 8 - Current 90-Day Hazardous Waste Accumulation Area																			
ERM-B-12	4/17/2003	<0.0002	<0.05	<0.05	**0.24**	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	**0.031**	**0.063**	<0.05	<0.005	<0.05	<0.02	<0.02	NA
Area of Concern 9 - Hazardous Material Storage Areas																			
ERM-B-13	4/16/2003	<0.0002	<0.05	<0.05	**0.058**	**0.0059**	<0.005	<0.005	<0.02	<0.005	**0.057**	**0.028**	<0.02	<0.05	**0.0058**	<0.05	<0.02	**0.017**	NA
ERM-B-14	4/17/2003	<0.0002	<0.05	<0.05	**0.058**	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	**0.065 †** J	<0.02	<0.02	**3,300**
W-B-22	4/18/2003	<0.0002	<0.05	<0.05	<0.05	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	**0.0099**	NA
P-2/UAL-MW-5*	4/22/2003	<0.0008	<0.06	<0.5	**0.053**	<0.004	<0.005	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	<0.01	<0.05	<0.05	<0.05	NA
P-2/UAL-MW-5	11/6/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	NA	NA	
Area of Concern 11 - Aircraft Fueling/Defueling Equipment Areas																			
ERM-B-16	4/16/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**15,000**
Area of Concern 12 - Fire System Motors and Associated Fuel Tanks																			
ERM-B-20	4/17/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2,200**
Area of Concern 14 - Storm Drains																			
ERM-B-23	4/17/2003	<0.0002 UJ	<0.05	<0.05	**0.077**	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	<0.02	NA
W-B-32	4/16/2003	<0.0002	<0.05	<0.05	**0.12**	**0.0058**	<0.005	<0.005	<0.02	**0.0056**	**0.05**	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	**0.021**	**1,900**
W-B-38	4/15/2003	<0.0002	<0.05	<0.05	<0.05	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	<0.02	NA
Area of Concern 15 - Aircraft Parking and Run Up Area																			
ERM-B-24	4/15/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1,300**
Area of Concern 17 - Former Vehicle Fuel USTs																			
UAL-MW-1*	4/15/2003	<0.0008	<0.06	**0.008**	**0.15**	<0.004	<0.005	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	NA
UAL-MW-1	11/6/2003	NA	<0.01	<0.005	NA	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
UAL-MW-2*	4/15/2003	<0.0008	<0.06	<0.005	**0.1**	<0.004	<0.005	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	NA
UAL-MW-2	11/6/2003	NA	<0.01	<0.005	NA	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
UAL-MW-3*	4/15/2003	<0.0008	<0.06	<0.005	<0.05	<0.004	<0.005	<0.02	<0.05	<0.05	<0.05	<0.05	**0.1**	<0.05	<0.01	<0.05	<0.05	<0.05	NA
UAL-MW-3	11/7/2003	NA	<0.01	<0.005	NA	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
P-1/UAL-MW-4*	4/22/2003	<0.0008	<0.06	**0.847**	**0.18**	<0.004	<0.005	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	<0.01	<0.01	<0.01	<0.01	NA
P-1/UAL-MW-4	11/6/2003	NA	<0.01	**0.047**	NA	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 18 - Offsite Solvent USTs																			
W-B-9*	4/18/2003	<0.0008	<0.06	<0.05	**0.12**	<0.0004	<0.0005	<0.002	<0.005	<0.005	<0.05	<0.005	<0.005	<0.05	<0.001	<0.05	<0.005	<0.005	NA
W-B-18*	4/18/2003	<0.0008	<0.06	<0.05	**0.57**	<0.004	<0.005	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	NA
W-B-19*	4/18/2003	<0.0008	<0.06	<0.05	<0.005	<0.0004	<0.0005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.001	<0.05	<0.005	<0.005	NA
W-B-20*	4/18/2003	<0.0008	<0.06	<0.05	**0.099**	<0.0004	<0.0005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.001	<0.05	<0.005	<0.005	NA
W-B-20-A*	4/18/2003	<0.0008	<0.6	<0.5	**0.13**	<0.0004	<0.0005	<0.002	<0.005	<0.005	<0.005	<0.05	<0.005	<0.5	<0.001	<0.5	<0.005	<0.005	NA
Area of Concern 19 - Runoff from Pavement to Unpaved Area North of OMC																			
W-B-25	4/16/2003	<0.0002	<0.05	<0.05	<0.05	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	**0.0081**	NA
W-B-29	4/16/2003	<0.0002	<0.05	<0.05	**0.12**	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	**0.005**	NA
Number of Samples		45	49	49	45	49	55	45	45	47	55	45	72	45	45	38	45	45	6
Number of Detections		0	2	4	34	3	2	4	1	6	8	8	40	0	1	0	0	12	6
Number of Detections above the Comm./Ind. GW ESL		0	2	1	0	3	2	1	0	0	8	0	15	0	0	0	0	0	0
Minimum Detection		na	0.055	0.0055	0.053	0.0058	0.0056	0.0075	0.02	0.0054	0.02	0.022	0.006	na	0.0058	na	na	0.005	1,300
Maximum Detection		na	0.074	0.847	0.6	0.0086	0.038	0.052	0.02	0.22	1.9	0.13	0.59	na	0.0058	na	na	0.79	15,000
Median of Detections		na	0.065	0.010	0.12	0.0059	0.022	0.044	0.02	0.033	0.042	0.041	0.083	na	0.0058	na	na	0.012	2,050
Mean of Detections		na	0.065	0.22	0.18	0.0068	0.022	0.037	0.02	0.065	0.38	0.062	0.12	na	0.0058	na	na	0.088	4,167

Table 12
Ground Water Analytical Results for Dissolved Metals
Former United Airlines Oakland Maintenance Center
Oakland International Airport

Sample Location	Date Sampled	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	V	Zn	TDS
	MCL (mg/L)	0.002	0.006	0.05	1.0	0.004	0.005	0.05	NS	1.3	0.015	NS	0.1	0.05	0.1**	0.002	NS	5.0**	NS

Notes:

Sample concentrations reported in milligrams per liter (mg/L)

ERM prefix indicates a boring completed by ERM

W prefix indicates a boring completed by Weiss Associates

MCL = California maximum contaminant level (*A Compilation of Water Quality Goals* , RWQCB, August 2000). These standards were used to assess the need for additional investigation for SVOCs in ground water, prior to conducting the risk assessment activities described in Section 5 of the text.

Bold values indicate concentrations detected above the laboratory method detection limit.

* Data Obtained from "United Maintenance Hanger Area, Metropolitan Oakland Airport", Weiss Associates, 27 May 2003

** Secondary MCL used when a Primary MCL was not available.

† Data not included in summary statistics due to probable interference with iron and aluminum in the analysis, as noted below

< 0.5	Compound not detected at or above the laboratory method detection limit
#	Indicates a concentration detected above the respective MCL
NS	MCL not established
NA	Not analyzed
na	Not applicable
0.21 / *<0.005**	**Bold** indicates the initial result by inductively coupled plasma/ *Italicized* indicates the result after reanalysis by graphite furnace

The initial arsenic and thallium results were obtained using an inductively coupled plasma method. Concentrations of iron and aluminum within the samples can cause interferences for certain elements including arsenic and thallium. The reanalysis using the graphite furnace method indicates that this interference is occurring with the samples collected during this investigation and the samples most likely contain concentrations similar to that detected by the graphite furnace analysis.

Abbreviations:

Hg = Mercury
Sb = Antimony
As = Arsenic
Ba = Barium
Be = Beryllium
Cd = Cadmium
Cr = Chromium
Co = Cobalt
Cu = Copper
Pb = Lead
Mo = Molybdenum
Ni = Nickel
Se = Selenium
Ag = Silver
Tl = Thallium
V = Vanadium
Zn = Zinc
TDS = Total dissolved solids

ERM Qualifiers:

J = Estimated value
UJ = Estimated non-detected value

			VOCs															TPH					
Sample Location	Sample Depth (feet bgs)	Date Sampled	N-BB	SEC-BB	DCM	IPB	P-IPT	MTBE	NAP	PCE	1,1,1-TCA	1,2,4-TMB	1,3,5-TMB	BZ	EB	TOL	XYL	TPPH	TEPH	TEPH SGCU	TPH-D	TPH-JF	TPH-MO
		Airport Worker Tier-1 ESLs (mg/kg)	NS/240	NS/220	1.5	NS/NS	NS/170	5.6	4.8	0.25	7.8	NS/70	NS/20	0.38	13	9.3	1.5	400	500	500	500	500	1,000
		Construction Worker Tier-1 ESLs (mg/kg)	NS/240	NS/220	1.5	NS/NS	NS/170	5.6	4.8	0.25	7.8	NS/70	NS/20	0.38	13	9.3	1.5	400	500	500	500	500	1,000
		Ecological Receptor Tier-1 ESLs (mg/kg)	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP
Area of Concern 1 - Small Parts Wash Rack/Former World Airways Cleaning Room																							
ERM-B-1	3.5	4/15/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA
ERM-B-2	3.5	4/15/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA
W-B-4*	0	4/14/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.055	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	1.7 g	NA	NA	57 o	<50	560
W-B-4*	3	4/14/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1	NA	NA	<1	<1	<5
W-B-4	3-4	4/14/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA
W-B-5*	0	4/14/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	0.074	0.11	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.026	3.1 g	NA	NA	71 o	<50	810
W-B-5*	3	4/14/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1	NA	NA	<1	<1	<5
W-B-5	3-4	4/14/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA
W-B-6*	0	4/14/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1	NA	NA	4.1 o	1.8	31
W-B-6*	3	4/14/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1	NA	NA	<1	<1	<5
W-B-6	3-4	4/14/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA
Area of Concern 2 - Aircraft Wash Rack																							
ERM-B-3	2.5	4/15/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA
ERM-B-4	2.5	4/15/03	0.0098	0.0073	<0.025	<0.0050	0.012	<0.0050	0.013	<0.0050	<0.0050	0.05	0.024	<0.0050	<0.0050	<0.0050	<0.010	4.7	18 NJ	9.2 NJ	NA	NA	NA
ERM-B-5	2.5	4/15/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	0.015	<0.0050	<0.0050	0.014	0.0078	<0.0050	<0.0050	<0.0050	<0.010	1.4	43 NJ	<20	NA	NA	NA
ERM-B-6	2.5	4/15/03	0.092 J	0.094 J	<0.025	0.048 J	0.19 J	<0.0050	0.047 J	<0.0050	<0.0050	1.2 J	1.1 J	<0.0050	0.027 J	0.005 J	0.35 J	170	1,300 J	410	NA	NA	NA
W-B-7*	0	4/17/03	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.28	<0.1	<0.1	2.1	1.3	<0.1	<0.1	<0.1	<0.1	[redacted] g	NA	NA	[redacted] d	[redacted]	<500
W-B-7	1-2	4/17/03	<0.0050	<0.0050	<0.025	0.0085	0.017	<0.0050	0.047	<0.0050	<0.0050	0.09	0.045	<0.0050	<0.0050	<0.0050	<0.010	7.9	27 NJ	13 NJ	NA	NA	NA
W-B-7*	3	4/17/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.006	<0.0050	<0.0050	0.0059	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	2.6 g	NA	NA	3.3 b,f	2.3	<5
W-B-8*	0	4/14/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.03	1.1 a	NA	NA	<50	<50	390
W-B-8	1.5-2.5	4/14/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<100	NA	NA	NA	NA
W-B-8*	3	4/14/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	1.7 g	NA	NA	81 o	<50	700
Area of Concern 3 - Industrial Wastewater Vault																							
W-B-10*	0	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA
W-B-10*	3	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA
W-B-10*	6	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA
W-B-10*	0	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.039	<1	NA	NA	1.1 b	<1	<5
W-B-10*	3	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-10	3-4	4/15/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA
W-B-10*	6	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-11*	0	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-11	1-2	4/15/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA
W-B-11*	3	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-11*	7.5	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-12*	0	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	3.3 g	NA	NA	34 b,o	9.9	100
W-B-12	0.5	4/16/03	<0.0050	<0.0050	<0.054 UJb	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	19 NJ	15 NJ	NA	NA	NA
W-B-12*	3	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	1.7 g	NA	NA	140 b,o	77	600
W-B-12*	5.5	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	7.4 b,o	3.9	22
Area of Concern 4 - Aboveground Fuel Storage Tank																							
ERM-B-8	4	4/16/03	NA	NA	NA	NA	NA	<0.0050	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	<0.10	<5.0	NA	NA	NA	NA
ERM-B-9	4.5	4/16/03	NA	NA	NA	NA	NA	<0.0050	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	<0.10	200 NJ	<20	NA	NA	NA
Area of Concern 5 - Vehicle Maintenance Center																							
ERM-B-10	2.5	4/17/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA
ERM-B-11	2.5	4/17/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA
ERM-B-11	6.5	4/17/03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<5.0	NA	NA	NA	NA
W-B-1*	0	4/14/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	13 o	<5	140
W-B-1*	3	4/14/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-1*	10	4/14/03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1	NA	NA	<1	<1	<5
W-B-2*	0	4/14/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	6.3 o	<5	81
W-B-2*	3	4/14/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-2	3.5-4.5	4/14/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA
W-B-2*	10	4/14/03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1	NA	NA	<1	<1	<5
W-B-3*	0	4/14/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	10 o	<5	93
W-B-3*	3	4/14/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-3	3-4	4/14/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1.0	<5.0	NA	NA	NA	NA
W-B-3*	7	4/14/03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1	NA	NA	<1	<1	<5

			VOCs															TPH					
Sample Location	Sample Depth (feet bgs)	Date Sampled	N-BB	SEC-BB	DCM	IPB	P-IPT	MTBE	NAP	PCE	1,1,1-TCA	1,2,4-TMB	1,3,5-TMB	BZ	EB	TOL	XYL	TPPH	TEPH	TEPH SGCU	TPH-D	TPH-JF	TPH-MO
		Airport Worker Tier-1 ESLs (mg/kg)	NS/240	NS/220	1.5	NS/NS	NS/170	5.6	4.8	0.25	7.8	NS/70	NS/20	0.38	13	9.3	1.5	400	500	500	500	500	1,000
		Construction Worker Tier-1 ESLs (mg/kg)	NS/240	NS/220	1.5	NS/NS	NS/170	5.6	4.8	0.25	7.8	NS/70	NS/20	0.38	13	9.3	1.5	400	500	500	500	500	1,000
		Ecological Receptor Tier-1 ESLs (mg/kg)	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP
Area of Concern 6 - Boiler and Aboveground Diesel Storage Tank																							
ERM-B-27	2	4/17/03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<5.0	NA	NA	NA	NA
Area of Concern 7 - Former 90-Day Hazardous Waste Accumulation Area																							
W-B-16*	0	4/17/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-16	1-2	4/17/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA
W-B-16*	3	4/17/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-17*	0	4/17/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-17	1-2	4/17/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA
W-B-17*	3	4/17/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
Area of Concern 8 - Current 90-Day Hazardous Waste Accumulation Area																							
ERM-B-12	2	4/17/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA
Area of Concern 9 - Hazardous Material Storage Areas																							
ERM-B-13	3.5	4/16/03	<0.0050	<0.0050	<0.047 UJb	<0.0050	<0.0050	<0.0050	0.0063	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA
ERM-B-14	4.5	4/17/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<20	NA	NA	NA	NA
W-B-21*	0	4/17/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	1.9 o	1.2	6.2
W-B-21*	3	4/17/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-22*	0	4/18/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<5	<5	57
W-B-22	2-3	4/18/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA
W-B-22*	3	4/18/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-23*	0	4/18/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-23*	3	4/18/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<200	<200	[redacted]
Area of Concern 10 - Chemical Storage Area																							
ERM-B-15	1	4/17/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA
Area of Concern 11 - Aircraft Fueling/Defueling Equipment Areas																							
ERM-B-16	4.5	4/16/03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<5.0	NA	NA	NA	NA
ERM-B-17	3.5	4/16/03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	5.1 NJ	<5.0	NA	NA	NA
ERM-B-18	4	4/16/03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<5.0	NA	NA	NA	NA
ERM-B-19	4.5	4/16/03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<5.0	NA	NA	NA	NA
Area of Concern 12 - Fire System Motors and Associated Fuel Tanks																							
ERM-B-20	3	4/16/03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<5.0	NA	NA	NA	NA
ERM-B-21	2	4/17/03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<5.0	NA	NA	NA	NA
Area of Concern 13 - Paint Spray Booth																							
ERM-B-22	1.5	4/17/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA
Area of Concern 14 - Storm Drains																							
ERM-B-23	4.5	4/17/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<20	NA	NA	NA	NA
W-B-32*	0	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	3 b,o	<1	10
W-B-32	1-2	4/16/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	23 NJ	22 NJ	NA	NA	NA
W-B-32*	3	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-32*	8	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	7.6 b,o	10	<25
W-B-38*	0	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-38	2-3	4/15/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1.0	<5.0	NA	NA	NA	NA
W-B-38*	3	4/14/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-38*	7.5	4/14/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-39*	0	4/14/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-39*	3	4/14/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-39*	8	4/14/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
Area of Concern 15 - Aircraft Parking and Run Up Area																							
ERM-B-24	2.5	4/15/03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<5.0	NA	NA	NA	NA
ERM-B-25	3.5	4/15/03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<5.0	NA	NA	NA	NA
ERM-B-26	2	4/16/03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<5.0	NA	NA	NA	NA
Area of Concern 16 - Reported Fuel Spill Area on Taxiway																							
W-B-13*	0	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-13*	3	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-13*	7.5	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-14*	0	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-14	2-3	4/15/03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<5.0	NA	NA	NA	NA
W-B-14*	3	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5
W-B-14*	7.5	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1	NA	NA	<1	<1	<5

Sample Location	Sample Depth (feet bgs)	Date Sampled	VOCs															TPH							
			N-BB	SEC-BB	DCM	IPB	P-IPT	MTBE	NAP	PCE	1,1,1-TCA	1,2,4-TMB	1,3,5-TMB	BZ	EB	TOL	XYL	TPPH		TEPH	TEPH SGCU	TPH-D		TPH-JF	TPH-MO
		Airport Worker Tier-1 ESLs (mg/kg)	NS/240	NS/220	1.5	NS/NS	NS/170	5.6	4.8	0.25	7.8	NS/70	NS/20	0.38	13	9.3	1.5	400		500	500	500		500	1,000
		Construction Worker Tier-1 ESLs (mg/kg)	NS/240	NS/220	1.5	NS/NS	NS/170	5.6	4.8	0.25	7.8	NS/70	NS/20	0.38	13	9.3	1.5	400		500	500	500		500	1,000
		Ecological Receptor Tier-1 ESLs (mg/kg)	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP		IP	IP	IP		IP	IP
W-B-15*	0	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-15*	7.5	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
Area of Concern 18 - Migration of Offsite Solvent Plume Onto OMC Property																									
W-B-9	3-3.5	4/18/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	NA		NA	NA	NA		NA	NA
W-B-9*	4	4/18/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-18*	4.5	4/18/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	**2**	b,o	**1.4**	<5
W-B-18*	7.5	4/18/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-19	3-3.5	4/18/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	NA		NA	NA	NA		NA	NA
W-B-19*	4	4/18/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-20*	3	4/18/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
Area of Concern 19 - Runoff from Pavement to Unpaved Area North of OMC																									
W-B-24*	0	4/14/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-24*	3	4/14/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	**1.4**	b	<1	<5
W-B-24*	7.5	4/14/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	**3.2**	o	<1	**17**
W-B-25*	0	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-25	1-2	4/15/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1		<5.0	NA	NA		NA	NA
W-B-25*	3	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-25*	8	4/15/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	**2**	b,o	<1	**7.9**
W-B-26*	0	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-26*	3	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-26*	11.5	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-27*	0	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-27*	3	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-27*	8	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-28*	0	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-28*	3	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-28*	7.5	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-29*	0	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-29	1-2	4/16/03	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<1		<5.0	NA	NA		NA	NA
W-B-29*	3	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-29*	8	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-30*	0	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-30*	3	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-30*	7.5	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-31*	0	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-31*	3	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	**7.1**	o	<2	**27**
W-B-31*	3.5	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	**11**	o	<5	**42**
W-B-33*	0	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**2.7**	g	NA	NA	**220**	o	<200	[redacted]
W-B-33*	2.5	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	**1.5**	o	<1	**6.8**
W-B-33*	3	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-33*	8	4/16/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	**12**	b,o	**10**	**27**
W-B-34*	0	4/17/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<10		<10	**100**
W-B-34*	3	4/17/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	**2.1**	b,o	<1	**7.9**
W-B-35*	0	4/17/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	**1.1**	o	<1	<5
W-B-35*	3	4/17/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	**6.8**	c,m	**1.1**	**12**
W-B-36*	0	4/17/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-36*	3	4/17/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	<1		<1	<5
W-B-37*	0	4/17/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	**5.5**	o	<1	**42**
W-B-37*	3.5	4/17/03	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1		NA	NA	**15**	b,o	**4.6**	**17**
		Number of Samples	129	129	129	129	129	131	129	129	129	129	129	142	142	142	142	129		38	8	96		96	96
		Number of Detections	2	2	0	2	3	0	7	1	2	6	5	0	1	1	4	13		1	5	30		12	27
		# of Detections above the Airport Worker Tier-1 ESL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		0	0	1		1	2
		# of Detections above the Construction Tier-1 ESL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		0	0	1		1	2
		# of Detections above the Ecological Tier-1 ESL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0		0	0
		Minimum Detection	0.0098	0.0073	na	0.0085	0.012	na	0.006	0.074	0.055	0.0059	0.0078	na	0.027	0.005	0.026	1.1		43	9.2	1.1		1.1	6.2
		Maximum Detection	0.092	0.094	na	0.048	0.19	na	0.28	0.074	0.11	2.1	1.3	na	0.027	0.005	0.35	1000		43	410	1,800		1,800	2,100
		Median of Detections	0.051	0.051	na	0.028	0.017	na	0.015	0.074	0.083	0.070	0.045	na	0.027	0.005	0.035	2.7		43	15	6.95		4.25	42.0
		Mean of Detections	0.051	0.051	na	0.028	0.073	na	0.059	0.074	0.083	0.577	0.495	na	0.027	0.005	0.111	92.5		43	93.8	84.4		160.3	300.3

Sample Location	Sample Depth (feet bgs)	Date Sampled	VOCs															TPH					
			N-BB	SEC-BB	DCM	IPB	P-IPT	MTBE	NAP	PCE	1,1,1-TCA	1,2,4-TMB	1,3,5-TMB	BZ	EB	TOL	XYL	TPPH	TEPH	TEPH SGCU	TPH-D	TPH-JF	TPH-MO
Airport Worker Tier-1 ESLs (mg/kg)			NS/240	NS/220	1.5	NS/NS	NS/170	5.6	4.8	0.25	7.8	NS/70	NS/20	0.38	13	9.3	1.5	400	500	500	500	500	1,000
Construction Worker Tier-1 ESLs (mg/kg)			NS/240	NS/220	1.5	NS/NS	NS/170	5.6	4.8	0.25	7.8	NS/70	NS/20	0.38	13	9.3	1.5	400	500	500	500	500	1,000
Ecological Receptor Tier-1 ESLs (mg/kg)			IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP

Notes:

Sample concentrations reported in milligrams per kilogram (mg/kg)
ERM prefix indicates a boring completed by ERM
W prefix indicates a boring completed by Weiss Associates
Samples from location ERM-B-11 were analyzed for PCB-1016, -1221, -1232, -1242, -1248, -1254, and -1260; no PCB concentrations were detected. In addition, samples from locations ERM-B-6 and ERM-B-9 were analyzed for SVOCs, but none were detected.
* Data Obtained from *"United Maintenance Hanger Area, Metropolitan Oakland Airport"*, Weiss Associates, 27 May 2003
Airport Worker Tier-1 ESLs = Environmental screening levels for shallow soil under a commercial/industrial land use scenario where potentially impacted ground water is not a current or potential drinking water resource were used as the Tier-1 ESLs for airport worker receptors (Table B of *Screening for Environmental Concerns At Sites with Contaminated Soil and Groundwater*, RWQCB, July 2003). For chemicals that have no ESL established in this table, the USEPA Region IX Preliminary Remediation Goal for Commercial/Industrial Sites was used, if a PRG was available for the chemical.
Construction Worker Tier-1 ESLs = Environmental Screening Levels for shallow soil under a commercial/industrial land use scenario where potentially impacted ground water is not a current or potential drinking water resource were used as the Tier-1 ESLs for construction worker receptors (Table B of *Screening for Environmental Concerns At Sites with Contaminated Soil and Groundwater*, RWQCB, July 2003). For chemicals that have no ESL established in this table, the USEPA Region IX Preliminary Remediation Goal for Commercial/Industrial Sites was used, if a PRG was available for the chemical.
Ecological Receptor Tier-1 ESLs = Incomplete Pathway. There is no complete exposure pathway for ecological receptors to be exposed to VOCs or TPH in soil; therefore, no standards are provided for this pathway.
Bold values indicate concentrations detected above the laboratory method detection limit.

< 0.5	Compound not detected at or above the laboratory method detection limit
#	Indicates a concentration detected above the respective Tier-1 ESL for airport workers
#	Indicates a concentration detected above the respective Tier-1 ESLs for airport and construction workers
#	Indicates a concentration detected above the respective Tier-1 ESL for construction workers
#	Indicates a concentration detected above the respective Tier-1 ESLs for construction workers and ecological receptors
#	Indicates a concentration detected above the respective Tier-1 ESL for ecological receptors
#	Indicates a concentration detected above the respective Tier-1 ESLs for airport workers and ecological receptors
#	Indicates a concentration detected above the respective Tier-1 ESLs for airport and construction workers and ecological receptors
#	Indicates that a sample result was not included in the statistical summary due to subsequent analysis using silica gel clean-up
IP	Incomplete pathway
NS/#	Indicates that these constituents have no established ESL standard. The number following the "NS" is the commercial/industrial preliminary remedial goal (PRG), which was used as the Tier-1 comparison criterium, when available (*EPA Region 9 PRG Table*, 1 October 2002)
NS/NS	Indicates that this constituent has no established ESL or PRG standard
NA	Not analyzed
na	Not applicable
feet bgs	Feet below ground surface

Abbreviations:

VOCs = Volatile organic compounds
TPH = Total petroleum hydrocarbons
SVOCs = Semi-volatile organic compounds
PCBs = Polychlorinated biphenyls
N-BB = n-Butylbenzene
SEC-BB = sec-Butylbenzene
DCM = Dichloromethane
IPB = Isopropylbenzene
P-IPT = p-Isopropyltoluene
MTBE = Methyl tert-butyl ether
NAP = Naphthalene
PCE = Tetrachloroethene
1,1,1-TCA = 1,1,1-Trichloroethane
1,2,4-TMB = 1,2,4-Trimethylbenzene
BZ = Benzene
EB = Ethylbenzene
TOL = Toluene
XYL = Xylenes
TPPH = Total purgeable petroleum hydrocarbons
TEPH = Total extractable petroleum hydrocarbons
TEPH SGCU = Total extractable petroleum hydrocarbons - with silica gel cleanup
TPH-D = Total petroleum hydrocarbons as diesel
TPH-JF = Total petroleum hydrocarbons as jet fuel
TPH-MO = Total petroleum hydrocarbons as motor oil

ERM Qualifiers:

J = Estimated value
UJb = Estimated non-detected value due to common laboratory contaminant
NJ = Tentative identification estimated

McCampbell Analytical/Weiss Notes:

a = Unmodified or weakly modified gasoline is significant
b = Diesel range compounds are significant; no recognizable pattern
c = Aged diesel is significant
d = Gasoline range compounds are significant
f = One to a few isolated peaks present
g = Strongly aged gasoline or diesel range compounds are significant
m = Fuel oil
o = Oil range compounds are significant

Table 13-B
Comparison of Detected Chemical Concentrations to Tier-1 Standards
Comparison of Metals Detected in Soil
Former United Airlines Oakland Maintenance Center
Oakland International Airport

Sample Location	Sample Depth (feet bgs)	Date Sampled	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl		V	Zn	
Airport Worker Tier-1 ESLs (mg/kg)			IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP		IP	IP	
Construction Worker Tier-1 ESLs (mg/kg)			10	40	5.5	1,500	8	7.4	58	80	230	750	40	150	10	40	13		200	600	
Ecological Receptor Tier-1 ESLs (mg/kg)			IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP		IP	IP	
Area of Concern 1 - Small Parts Wash Rack/Former World Airways Cleaning Room																					
ERM-B-1	3.5	4/15/2003	<0.020	<10	19	22	<1.0	<1.0	18	12	38	<10	<4.0	21	<10	<1.0	70	J	12	40	J
ERM-B-2	3.5	4/15/2003	<0.020	<10	20	22	<1.0	<1.0	15	<4.0	4.9	<10	<4.0	18	<10	<1.0	63	J	11	19	J
W-B-4*	0	4/14/2003	<0.06	<2.5	3.8	120	<0.5	<0.5	40	6.8	19	4.6	<2	51	<2.5	<1	<2.5		21	34	
W-B-4*	3	4/14/2003	<0.06	<2.5	3	82	<0.5	<0.5	21	3.7	4.3	<3	<2	21	<2.5	<1	<2.5		13	14	
W-B-4	3-4	4/14/2003	<0.020	<10	16	14	<1.0	<1.0	17	<4.0	3.2	<10	<4.0	17	<10	<1.0	63	J	12	14	
W-B-5*	0	4/14/2003	<0.06	<2.5	4.6	110	<0.5	0.86	70	8.4	23	3.5	<2	68	<2.5	<1	<2.5		26	42	
W-B-5*	3	4/14/2003	<0.06	<2.5	2.7	27	<0.5	<0.5	22	3.9	4.9	<3	<2	24	<2.5	<1	<2.5		15	16	
W-B-5	3-4	4/14/2003	<0.020	<10	17	13	<1.0	<1.0	15	<4.0	3.0	<10	<4.0	18	<10	<1.0	59	J	11	13	
W-B-6*	0	4/14/2003	<0.06	<2.5	4.2	98	<0.5	0.66	43	6.2	19	5.1	<2	47	<2.5	<1	<2.5		22	33	
W-B-6*	3	4/14/2003	<0.06	<2.5	2.8	31	<0.5	<0.5	16	3.3	2.9	<3	<2	19	<2.5	<1	<2.5		13	12	
W-B-6	3-4	4/14/2003	0.032	<10	30	65	<1.0	<1.0	20	5.9	14	<10	<4.0	35	<10	<1.0	140	J	13	26	
Area of Concern 2 - Aircraft Wash Rack																					
ERM-B-3	2.5	4/15/2003	<0.020	<10	19	21	<1.0	<1.0	17	<4.0	6.0	<10	<4.0	19	<10	<1.0	72	J	12	<14	UJ
ERM-B-4	2.5	4/15/2003	<0.020	<10	19	27	<1.0	<1.0	13	<4.0	6.4	<10	<4.0	17	<10	<1.0	55	J	10	<14	UJ
ERM-B-5	2.5	4/15/2003	<0.020	<10	21	26	<1.0	<1.0	22	<4.0	7.0	<10	<4.0	21	<10	<1.0	67	J	12	<21	UJ
ERM-B-6	2.5	4/15/2003	<0.020	<10	19	23	<1.0	<1.0	16	<4.0	9.0	<10	<4.0	17	<10	<1.0	62	J	11	<14	UJ
W-B-7*	0	4/17/2003	<0.06	<2.5	<2.5	35	<0.5	6.4	24	8.8	63	3.1	2.8	24	<2.5	<1	<2.5		16	18	
W-B-7	1-2	4/17/2003	<0.017	<10	21	31	<1.0	<1.0	18	<4.0	5.5	<10	<4.0	22	<10	<1.0	75	J	13	15	J
W-B-7*	3	4/17/2003	<0.06	<2.5	3	38	<0.5	<0.5	20	3.5	4.6	4.6	<2	20	<2.5	<1	<2.5		14	12	
W-B-8*	0	4/14/2003	0.087	3.5	11	140	<0.5	3.5	39	7.5	160	92	7.7	51	<2.5	<1	<2.5		30	110	
W-B-8	1.5-2.5	4/14/2003	0.16	<10	46	110	<1.0	<1.0	19	6.5	25	79	<4.0	32	<10	<1.0	200	J	23	94	
W-B-8*	3	4/14/2003	0.12	<2.5	12	110	<0.5	<0.5	20	6.9	18	90	<2	25	<2.5	<1	<2.5		23	100	
Area of Concern 3 - Industrial Wastewater Vault																					
W-B-10*	0	4/15/2003	<0.06	<2.5	<2.5	53	<0.5	0.64	22	3.9	9.1	4.2	<2	24	<2.5	<1	<2.5		13	22	
W-B-10*	3	4/15/2003	<0.06	<2.5	25	<0.5	<0.5	14	2.8	3.5	<3	<3	<2	19	<2.5	<1	<2.5		10	13	
W-B-10	3-4	4/15/2003	<0.020	<10	19	20	<1.0	<1.0	18	<4.0	3.6	<10	<4.0	19	<10	<1.0	60	J	12	15	
W-B-10*	6	4/15/2003	<0.06	<2.5	<2.5	35	<0.5	<0.5	16	2.7	3.8	<3	<2	17	<2.5	<1	<2.5		9.8	11	
W-B-11*	0	4/15/2003	<0.06	<2.5	<2.5	33	<0.5	0.5	22	4.3	7.6	3.6	<2	25	<2.5	<1	<2.5		15	19	
W-B-11	1-2	4/15/2003	0.022	<10	29	50	<1.0	<1.0	20	4.3	6.6	<10	<4.0	26	<10	<1.0	93	J	15	20	
W-B-11*	3	4/15/2003	<0.06	<2.5	<2.5	79	<0.5	<0.5	27	5.5	8.8	3	<2	34	<2.5	<1	<2.5		18	24	
W-B-11*	8	4/15/2003	<0.06	<2.5	<2.5	23	<0.5	<0.5	16	2.6	3.2	<3	<2	14	<2.5	<1	<2.5		9.8	9.7	
W-B-12*	0	4/15/2003	<0.06	11	<2.5	45	<0.5	15	30	2.9	690	7.8	19	51	<2.5	<1	<2.5		11	51	
W-B-12	0.5	4/16/2003	<0.020	25	33	150	<1.0	44	90	6.2	4,200	35	260	340	<10	2.7	160	J	19	190	
W-B-12*	3	4/15/2003	<0.06	3.3	12	51	<0.5	14	28	3.7	580	7.9	16	50	<2.5	<1	<2.5		11	51	
W-B-12*	6	4/15/2003	<0.06	<2.5	<2.5	21	<0.5	<0.5	18	3.2	12	<3	<2	20	<2.5	<1	<2.5		12	14	
Area of Concern 5 - Vehicle Maintenance Center																					
ERM-B-10	2.5	4/17/2003	<0.018	<10	23	28	<1.0	<1.0	19	4.0	4.7	<10	<4.0	21	<10	<1.0	77	J	13	15	J
ERM-B-11	2.5	4/17/2003	<0.018	<10	24	39	<1.0	<1.0	18	<4.0	4.1	<10	<4.0	20	<10	<1.0	75	J	13	16	J
W-B-1*	0	4/14/2003	<0.06	<2.5	2.6	100	<0.5	<0.5	190	5.9	16	4.7	<2	120	<2.5	<1	<2.5		20	33	
W-B-1*	3	4/14/2003	<0.06	<2.5	<2.5	91	<0.5	<0.5	20	5.9	13	4.1	<2	37	<2.5	<1	<2.5		14	27	
W-B-2*	0	4/14/2003	<0.06	<2.5	2.6	90	<0.5	<0.5	60	6.7	17	5.4	<2	51	<2.5	<1	<2.5		18	43	
W-B-2*	3	4/14/2003	<0.06	<2.5	<2.5	59	<0.5	<0.5	47	4.8	10	3.1	<2	42	<2.5	<1	<2.5		14	24	
W-B-2	3.5-4.5	4/14/2003	<0.020	<10	15	66	<1.0	<1.0	12	<4.0	2.6	<10	<4.0	15	<10	<1.0	58	J	8.9	11	
W-B-3*	0	4/14/2003	<0.06	<2.5	2.8	88	<0.5	<0.5	180	7.5	17	4.1	<2	120	<2.5	<1	<2.5		19	32	
W-B-3*	3	4/14/2003	<0.06	<2.5	<2.5	85	<0.5	<0.5	41	5.9	12	3.6	<2	43	<2.5	<1	<2.5		17	26	
W-B-3	3-4	4/14/2003	<0.020	<10	15	20	<1.0	<1.0	19	<4.0	4.6	<10	<4.0	21	<10	<1.0	74	J	12	18	

Sample Location	Sample Depth (feet bgs)	Date Sampled	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	V	Zn
Airport Worker Tier-1 ESLs (mg/kg)			IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP
Construction Worker Tier-1 ESLs (mg/kg)			10	40	5.5	1,500	8	7.4	58	80	230	750	40	150	10	40	13	200	600
Ecological Receptor Tier-1 ESLs (mg/kg)			IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP
Area of Concern 7 - Former 90-Day Hazardous Waste Accumulation Area																			
W-B-16*	0	4/17/2003	**0.071**	<2.5	<2.5	**31**	<0.5	<0.5	**23**	**4.3**	**4.5**	<3	<2	**23**	<2.5	<1	<2.5	**15**	**13**
W-B-16	1-2	4/17/2003	<0.019	<10	**24**	**32**	<1.0	<1.0	**19**	<4.0	**4.9**	<10	<4.0	**22**	<10	<1.0	**60** J	**14**	**18** J
W-B-16*	3	4/17/2003	<0.06	<2.5	<2.5	**12**	<0.5	<0.5	**17**	**3.2**	**3.6**	<3	<2	**19**	<2.5	<1	<2.5	**14**	**9.9**
W-B-17*	0	4/17/2003	**0.19**	<2.5	<2.5	**34**	<0.5	<0.5	**20**	**3.7**	**4.6**	<3	<2	**23**	<2.5	<1	<2.5	**15**	**13**
W-B-17	1-2	4/17/2003	<0.017	<10	**28**	**31**	<1.0	<1.0	**22**	**6.7**	**6.6**	<10	<4.0	**25**	<10	<1.0	**93** J	**15**	**18** J
W-B-17*	3	4/17/2003	**0.13**	<2.5	<2.5	**29**	<0.5	<0.5	**26**	**7.3**	**5.8**	<3	<2	**25**	<2.5	<1	<2.5	**15**	**15**
Area of Concern 8 - Current 90-Day Hazardous Waste Accumulation Area																			
ERM-B-12	2	4/17/2003	<0.018	<10	**27**	**32**	<1.0	<1.0	**21**	**4.2**	**5.5**	<10	<4.0	**24**	<10	<1.0	**91** J	**15**	**19** J
Area of Concern 9 - Hazardous Material Storage Areas																			
ERM-B-13	3.5	4/16/2003	<0.020	<10	**14**	**19**	<1.0	<1.0	**11**	<4.0	**4.0**	<10	<4.0	**15**	<10	<1.0	**59** J	**7.6**	**13**
ERM-B-14	4.5	4/17/2003	**0.028**	<10	**36**	**37**	<1.0	<1.0	**23**	**6.0**	**8.0**	<10	<4.0	**30**	<10	<1.0	**150** J	**16**	**28**
W-B-21*	0	4/17/2003	**0.075**	<2.5	<2.5	**47**	<0.5	<0.5	**32**	**4.9**	**7.2**	**4.5**	<2	**32**	<2.5	<1	<2.5	**16**	**18**
W-B-21*	3	4/17/2003	**0.071**	<2.5	<2.5	**29**	<0.5	<0.5	**20**	**4.0**	**4.3**	<3	<2	**24**	<2.5	<1	<2.5	**13**	**12**
W-B-22*	0	4/18/2003	<0.06	<2.5	**2.6**	**55**	<0.5	<0.5	**25**	**4.1**	**5.2**	<3	<2	**25**	<2.5	<1	<2.5	**15**	**18**
W-B-22	2-3	4/18/2003	<0.017	<10	**22**	**29**	<1.0	<1.0	**16**	<4.0	**3.8**	<10	<4.0	**18**	<10	<1.0	**76** J	**12**	**20** J
W-B-22*	3	4/18/2003	<0.06	<2.5	<2.5	**28**	<0.5	<0.5	**22**	**3.6**	**4.9**	<3	<2	**24**	<2.5	<1	<2.5	**14**	**16**
W-B-23*	0	4/18/2003	**0.09**	<2.5	<2.5	**30**	<0.5	<0.5	**24**	**3.8**	**4.6**	<3	<2	**25**	<2.5	<1	<2.5	**16**	**16**
W-B-23*	3	4/18/2003	<0.06	<2.5	**2.6**	**86**	<0.5	<0.5	**110**	**6.4**	**16**	**7.2**	<2	**80**	<2.5	<1	<2.5	**21**	**35**
Area of Concern 10 - Chemical Storage Area																			
ERM-B-15	1	4/17/2003	<0.019	<10	**22**	**21**	<1.0	<1.0	**17**	<4.0	**3.9**	<10	<4.0	**21**	<10	<1.0	**63** J	**13**	**18** J
Area of Concern 13 - Paint Spray Booth																			
ERM-B-22	1.5	4/17/2003	<0.019	<10	**25**	**21**	<1.0	<1.0	**18**	<4.0	**4**	<10	<4.0	**20**	<10	<1.0	**85** J	**13**	**15** J
Area of Concern 14 - Storm Drains																			
ERM-B-23	4.5	4/17/2003	**0.024**	<10	**26**	**35**	<1.0	<1.0	**17**	**4.2**	**7.9**	<10	<4.0	**21**	<10	<1.0	**96** J	**15**	**31**
W-B-32*	0	4/16/2003	<0.06	<2.5	**3.1**	**33**	<0.5	**3.3**	**30**	**4.4**	**20**	**21**	<2	**26**	<2.5	<1	<2.5	**18**	**120**
W-B-32	1-2	4/16/2003	**0.029**	<10	**22**	**23**	<1.0	**4.2**	**26**	<4.0	**23**	**20**	<4.0	**17**	<10	<1.0	**78** J	**11**	**140**
W-B-32*	3	4/16/2003	<0.06	<2.5	<2.5	**22**	<0.5	**0.5**	**19**	**3.2**	**5.7**	<3	<2	**20**	<2.5	<1	<2.5	**13**	**29**
W-B-32*	8	4/16/2003	<0.06	<2.5	**4.1**	**42**	<0.5	**1.2**	**41**	**6.4**	**13**	**10**	<2	**40**	<2.5	<1	<2.5	**25**	**42**
W-B-38*	0	4/15/2003	<0.06	<2.5	<2.5	**38**	<0.5	<0.5	**27**	**5.2**	**7**	<3	<2	**32**	<2.5	<1	<2.5	**17**	**22**
W-B-38	2-3	4/15/2003	<0.020	<10	**21**	**11**	<1.0	<1.0	**16**	<4.0	**3.4**	<10	<4.0	**20**	<10	<1.0	**67** J	**12**	**14**
W-B-38*	3	4/14/2003	<0.06	<2.5	<2.5	**14**	<0.5	<0.5	**17**	**3.5**	**3.9**	<3	<2	**21**	<2.5	<1	<2.5	**13**	**13**
W-B-38*	8	4/14/2003	<0.06	<2.5	<2.5	**12**	<0.5	<0.5	**14**	**2.8**	**3.4**	<3	<2	**18**	<2.5	<1	<2.5	**9.3**	**12**
W-B-39*	0	4/14/2003	<0.06	<2.5	<2.5	**41**	<0.5	<0.5	**21**	**4.8**	**6.1**	**4.2**	<2	**27**	<2.5	<1	<2.5	**14**	**21**
W-B-39*	3	4/14/2003	<0.06	<2.5	<2.5	**10**	<0.5	<0.5	**15**	**3.2**	**3.9**	<3	<2	**20**	<2.5	<1	<2.5	**10**	**12**
W-B-39*	8	4/14/2003	<0.06	<2.5	<2.5	**31**	<0.5	<0.5	**24**	**4.2**	**5.6**	<3	<2	**28**	<2.5	<1	<2.5	**15**	**18**
Area of Concern 16 - Reported Fuel Spill Area on Taxiway																			
W-B-13*	0	4/15/2003	<0.06	<2.5	**2.8**	**58**	<0.5	<0.5	**29**	**5.5**	**9.4**	<3	<2	**34**	<2.5	<1	<2.5	**20**	**27**
W-B-13*	3	4/15/2003	<0.06	<2.5	<2.5	**26**	<0.5	<0.5	**17**	**2.9**	**3.5**	<3	<2	**18**	<2.5	<1	<2.5	**10**	**12**
W-B-13*	8	4/15/2003	<0.06	<2.5	<2.5	**36**	<0.5	<0.5	**17**	**2.5**	**3**	<3	<2	**15**	<2.5	<1	<2.5	**11**	**9.6**
W-B-14*	0	4/15/2003	<0.06	<2.5	<2.5	**26**	<0.5	<0.5	**19**	**3.7**	**4.6**	<3	<2	**23**	<2.5	<1	<2.5	**13**	**16**
W-B-14*	3	4/15/2003	<0.06	<2.5	<2.5	**51**	<0.5	<0.5	**25**	**4.4**	**17**	<3	<2	**28**	<2.5	<1	<2.5	**16**	**21**
W-B-14*	8	4/15/2003	<0.06	<2.5	<2.5	**26**	<0.5	<0.5	**16**	**3.1**	**3.7**	<3	<2	**18**	<2.5	<1	<2.5	**11**	**12**
W-B-15*	0	4/15/2003	<0.06	<2.5	<2.5	**53**	<0.5	<0.5	**32**	**5.6**	**8.6**	<3	<2	**39**	<2.5	<1	<2.5	**22**	**26**
W-B-15*	8	4/15/2003	<0.06	<2.5	<2.5	**39**	<0.5	<0.5	**16**	**3**	**3.7**	<3	<2	**18**	<2.5	<1	<2.5	**10**	**13**
Area of Concern 18 - Offsite Solvent USTs																			
W-B-9*	4	4/18/2003	**0.064**	<2.5	<2.5	**27**	<0.5	<0.5	**23**	**3.3**	**4.5**	<3	<2	**21**	<2.5	<1	<2.5	**14**	**15**
W-B-18*	4.5	4/18/2003	<0.06	<2.5	<2.5	**48**	<0.5	<0.5	**25**	**4.4**	**6.2**	<3	<2	**26**	<2.5	<1	<2.5	**15**	**18**
W-B-18*	7.5	4/18/2003	**0.093**	<2.5	<2.5	**14**	<0.5	<0.5	**22**	**3.4**	**4**	<3	<2	**18**	<2.5	<1	<2.5	**13**	**11**

Sample Location	Sample Depth (feet bgs)	Date Sampled	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	V	Zn
Airport Worker Tier-1 ESLs (mg/kg)			IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP
Construction Worker Tier-1 ESLs (mg/kg)			10	40	5.5	1,500	8	7.4	58	80	230	750	40	150	10	40	13	200	600
Ecological Receptor Tier-1 ESLs (mg/kg)			IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP
W-B-19*	4	4/18/03	<0.06	<2.5	<2.5	20	<0.5	<0.5	20	3.4	4.5	<3	<2	22	<2.5	<1	<2.5	13	15
W-B-20*	3	4/18/03	<0.06	<2.5	<2.5	39	<0.5	<0.5	24	3.6	6.7	<3	<2	24	<2.5	<1	<2.5	14	21
Area of Concern 19 - Runoff from Pavement to Unpaved Area North of OMC																			
W-B-24*	0	4/14/03	<0.06	<2.5	<2.5	41	<0.5	<0.5	20	2.7	18	25	<2	19	<2.5	<1	<2.5	10	38
W-B-24*	3	4/14/03	<0.06	<2.5	<2.5	45	<0.5	0.55	30	5.3	9.3	4.3	<2	34	<2.5	<1	<2.5	18	33
W-B-24*	8	4/14/03	<0.06	<2.5	<2.5	56	<0.5	<0.5	22	3.9	4.6	<3	<2	26	<2.5	<1	<2.5	16	19
W-B-25*	0	4/15/03	<0.06	<2.5	<2.5	19	<0.5	<0.5	17	3.2	4.5	7.9	<2	18	<2.5	<1	<2.5	10	15
W-B-25	1-2	4/15/03	<0.020	<10	92	120	<1.0	<1.0	55	11	29	<10	<4.0	22	<10	<1.0	[illegible]	54	61
W-B-25*	3	4/15/03	<0.06	<2.5	3.3	88	<0.5	<0.5	89	7.8	12	5.7	<2	71	<2.5	<1	<2.5	27	38
W-B-25*	8	4/15/03	<0.06	<2.5	<2.5	23	<0.5	<0.5	22	4.1	6.2	3.3	<2	27	<2.5	<1	<2.5	15	20
W-B-26*	0	4/16/03	<0.06	<2.5	<2.5	43	<0.5	<0.5	28	4.2	5.4	3.1	<2	29	<2.5	<1	<2.5	16	17
W-B-26*	3	4/16/03	<0.06	<2.5	<2.5	18	<0.5	<0.5	18	3.4	3.6	<3	<2	21	<2.5	<1	<2.5	14	13
W-B-26*	12	4/16/03	<0.06	<2.5	2.9	38	<0.5	<0.5	28	4.3	5.4	<3	<2	29	<2.5	<1	<2.5	19	19
W-B-27*	0	4/16/03	<0.06	<2.5	<2.5	26	<0.5	<0.5	18	3.4	4.4	<3	<2	21	<2.5	<1	<2.5	13	13
W-B-27*	3	4/16/03	<0.06	<2.5	<2.5	42	<0.5	<0.5	15	2.7	2.7	<3	<2	16	<2.5	<1	<2.5	10	9.5
W-B-27*	8	4/16/03	<0.06	<2.5	<2.5	34	<0.5	<0.5	19	3.4	3.9	<3	<2	22	<2.5	<1	<2.5	14	14
W-B-28*	0	4/16/03	<0.06	<2.5	3.2	38	<0.5	7.5	31	6.2	150	16	3.4	39	<2.5	<1	<2.5	16	41
W-B-28*	3	4/16/03	<0.06	<2.5	3.8	18	<0.5	<0.5	14	2.9	2.3	<3	<2	14	<2.5	<1	<2.5	9.4	8.6
W-B-28*	8	4/16/03	<0.06	<2.5	<2.5	27	<0.5	<0.5	23	3.7	4.3	<3	<2	24	<2.5	<1	<2.5	14	14
W-B-29*	0	4/16/03	<0.06	<2.5	3.1	41	<0.5	<0.5	29	4.6	8.2	4.9	<2	31	<2.5	<1	<2.5	19	24
W-B-29	1-2	4/16/03	0.039	<10	27	61	<1.0	<1.0	56	11	20	<10	<4.0	72	<10	<1.0	[illegible]	33	52
W-B-29*	3	4/16/03	<0.06	<2.5	<2.5	24	<0.5	<0.5	21	3.8	3.9	<3	<2	23	<2.5	<1	<2.5	14	15
W-B-29*	8	4/16/03	<0.06	<2.5	2.9	21	<0.5	<0.5	17	2.8	2.8	<3	<2	17	<2.5	<1	<2.5	11	11
W-B-30*	0	4/16/03	0.21	<2.5	3.7	48	<0.5	1	31	5.7	9.8	9.1	<2	32	<2.5	<1	<2.5	21	32
W-B-30*	3	4/16/03	<0.06	<2.5	<2.5	20	<0.5	<0.5	21	3.8	3.9	<3	<2	24	<2.5	<1	<2.5	14	14
W-B-30*	8	4/16/03	<0.06	<2.5	2.8	15	<0.5	<0.5	20	3.5	3.3	<3	<2	20	<2.5	<1	<2.5	13	12
W-B-31*	0	4/16/03	<0.06	<2.5	2.8	30	<0.5	2.1	24	4.2	15	6	<2	25	<2.5	<1	<2.5	16	71
W-B-31*	3	4/16/03	0.19	<2.5	9.4	34	<0.5	1.3	56	11	28	24	<2	56	<2.5	<1	<2.5	41	81
W-B-31-DUP*	3.5	4/16/03	0.49	<2.5	6.0	34	<0.5	6.8	74	10	33	34	<2	53	<2.5	<1	<2.5	40	110
W-B-33*	0	4/16/03	0.17	<2.5	3.9	74	<0.5	6.4	38	7.4	37	44	<2	43	<2.5	<1	<2.5	32	69
W-B-33-DUP*	2.5	4/16/03	0.12	<2.5	4.3	29	<0.5	1.1	31	5.8	9.9	7.4	<2	34	<2.5	<1	<2.5	21	33
W-B-33*	3	4/16/03	<0.06	<2.5	2.9	43	<0.5	0.82	34	5.7	8.3	5.8	<2	36	<2.5	<1	<2.5	22	25
W-B-33*	8	4/16/03	0.068	<2.5	3.8	32	<0.5	1.7	47	7.6	18	16	<2	44	<2.5	<1	<2.5	30	60
W-B-34*	0	4/17/03	0.42	<2.5	32	100	<0.5	<0.5	22	9.1	24	37	<2	17	<2.5	<1	<2.5	34	110
W-B-34*	3	4/17/03	0.28	<2.5	6.1	46	<0.5	2	50	8.8	23	19	<2	52	<2.5	<1	<2.5	31	67
W-B-35*	0	4/17/03	0.52	<2.5	5.9	110	<0.5	1.2	48	6.5	20	17	<2	43	<2.5	<1	<2.5	28	63
W-B-35*	3	4/17/03	0.094	<2.5	3.5	39	<0.5	0.75	25	5.4	12	10	<2	24	<2.5	<1	<2.5	21	27
W-B-36*	0	4/17/03	<0.06	<2.5	<2.5	47	<0.5	<0.5	24	4.1	6.1	3.5	<2	25	<2.5	<1	<2.5	15	18
W-B-36*	3	4/17/03	<0.06	<2.5	<2.5	28	<0.5	<0.5	19	3	4.3	<3	<2	20	<2.5	<1	<2.5	13	12
W-B-37*	0	4/17/03	0.1	<2.5	<2.5	76	<0.5	4.8	33	3.1	55	28	<2	21	<2.5	1	<2.5	14	180
W-B-37*	3.5	4/17/03	0.088	<2.5	<2.5	16	<0.5	<0.5	23	3.8	4.9	<3	<2	23	<2.5	<1	<2.5	15	14

Table 13-B
Comparison of Detected Chemical Concentrations to Tier-1 Standards
Comparison of Metals Detected in Soil
Former United Airlines Oakland Maintenance Center
Oakland International Airport

Sample Location	Sample Depth (feet bgs)	Date Sampled	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	V	Zn
Airport Worker Tier-1 ESLs (mg/kg)			IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP
Construction Worker Tier-1 ESLs (mg/kg)			10	40	5.5	1,500	8	7.4	58	80	230	750	40	150	10	40	13	200	600
Ecological Receptor Tier-1 ESLs (mg/kg)			IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP
Number of Samples			124	124	93	124	124	124	124	124	124	124	124	124	124	124	93	124	124
Number of Detections			29	4	38	123	0	28	124	105	123	48	6	124	0	2	0	124	120
# of Detections above the Airport Worker Tier-1 ESL			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
# of Detections above the Construction Tier-1 ESL			0	0	9	0	0	5	8	0	3	0	1	1	0	0	0	0	0
# of Detections above the Ecological Tier-1 ESL			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Detection			0.022	3.3	2.5	10	na	0.5	2.8	2.5	2.3	3	2.8	14	na	1	na	7.6	8.6
Maximum Detection			0.52	25	32	150	na	44	190	12	4,200	92	260	340	na	2.7	na	54	190
Median of Detections			0.093	7.25	3.25	34	na	1.85	22	4.2	6.1	6.6	11.85	24	na	1.85	na	14	18.5
Mean of Detections			0.14	10.70	5.595	44.01	na	5.2	29.3	5.0	56.6	15.9	51.5	31.9	na	1.9	na	16.3	31.5
East Bay Background Ranges			0.07 - 0.6	1.5 - 7.1	1.2 - 31	41 - 411	0.29 - 1.1	0.27 - 3.3	10 - 142	6.5 - 25.5	5.4 - 100	4.8 - 65	0.33 - 11.4	16 - 144	<0.25 - 7	0.2 - 2.2	<0.25 - 42.5	22 - 90	33 - 282

Notes:

Sample concentrations reported in milligrams per kilogram (mg/kg)
ERM prefix indicates a boring completed by ERM
W prefix indicates a boring completed by Weiss Associates
* Data Obtained from "*United Maintenance Hanger Area, Metropolitan Oakland Airport*", Weiss Associates, 27 May 2003
Airport Worker Tier-1 ESLs = Incomplete Pathway. There is no complete exposure pathway for airport workers to be exposed to metals in soil; therefore, no standards are provided for this pathway.
Construction Worker Tier-1 ESLs = Environmental screening levels for shallow soil under a commercial/industrial land use scenario where potentially impacted ground water is not a current or potential drinking water resource were used as the Tier-1 ESLs for construction worker receptors (Table B of *Screening for Environmental Concerns At Sites with Contaminated Soil and Groundwater*, RWQCB, July 2003).
Ecological Receptor Tier-1 ESLs = Incomplete Pathway. There is no complete exposure pathway for ecological receptors to be exposed to metals in soil; therefore, no standards are provided for this pathway.
Bold values indicate concentrations detected above the laboratory method detection limit.

< 0.5	Compound not detected at or above the laboratory method detection limit
#	Indicates a concentration detected above the respective Tier-1 ESL for airport workers
#	Indicates a concentration detected above the respective Tier-1 ESLs for airport and construction workers
#	Indicates a concentration detected above the respective Tier-1 ESL for construction workers
#	Indicates a concentration detected above the respective Tier-1 ESLs for construction workers and ecological receptors
#	Indicates a concentration detected above the respective Tier-1 ESL for ecological receptors
#	Indicates a concentration detected above the respective Tier-1 ESLs for airport workers and ecological receptors
#	Indicates a concentration detected above the respective Tier-1 ESLs for airport and construction workers and ecological receptors
#	Indicates that a sample result was not included in the statistical summary due to probable interference with iron and aluminum during analysis, as discussed below
IP	Incomplete pathway
NA	Not analyzed
na	Not applicable
feet bgs	Feet below ground surface
380/*<0.42**	**Bold** indicates the initial result by inductively coupled plasma / *Italicized* indicates the result after reanalysis by graphite furnace

The initial arsenic and thallium results in samples collected by ERM were obtained using an inductively coupled plasma method. Concentrations of iron and aluminum within the samples can cause interferences for certain elements including arsenic and thallium. The reanalysis using the graphite furnace method indicates that this interference is occurring with the samples collected during this investigation and the samples most likely contain concentrations similar to that detected by the graphite furnace analysis.

Abbreviations:

Hg = Mercury
Sb = Antimony
As = Arsenic
Ba = Barium
Be = Beryllium
Cd = Cadmium
Cr = Chromium
Co = Cobalt
Cu = Copper
Pb = Lead
Mo = Molybdenum
Ni = Nickel
Se = Selenium
Ag = Silver
Tl = Thallium
V = Vanadium
Zn = Zinc

ERM Qualifiers:

J = Estimated value
UJ = Estimated non-detected value

Sample Location	Date Sampled	N-BB	T-BB	CE	CF	CM	1,2-DCB	1,4-DCB	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	DCM	IPB	P-IPT	MTBE	NAP	N-PB	STY	1,1,1-TCA	TCE	1,2,4-TMB	1,3,5-TMB	BZ	EB	TOL	VC	XYL
		VOCs																											
Airport Worker Tier-1 ESLs (µg/l)		NS	NS	12	340	170	14	15	47	200	25	590	590	2,200	NS	NS	1,800	24	NS	100	62	360	NS	NS	46	290	130	4	13
Construction Worker Tier-1 ESLs (µg/l)		IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP
Ecological Receptor Tier-1 ESLs (µg/l)		NS	NS	12	470	3,200	10	11	47	99	3.2	590	260	1,600	NS	NS	180	21	NS	11	62	81	NS	NS	46	30	40	530	13
Area of Concern 1 - Small Parts Wash Rack/Former World Airways Cleaning Room																													
ERM-B-1	4/15/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	38 J	<0.50	3.2 J	3.4 J	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.5	0.73 J	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-B-2	4/15/2003	<0.50	<0.50	1.4 J	<0.50	<0.50	<0.50	<0.50	47 J	<0.50	7 J	8.2 J	<0.50	<1.0 [illegible]	<0.50	<0.50	<0.50	<1.0	<0.50	0.77 J	<0.5	3.3 J	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-4	4/15/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	16 J	<0.50	2.7 J	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	12 J	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-5	4/15/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	38 J	<0.50	4.4 J	1.1 J	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	14 J	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-6	4/15/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	33 J	<0.50	5 J	0.48 J	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	4.8 J	0.73 J	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-1	5/9/2003	<0.50	<0.50	<0.50	<0.50	<0.50	0.82	1.3	23	0.88	2	19	<0.50	<1.0	0.54	3.3	<0.50	26	1.1	<0.50	<0.50	1.3	6.8	4.1	<0.50	8.8	0.72	<0.50	4.9
ERM-MW-1D	5/9/2003	<0.50	<0.50	<0.50	<0.50	<0.50	0.76	<0.50	22	0.78	1.9	18	<0.50	<1.0	0.5	3.6	<0.50	17	0.99	<0.50	<0.50	1.2	6.1	3.4	<0.50	0.83	0.75	<0.50	4.3
ERM-MW-1	11/6/2003	<0.50	<0.50	0.62	<0.50	<0.50	<0.5	<0.50	16	<0.5	1.1	7.3	<0.50	<5.0	<0.5	0.74	<0.50	16	0.6	<0.50	<0.50	1.3	1.5	1.7	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-2	5/9/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	21	0.56	2.8	4.7	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	2.6	0.8	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-2	11/6/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	16	<0.50	2.6	0.87	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.1	0.74	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-3	5/9/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	6.8	<0.50	1.1	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-3	11/6/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	16	<0.50	2.4	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-3DUP	11/6/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	16	<0.50	2.3	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-4	5/9/2003	<0.50	<0.50	<0.50	1.4	<0.50	<0.50	<0.50	12	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.72	<0.50	<0.50
ERM-MW-4	11/7/2003	<1	<1	<1	<0.50	<1	<1	<0.50	33	5.2	<0.5	<1	<1	<5.0	<1	<1	<1	<1.2	<1	<1	<1	<1	<1	<1	<0.50	<1	<1	<0.50	<1
ERM-MW-5	5/9/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	[redacted]	3.5	[illegible]	46	0.83	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	4.6	<0.50	<0.50	<0.50	<0.50	<0.50	0.89	<0.50
ERM-MW-5	11/6/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	36	3.8	3.1	38	0.75	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	4.1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.50
ERM-MW-11	12/30/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	7.4	<0.50	0.66	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.50
ERM-MW-12	12/29/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	0.83	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.50
ERM-MW-13	12/29/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	9.9	<0.50	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.50
ERM-MW-14	12/29/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	9.4	<0.50	<0.50	0.81	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.50
Area of Concern 2 - Aircraft Wash Rack																													
ERM-B-3	4/15/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-B-4	4/15/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-B-5	4/15/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	96 J	<5.0	<5.0	<5.0	19 J	<5.0	<5.0	<5.0	<5.0	60 J	12 J	<5.0	<5.0	<5.0	<5.0	14 J
ERM-B-6	4/15/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	99 J	<5.0	6.8 J	<5.0	30 J	<5.0	<5.0	<5.0	<5.0	140 J	74 J	<5.0	<5.0	<5.0	<5.0	21 J
ERM-B-7	4/15/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-7	4/17/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	0.65 J	<0.50	<1.9 UJ	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-8*	4/14/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-8	4/14/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-6	5/9/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	1.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-6	11/6/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-7	5/9/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-7	11/9/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-8	5/9/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-8	11/6/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-9	5/9/2003	4.9	1.2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	2.2	4.2	<0.50	29	2.4	<0.50	<0.50	<0.50	93	43	<0.50	1.6	0.61	<0.50	19
ERM-MW-9	11/6/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	9.8	<0.50	<0.50	<0.50	<0.50	18	5.7	<0.50	<0.50	<0.50	<0.50	<0.50
Area of Concern 3 - Industrial Wastewater Vault																													
W-B-10	4/15/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-11	4/15/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-12	4/15/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-10	5/9/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-10	11/6/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Area of Concern 4 - Aboveground Fuel Storage Tank																													
ERM-B-8	6/16/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2.0	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
ERM-B-9	6/16/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2.0	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
Area of Concern 5 - Vehicle Maintenance Center																													
ERM-B-10	6/17/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.84 J	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	110 J	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-B-11	6/17/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.6 J	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	75 J	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-1*	6/13/2003	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	120	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
W-B-2*	6/13/2003	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	100	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
W-B-2	6/13/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	300 J	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-3*	6/13/2003	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	190	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
W-B-3	6/13/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	310 J	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Area of Concern 6 - Boiler and Aboveground Diesel Storage Tank																													
ERM-B-27	4/17/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
Area of Concern 7 - Former 90-Day Hazardous Waste Accumulation Area																													
W-B-16*	4/17/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.75 J	<0.50	0.56	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-16	4/17/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.75 J	<0.50	0.55 J	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-16-D	4/17/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.75 J	<0.50	0.59 J	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-17*	4/17/2003	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	48	<1.2	55	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<2.5	<1.2	<1.2	1.3	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
W-B-17	4/17/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	14 J	<0.50	86	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	1.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-MW-17	12/30/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.7	<0.50	[illegible]	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.66	<0.50	<0.50
ERM-MW-17D	12/30/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.3	<0.50	2.3	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.55	<0.50	<0.50
Area of Concern 8 - Current 90-Day Hazardous Waste Accumulation Area																													
ERM-B-12	4/17/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Area of Concern 9 - Hazardous Material Storage Areas																													
ERM-B-13	4/16/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	1.8 J	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-B-14	4/17/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ERM-B-14 D	4/17/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-22	4/18/2003	<0.50	<0.50	<0.50	<0.50	0.51 J	<0.50	<0.50	0.8 J	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-22-D	4/18/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.8 J	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

VOCs

Sample Location	Date Sampled	N-BB	T-BB	CE	CF	CM	1,2-DCB	1,4-DCB	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	DCM
Airport Worker Tier-1 ESLs (µg/l)		NS	NS	12	340	170	14	15	47	200	25	590	590	2,200
Construction Worker Tier-1 ESLs (µg/l)		IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP
Ecological Receptor Tier-1 ESLs (µg/l)		NS	NS	12	470	3,200	10	11	47	99	3.2	590	260	1,600
P-2/UAL-MW-5	4/18/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0
P-2/UAL-MW-5*	4/22/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5
P-2/UAL-MW-5	11/4/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0
Area of Concern 11 - Aircraft Fueling/Defueling Equipment Areas														
ERM-B-16	4/16/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-17	4/16/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-18	4/16/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-19	4/16/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 12 - Fire System Motors and Associated Fuel Tanks														
ERM-B-20	4/17/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-21	4/17/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 14 - Storm Drains														
ERM-B-23	4/17/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0
W-B-32	4/16/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0
W-B-38	4/15/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0
W-B-38 DUP	4/15/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0
Area of Concern 15 - Aircraft Parking and Run Up Area														
ERM-B-24	4/15/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-25	4/15/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-26	4/16/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 16 - Reported Fuel Spill Area on Taxiway														
W-B-14	4/15/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 17 - Former Vehicle Fueling USTs														
UAL MW 1	4/18/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0
UAL MW-1*	4/15/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
UAL MW 1	11/6/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
UAL-MW-2	4/18/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.4 J	<0.50	<0.50	4.6 J	<0.50	<1.0
UAL-MW-2*	4/15/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.1	<0.50	<0.50	3	<0.50	<0.50
UAL-MW-2	11/6/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
UAL-MW-3	4/18/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	4.9 J	<0.50	<0.50	<0.50	<0.50	<1.0
UAL-MW-3*	4/15/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3	<0.50	<0.50	<0.50	<0.50	<0.50
UAL-MW-3	11/7/2003	<1	<1	<1	<0.50	<1	<1	<0.50	3.7	<0.50	<0.50	<1	<1	<5.0
P-1/UAL-MW-4	4/18/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.3 J	<0.50	<0.50	<0.50	<0.50	<1.0
P-1/UAL-MW-4*	4/22/2003	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
Area of Concern 18 - Migration of Offsite Solvent Plume Onto OMC Property														
W-B-9*	4/18/2003	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
W-B-9	4/18/2003	<0.50	<0.50	<0.50	<0.50	0.51 J	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0
W-B-18*	4/18/2003	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
W-B-19*	4/18/2003	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	5	<0.5	<0.5
W-B-19	4/18/2003	<0.50	<0.50	<0.50	<0.50	0.52 J	<0.50	<0.50	0.59 J	<0.50	<0.50	6.4 J	<0.50	<1.0
W-B-20*	4/18/2003	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
W-B-20-DUP*	4/18/2003	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Area of Concern 19 - Runoff from Pavement to Unpaved Area North of OMC														
W-B-25	4/16/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0
W-B-29	4/16/2003	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0
Number of Samples[1]		59	59	59	59	59	59	59	59	59	59	59	59	59
Number of Detections[1]		1	1	1	1	3	1	1	26	6	13	12	2	0
# of Detections above the Airport Worker Tier-1 ESL[1]		0	0	0	0	0	0	0	1	0	0	0	0	0
# of Detections above the Construction Tier-1 ESL[1]		0	0	0	0	0	0	0	0	0	0	0	0	0
# of Detections above the Ecological Tier-1 ESL[1]		0	0	0	0	0	0	0	1	0	2	0	0	0
Minimum Detection[1]		4.9	1.2	0.62	1.4	0.51	0.82	1.3	0.59	0.56	0.55	0.81	0.75	na
Maximum Detection[1]		4.9	1.2	0.62	1.4	0.52	0.82	1.3	52	5.2	4.2	46	0.83	na
Median of Detections[1]		4.9	1.2	0.62	1.4	0.51	0.82	1.3	7.1	2.3	2.4	4.85	0.79	na
Mean of Detections[1]		4.9	1.2	0.62	1.4	0.51	0.82	1.3	11.6	2.5	2.1	11.4	0.79	na

Sample Location	Date Sampled	IPB	P-IPT	MTBE	NAP	N-PB	STY	1,1,1-TCA	TCE	1,2,4-TMB	1,3,5-TMB	BZ	EB	TOL	VC	XYL
Airport Worker Tier-1 ESLs (µg/l)		NS	NS	1,800	24	NS	100	62	360	NS	NS	46	290	130	4	13
Construction Worker Tier-1 ESLs (µg/l)		IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP
Ecological Receptor Tier-1 ESLs (µg/l)		NS	NS	180	21	NS	11	62	81	NS	NS	46	300	40	530	13
P-2/UAL-MW-5	4/18/2003	<0.50	<0.50	1.7 J	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
P-2/UAL-MW-5*	4/22/2003	<0.50	<0.50	0.84	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
P-2/UAL-MW-5	11/4/2003	<0.50	<0.50	0.99	<0.5	<0.50	<0.50	1.9	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Area of Concern 11 - Aircraft Fueling/Defueling Equipment Areas																
ERM-B-16	4/16/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
ERM-B-17	4/16/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
ERM-B-18	4/16/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
ERM-B-19	4/16/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
Area of Concern 12 - Fire System Motors and Associated Fuel Tanks																
ERM-B-20	4/17/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
ERM-B-21	4/17/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
Area of Concern 14 - Storm Drains																
ERM-B-23	4/17/2003	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-32	4/16/2003	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-38	4/15/2003	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-38 DUP	4/15/2003	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Area of Concern 15 - Aircraft Parking and Run Up Area																
ERM-B-24	4/15/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
ERM-B-25	4/15/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	1.5
ERM-B-26	4/16/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
Area of Concern 16 - Reported Fuel Spill Area on Taxiway																
W-B-14	4/15/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	NA	<0.50
Area of Concern 17 - Former Vehicle Fueling USTs																
UAL MW 1	4/18/2003	<0.50	<0.50	2.0 J	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
UAL MW-1*	4/15/2003	<0.50	<0.50	0.65	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
UAL MW 1	11/6/2003	NA	NA	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
UAL-MW-2	4/18/2003	<0.50	<0.50	38 J	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
UAL-MW-2*	4/15/2003	<0.50	<0.50	22	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
UAL-MW-2	11/6/2003	NA	NA	21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
UAL-MW-3	4/18/2003	<0.50	<0.50	69 J	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
UAL-MW-3*	4/15/2003	<0.50	<0.50	43	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
UAL-MW-3	11/7/2003	<1	<1	41	<1.2	<1	<1	<1	<1	<1	<1	<0.50	<1	<1	<0.50	<1
P-1/UAL-MW-4	4/18/2003	<0.50	<0.50	84 J	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
P-1/UAL-MW-4*	4/22/2003	<1.2	<1.2	55	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
Area of Concern 18 - Migration of Offsite Solvent Plume Onto OMC Property																
W-B-9*	4/18/2003	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
W-B-9	4/18/2003	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-18*	4/18/2003	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
W-B-19*	4/18/2003	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	34	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
W-B-19	4/18/2003	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	56 J	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-20*	4/18/2003	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
W-B-20-DUP*	4/18/2003	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Area of Concern 19 - Runoff from Pavement to Unpaved Area North of OMC																
W-B-25	4/16/2003	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W-B-29	4/16/2003	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Number of Samples[1]		59	59	63	59	59	59	59	59	59	59	72	72	72	59	72
Number of Detections[1]		3	3	14	4	3	0	7	8	6	4	0	2	4	1	3
# of Detections above the Airport Worker Tier-1 ESL[1]		0	0	0	2	0	0	0	0	0	0	0	0	0	0	1
# of Detections above the Construction Tier-1 ESL[1]		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
# of Detections above the Ecological Tier-1 ESL[1]		0	0	0	2	0	0	0	0	0	0	0	0	0	0	1
Minimum Detection[1]		0.54	0.74	0.65	9.8	0.6	na	1.0	0.74	1.3	1.7	na	0.9	0.61	0.89	1.5
Maximum Detection[1]		2.2	4.2	84	29	2.4	na	12	56	83	42	na	1.6	0.72	0.89	18
Median of Detections[1]		0.65	1.1	30	21	1.1	na	3.2	2.7	4.2	4.9	na	1.25	0.70	0.89	4.9
Mean of Detections[1]		1.19	2.01	32.3	20.2	1.37	na	4.2	12.9	18	13.4	na	1.25	0.68	0.89	8.1

Notes:
Sample concentrations reported in micrograms per liter (µg/L)
ERM prefix indicates a boring completed by ERM
W prefix indicates a boring completed by Weiss Associates
* Data Obtained from "United Maintenance Hanger Area, Metropolitan Oakland Airport", Weiss Associates, 27 May 2003
Airport Worker Tier-1 ESLs – Environmental screening levels for ground water under a commercial/industrial land use scenario where potentially impacted ground water is not a current or potential drinking water resource were used as the Tier-1 ESLs for airport worker receptors (Table B of *Screening for Environmental Concerns At Sites with Contaminated Soil and Groundwater*, RWQCB, July 2003)
Construction Woker Tier-1 ESLs – Incomplete Pathway. There is no complete exposure pathway for construction workers to be exposed to VOCs in soil, therefore, no standards are provided for this pathway
Ecological Receptor Tier-1 ESLs – Environmental screening levels for discharge to estuarine surface water were used as the Tier 1 ESLs for ecological receptors (Table F of *Screening for Environmental Concerns At Sites with Contaminated Soil and Groundwater*, RWQCB, July 2003)
[1] Duplicate samples not included in this count
Bold values indicate concentrations detected above the laboratory method detection limit

< 0.5	Compound not detected at or above the laboratory method detection limit
#	Indicates a concentration detected above the respective Tier-1 ESL for airport workers
#	Indicates a concentration detected above the respective Tier-1 ESLs for airport and construction workers
#	Indicates a concentration detected above the respective Tier-1 ESL for construction workers
#	Indicates a concentration detected above the respective Tier-1 ESLs for construction workers and ecological receptors
#	Indicates a concentration detected above the respective Tier-1 ESL for ecological receptors
#	Indicates a concentration detected above the respective Tier-1 ESLs for airport workers and ecological receptors
#	Indicates a concentration detected above the respective Tier-1 ESLs for airport and construction workers and ecological receptors
#	Indicates that sample results from these grab samples were not included in the statistical summary due to the subsequent installation and sampling of a nearby well
IP	Incomplete pathway
NS	Standard not established
NA	Not analyzed
na	Not applicable

Abbreviations:

VOCs = Volatile organic compounds
N-BB = n-Butylbenzene
t-1,2-DCE = trans 1,2-Dichloroethene
DCM = Dichloromethane
BZ = Benzene
EB = Ethylbenzene

Table 13-C
Comparison of Detected Chemical Concentrations to Tier-1 Standards
Comparison of VOCs Detected in Ground Water
Former United Airlines Oakland Maintenance Center
Oakland International Airport

Sample Location	Date Sampled	N-BB	T-BB	CT	CF	CM	1,2-DCB	1,4-DCB	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	DCM	IPB	P-IPT	MTBE	NAP	N-PB	STY	1,1,1-TCA	TCE	1,2,4-TMB	1,3,5-TMB	BZ	EB	TOL	VC	XYL
		VOCs																											
Airport Worker Tier-1 ESLs (µg/l)		NS	NS	12	340	170	14	15	47	210	25	590	590	2,200	NS	NS	1,800	24	NE	100	62	360	NS	NS	46	290	130	4	13
Construction Worker Tier-1 ESLs (µg/l)		IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP
Ecological Receptor Tier 1 ESLs (µg/l)		NS	NS	12	470	3,200	10	11	47	99	3.2	590	260	1,600	NS	NS	180	21	NS	13	62	81	NS	NS	46	30	40	330	13

T-BB = tert-Butylbenzene
CE = Chloroethane
CF = Chloroform
CM = Chloromethane
1,2-DCB = 1,2-Dichlorobenzene
1,4-DCB = 1,4-Dichlorobenzene
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
1,1-DCE = 1,1-Dichloroethene
c-1,2-DCE = cis-1,2-Dichloroethene

IPB = Isopropylbenzene
P-IPT = p-Isopropyltoluene
MTBE = Methyl tert-butyl ether
NAP = Naphthalene
N-PB = n-Propylbenzene
STY = Styrene
1,1,1-TCA = 1,1,1-Trichloroethane
TCE = Trichloroethene
1,2,4-TMB = 1,2,4-Trimethylbenzene
1,3,5 TMB = 1,3,5-Trimethylbenzene

TOL = Toluene
VC = Vinyl chloride
XYL = Xylenes

ERM Qualifiers:

J = Estimated value
UJ = Estimated non-detected value
UJb = Estimated non-detected value due to common laboratory contaminant
NJ = Tentative Identification Estimated

Sample Location	Date Sampled	TPH													SVOCs
		TEPH	TEPH		TEPH SGCU		Diesel	Diesel SGCU	Hydraulic Oil	Hydraulic Oil SGCU	Motor Oil	Motor Oil SGCU	Jet Fuel	Jet Fuel SGCU	4-Methylphenol
Airport Worker Tier-1 ESLs (µg/l)		500	640		640		640	640	640	640	640	640	640	640	NS
Construction Worker Tier-1 ESLs (µg/l)		IP	IP		IP		IP	IP	IP	IP	IP	IP	IP	IP	IP
Ecological Receptor Tier-1 ESLs (µg/l)		500	640		640		640	640	640	640	640	640	640	640	NS
Area of Concern 1 - Small Parts Wash Rack/Former World Airways Cleaning Room															
ERM-B-1	4/15/03	110	[redacted]	NJ	340	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-2	4/15/03	71	[redacted]	NJ	<560		NA	NA	NA	NA	NA	NA	NA	NA	<50
W-B-4	4/15/03	<50	[redacted]	NJ	97	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-B-5	4/15/03	<50	<500		NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
W-B-6	4/15/03	<50	[redacted]	NJ	260	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 2 - Aircraft Wash Rack															
ERM-B-3	4/15/03	<50	930	NJ	220	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-4	4/15/03	<50	4,500	NJ	840	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-5	4/15/03	<50	13,000	NJ	4,700	NJ	NA	NA	NA	NA	NA	NA	NA	NA	34
ERM-B-6	4/15/03	1,700	7,700	NJ	890	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-7	4/15/03	<50	1,900	NJ	130	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-B-7	4/17/03	<50	93	NJ	79	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-B-8*	4/14/03	NA	NA		NA		NA	210	NA	NA	NA	1,100	NA	210	NA
W-B-8	4/14/03	<50	91	NJ	100	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-MW-6	5/9/03	<50	NA		NA		NA	<50	NA	NA	NA	<100	NA	NA	NA
ERM-MW-6	11/6/03	<50	NA		NA		390	110	<250	NA	<250	NA	<50	NA	NA
ERM-MW-7	5/9/03	<50	NA		NA		NA	89	NA	NA	NA	110	NA	NA	NA
ERM-MW-7	11/6/03	<50	NA		NA		<50	NA	<250	NA	<250	NA	<50	NA	NA
ERM-MW-8	5/9/03	<50	NA		NA		NA	170	NA	NA	NA	150	NA	NA	NA
ERM-MW-8	11/6/03	<50	NA		NA		[illegible]	250x	[illegible]	<250	<250	NA	<50	NA	NA
ERM-MW-9	5/9/03	220	NA		NA		NA	540	NA	NA	NA	270	NA	NA	NA
ERM-MW-9	11/6/03	210x	NA		NA		[illegible]	[illegible]	[illegible]	<250	<250	NA	<50	NA	NA
Area of Concern 3 - Industrial Wastewater Vault															
W-B-10	4/15/03	<50	160	NJ	93	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-B-11	4/15/03	<50	140	NJ	120	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-B-12	4/15/03	<50	4,300	NJ	5,100	NJ	NA	NA	NA	NA	NA	NA	NA	NA	<5.0
ERM-MW-10	5/9/03	<50	NA		NA		NA	73	NA	NA	NA	110	NA	NA	NA
ERM-MW-10	11/6/03	<50	NA		NA		[illegible]	180	420y	<250	<250	NA	<50	NA	NA
Area of Concern 4 - Aboveground Fuel Storage Tank															
ERM-B-8	4/16/03	<50	[illegible]	NJ	72	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-9	4/16/03	<50	[illegible]	NJ	150	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 5 - Vehicle Maintenance Center															
ERM-B-10	4/17/03	59	96	NJ	63	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-11	4/17/03	<50	110	NJ	86	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-B-1*	4/15/03	<50	NA		NA		NA	110 x	NA	NA	NA	340	NA	<50	NA
W-B-2*	4/15/03	<50	NA		NA		NA	<50	NA	NA	NA	<250	NA	<50	NA
W-B-2	4/15/03	90	200	NJ	98	NJ	NA	NA	NA	NA	NA	NA	NA	NA	<5.0
W-B-3*	4/15/03	<50	NA		NA		NA	98 x	NA	NA	NA	590	NA	<50	NA
W-B-3	4/15/03	53	120	NJ	77	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 6 - Boiler and Aboveground Diesel Storage Tank															
ERM-B-27	4/17/03	NA	[illegible]	NJ	180	NJ	NA	NA	NA	NA	NA	NA	NA	NA	<5.0
Area of Concern 7 - Former 90-Day Hazardous Waste Accumulation Area															
W-B-16*	4/17/03	<50	NA		NA		NA	<50	NA	NA	NA	<250	NA	<50	NA
W-B-16	4/17/03	<50	[illegible]	NJ	69	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-B-17*	4/17/03	<50	NA		NA		NA	<50	NA	NA	NA	<250	NA	<50	NA

Sample Location	Date Sampled	TPH: TPPH	TPH: TEPH		TPH: TEPH SGCU		TPH: Diesel	TPH: Diesel SGCU	TPH: Hydraulic Oil	TPH: Hydraulic Oil SGCU	TPH: Motor Oil	TPH: Motor Oil SGCU	TPH: Jet Fuel	TPH: Jet Fuel SGCU	SVOCs: 4-Methylphenol
Airport Worker Tier 1 ESLs (µg/l)		500	640		640		640	640	640	640	640	640	640	640	NS
Construction Worker Tier-1 ESLs (µg/l)		IP	IP		IP		IP	IP	IP	IP	IP	IP	IP	IP	IP
Ecological Receptor Tier 1 ESLs (µg/l)		500	640		640		640	640	640	640	640	640	640	640	NS
W-B-17	4/17/03	<50	[illegible]	NJ	220	NJ	NA	NA	NA	NA	NA	NA	NA	NA	<5.0
Area of Concern 8 - Current 90-Day Hazardous Waste Accumulation Area															
ERM-B-12	4/17/03	<50	<50		NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 9 - Hazardous Material Storage Areas															
ERM-B 13	4/16/03	<50	[illegible]	NJ	77	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM B 14	4/17/03	<50	[illegible]	NJ	170	NJ	NA	NA	NA	NA	NA	NA	NA	NA	<5.0
W-B-22	4/18/03	<50	<50		NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
P-2/UAL-MW 5*	4/22/03	<50	NA		NA		NA	<50	NA	NA	NA	<250	NA	<50	NA
P-2/UAL-MW 5	4/18/03	<50	<50		NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 11 - Aircraft Fueling/Defueling Equipment Areas															
ERM B 16	4/16/03	NA	[illegible]	NJ	82	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-17	4/16/03	NA	[illegible]	NJ	80	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-18	4/16/03	NA	[illegible]	NJ	100	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-19	4/16/03	NA	[illegible]	NJ	100	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 12 - Fire System Motors and Associated Fuel Tanks															
ERM-B-20	4/17/03	NA	[redacted]	NJ	83	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-21	4/17/03	NA	[redacted]	NJ	130	NJ	NA	NA	NA	NA	NA	NA	NA	NA	<5.0
Area of Concern 14 - Storm Drains															
ERM-B 23	4/17/03	<50	<50		NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
W B-32	4/16/03	<50	[redacted]	NJ	160	NJ	NA	NA	NA	NA	NA	NA	NA	NA	<5.0
W-B-38	4/15/03	<50	[redacted]	NJ	120	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 15 - Aircraft Parking and Run Up Area															
ERM-B-24	4/15/03	NA	[redacted]	NJ	160	NJ	NA	NA	NA	NA	NA	NA	NA	NA	<56
ERM B 25	4/15/03	NA	[redacted]	NJ	140	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-26	4/16/03	NA	[redacted]	NJ	140	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 16 - Reported Fuel Spill Area on Taxiway															
W-B-14	4/15/03	NA	[redacted]	NJ	69	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 17 - Former Vehicle Fueling USTs															
UAL MW-1	4/18/03	<50	<50		NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
UAL-MW-1*	4/15/03	<50	NA		NA		NA	<50	NA	NA	NA	<250	NA	<50	NA
UAL-MW-1	11/6/03	<50	NA		NA		<50	NA	<250	NA	<250	NA	<50	NA	NA
UAL-MW-2	4/18/03	<50	[redacted]	NJ	120	NJ	NA	NA	NA	NA	NA	NA	NA	NA	<5.0
UAL-MW-2*	4/15/03	<50	NA		NA		NA	<50	NA	NA	NA	<250	NA	<50	NA
UAL-MW-2	11/6/03	<50	NA		NA		<50	NA	<250	NA	<250	NA	<50	NA	NA
UAL-MW-3	4/18/03	<50	[redacted]	NJ	78	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
UAL-MW-3*	4/15/03	<50	NA		NA		NA	<50	NA	NA	NA	<250	NA	<50	NA
UAL-MW-3	11/7/03	<50	<50		NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
P-1/UAL-MW-4*	4/22/03	<50	NA		NA		NA	<50	NA	NA	NA	<250	NA	<50	NA
P-1/UAL-MW-4	4/18/03	<50	[redacted]	NJ	100	NJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 18 - Migration of Offsite Solvent Plume Onto OMC Property															
W-B-9*	4/18/03	<50	NA		NA		NA	<50	NA	NA	NA	<250	NA	<50	NA
W-B-9	4/18/03	NA	NA		NA		NA	NA	NA	NA	NA	NA	NA	<50	NA
W-B-18*	4/18/03	<50	NA		NA		NA	<50	NA	NA	NA	<250	NA	<50	NA
W-B-19*	4/18/03	<50	NA		NA		NA	<50	NA	NA	NA	<250	NA	<50	NA
W-B-19	4/18/03	NA	NA		NA		NA	NA	NA	NA	NA	NA	NA	<50	NA
W B 20*	4/18/03	<50	NA		NA		NA	<50	NA	NA	NA	<250	NA	<50	NA
W-B-20 DUP*	4/18/03	<50	NA		NA		NA	<50	NA	NA	NA	<250	NA	<50	NA

Table 13-D
Comparison of Detected Chemical Concentrations to Tier-1 Standards
Comparison of TPH and SVOCs Detected in Ground Water
Former United Airlines Oakland Maintenance Center
Oakland International Airport

Sample Location	Date Sampled	TPH											SVOCs
		TPPH	TEPH	TEPH SGCU	Diesel	Diesel SGCU	Hydraulic Oil	Hydraulic Oil SGCU	Motor Oil	Motor Oil SGCU	Jet Fuel	Jet Fuel SGCU	4-Methylphenol
Airport Worker Tier-1 ESLs (µg/l)		500	640	640	640	640	640	640	640	640	640	640	NS
Construction Worker Tier-1 ESLs (µg/l)		IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP
Ecological Receptor Tier-1 ESLs (µg/l)		500	640	640	640	640	640	640	640	640	640	640	NS
Area of Concern 19 - Runoff from Pavement to Unpaved Area North of OMC													
W-B-25	4/16/03	<50	<50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-B-29	4/16/03	<50	<50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Number of Samples[1]		51	9	30	4	20	4	3	7	16	7	13	11
Number of Detections[1]		4	0	29	1	8	0	0	0	4	0	0	1
# of Detections above the Airport Worker Tier-1 ESL[1]		0	0	0	0	1	0	0	0	0	0	0	0
# of Detections above the Construction Tier-1 ESL[1]		0	0	0	0	0	0	0	0	0	0	0	0
# of Detections above the Ecological Tier-1 ESL[1]		0	0	0	0	1	0	0	0	0	0	0	0
Minimum Detection[1]		71	na	66	390	75	na	na	na	110	na	na	na
Maximum Detection[1]		220	na	340	390	760	na	na	na	270	na	na	na
Median of Detections[1]		160	na	120	390	175	na	na	na	130	na	na	na
Mean of Detections[1]		153	na	129	390	272	na	na	na	160	na	na	na

Notes:
Sample concentrations reported in micrograms per liter (µg/L)
ERM prefix indicates a boring completed by ERM
W prefix indicates a boring completed by Weiss Associates
* Data Obtained from "United Maintenance Hangar Area, Metropolitan Oakland Airport", Weiss Associates, 27 May 2003
Airport Worker Tier-1 ESLs = Environmental screening levels for ground water under a commercial/industrial land use scenario where potentially impacted ground water is not a current or potential drinking water resource were used as Tier-1 ESLs for airport worker receptors (*Table B of Screening for Environmental Concerns At Sites with Contaminated Soil and Groundwater*, RWQCB, July 2003).
Construction Worker Tier-1 ESLs = Incomplete Pathway. There is no complete exposure pathway for construction workers to be exposed to TPH in soil; therefore, no standards are provided for this pathway.
Ecological Receptor Tier-1 ESLs = Environmental screening levels for discharge to estuarine surface water were used as the Tier-1 ESLs for ecological receptors (Table F of *Screening for Environmental Concerns At Sites with Contaminated Soil and Groundwater*, RWQCB, July 2003).
[1] Duplicate samples not included in this count.
Bold values indicate concentrations detected above the laboratory method detection limit.

<0.5	Compound not detected at or above the laboratory method detection limit
x	Indicates a concentration detected above the respective Tier-1 ESL for airport workers
x	Indicates a concentration detected above the respective Tier-1 ESLs for airport and construction workers
x	Indicates a concentration detected above the respective Tier-1 ESL for construction workers
x	Indicates a concentration detected above the respective Tier-1 ESLs for construction workers and ecological receptors
x	Indicates a concentration detected above the respective Tier-1 ESL for ecological receptors
x	Indicates a concentration detected above the respective Tier-1 ESLs for airport workers and ecological receptors
x	Indicates a concentration detected above the respective Tier-1 ESLs for airport and construction workers and ecological receptors
#	Indicates that sample results from these samples were not included in the statistical summary due to the subsequent installation and sampling of a nearby well or analysis using silica gel clean-up
IP	Incomplete pathway
NS	Standard not established
NA	Not analyzed
na	Not applicable
x	Not a TPH-Diesel pattern
y	Final result elevated due to presence of discrete peaks in the hydraulic oil range.

ERM Qualifiers:

NJ = Tentative identification estimated

McCambell Analytical/Weiss Notes:

e = Oil range compounds are significant

Table 13-D
Comparison of Detected Chemical Concentrations to Tier-1 Standards
Comparison of TPH and SVOCs Detected in Ground Water
Former United Airlines Oakland Maintenance Center
Oakland International Airport

		TPH											SVOCs
Sample Location	Date Sampled	TPPH	TEPH	TEPH SGCU	Diesel	Diesel SGCU	Hydraulic Oil	Hydraulic Oil SGCU	Motor Oil	Motor Oil SGCU	Jet Fuel	Jet Fuel SGCU	4-Methylphenol
Airport Worker Tier-1 ESLs (µg/l)		500	640	640	640	640	640	640	640	640	640	640	NS
Construction Worker Tier-1 ESLs (µg/l)		IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP
Ecological Receptor Tier-1 ESLs (µg/l)		500	640	640	640	640	640	640	640	640	640	640	NS

Abbreviations:

SVOCs = Semi-volatile organic compounds
TPH = Total petroleum hydrocarbons
TPPH = Total purgeable petroleum hydrocarbons
TEPH = Total extractable petroleum hydrocarbons
SGCU = Silica gel cleanup

Table 13-E
Comparison of Detected Chemical Concentrations to Tier-1 Standards
Comparison of Dissolved Metals Detected in Ground Water
Former United Airlines Oakland Maintenance Center
Oakland International Airport

Sample Location	Date Sampled	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	V	Zn	TDS
Airport Worker Tier-1 ESLs (mg/l)		IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP
Construction Worker Tier-1 ESLs (mg/l)		IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP
Ecological Receptor Tier-1 ESLs (mg/l)		0.000012	0.030	0.00014	1.0	0.0027	0.0022	0.18	0.0030	0.0031	0.0025	0.24	0.0082	0.0050	0.00019	0.0063	0.019	0.081	NS
Area of Concern 1 - Small Parts Wash Rack/Former World Airways Cleaning Room																			
ERM-B-1	4/15/2003	<0.0002	<0.05	<0.05	0.18	<0.005	<0.005	<0.005		<0.005	<0.05	<0.02	0.19	<0.05	<0.005	<0.05	<0.02	0.0065	NA
ERM-B-2	4/15/2003	<0.0002	<0.05	<0.05	0.6	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	0.13	<0.05	<0.005	0.21/<0.005* J	<0.02	<0.005	NA
W-B-4	4/15/2003	<0.0002	<0.05	<0.05	0.064	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	0.082 J	<0.02	<0.02	NA
W-B-5	4/15/2003	<0.0002	<0.05	<0.05	0.21	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	0.064	<0.05	<0.005	<0.05	<0.02	<0.02	NA
W-B-6	4/15/2003	<0.0002	<0.05	<0.05	0.19	<0.0055 UJ	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	0.031	<0.05	<0.005	<0.05	<0.02	<0.02	NA
ERM-MW-01	5/9/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.09	NA	NA	NA	NA	NA	NA
ERM-MW-01	11/6/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.19	NA	NA	NA	NA	NA	NA
ERM-MW-02	5/9/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.030	NA	NA	NA	NA	NA	NA
ERM-MW-02	11/6/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.015	NA	NA	NA	NA	NA	NA
ERM-MW-03	5/9/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.03	NA	NA	NA	NA	NA	NA
ERM-MW-03	11/6/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.049	NA	NA	NA	NA	NA	NA
ERM-MW-04	5/9/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.062	NA	NA	NA	NA	NA	NA
ERM-MW-04	11/7/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.20	NA	NA	NA	NA	NA	NA
ERM-MW-05	5/9/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.03	NA	NA	NA	NA	NA	NA
ERM-MW-05	11/6/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.045	NA	NA	NA	NA	NA	NA
ERM-MW-11	12/30/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.014	NA	NA	NA	NA	NA	NA
ERM-MW-12	12/29/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.010	NA	NA	NA	NA	NA	NA
ERM-MW-13	12/29/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.16	NA	NA	NA	NA	NA	NA
ERM-MW-14	12/29/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.59	NA	NA	NA	NA	NA	NA
Area of Concern 2 - Aircraft Wash Rack																			
ERM-B-3	4/15/2003	<0.0002	<0.05	<0.05	0.29	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	0.12	<0.05	<0.005	<0.05	<0.02	<0.005	NA
ERM-B-4	4/15/2003	<0.0002	<0.05	<0.05	0.3	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	0.16	<0.05	<0.005	<0.05	<0.02	<0.005	NA
ERM-B-5	4/15/2003	<0.0002	<0.05	<0.05	0.16	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	0.051	0.23	<0.05	<0.005	0.074 J	<0.02	0.0066	NA
ERM-B-6	4/15/2003	<0.0002	<0.05	<0.05	0.33	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	0.028	0.26	<0.05	<0.005	0.061 J	<0.02	<0.005	NA
ERM-B-7	4/15/2003	<0.0002 UJ	<0.05	<0.05	0.13	<0.005	0.0056	0.0075	<0.02	0.0054	<0.05	0.12	0.092	<0.05	<0.005	<0.05	<0.02	0.014	NA
W-B-7	4/17/2003	<0.0002	<0.05	<0.05	0.28	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	<0.02	NA
W-B-8	4/14/2003	<0.0002	<0.05	<0.05	0.37	<0.005	<0.005	0.047	<0.02	0.048	1.9	<0.02	0.052	<0.05	<0.005	0.15 J	<0.02		NA
W-B-8*	4/14/2003	<0.0008	<0.06	<0.05	0.44	<0.004	<0.005	0.052	<0.05	0.094	0.96	<0.05	0.1	<0.5	<0.01	<0.05	<0.05		NA
ERM-MW-06	5/9/2003	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	<0.05	NA	<0.03	NA	NA	NA	NA	NA	NA
ERM-MW-06	11/6/2003	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	0.021	NA	0.01	NA	NA	NA	NA	NA	NA
ERM-MW-06	12/30/2003	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-MW-07	5/9/2003	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	<0.05	NA	0.084	NA	NA	NA	NA	NA	NA
ERM-MW-07	11/6/2003	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	0.033	NA	0.07	NA	NA	NA	NA	NA	NA
ERM-MW-08	5/9/2003	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	<0.05	NA	0.11	NA	NA	NA	NA	NA	NA
ERM-MW-08	11/6/2003	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	0.035	NA	0.24	NA	NA	NA	NA	NA	NA
ERM-MW-09	5/9/2003	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	<0.05	NA	0.23	NA	NA	NA	NA	NA	NA
ERM-MW-09	11/6/2003	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	0.02	NA	0.27	NA	NA	NA	NA	NA	NA
ERM-MW-15	12/30/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.006	NA	NA	NA	NA	NA	NA
ERM-MW-16	12/30/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.013	NA	NA	NA	NA	NA	NA
Area of Concern 3 - Industrial Wastewater Vault																			
W-B-10	4/15/2003	<0.0002	<0.05	<0.05	0.068	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	<0.02	NA
W-B-11	4/15/2003	<0.0002	<0.05	<0.05	0.086	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	<0.02	NA
W-B-12	4/15/2003	<0.0002	<0.05	<0.05	<0.05	<0.005	0.039	<0.005	<0.02	0.22	<0.05	0.085	0.063	<0.05	<0.005	<0.05	<0.02	0.036	NA
ERM-MW-10	5/9/2003	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	<0.05	NA	0.082	NA	NA	NA	NA	NA	NA
ERM-MW-10	11/6/2003	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	<0.015	NA	0.12	NA	NA	NA	NA	NA	NA
ERM-MW-10	12/30/2003	NA	NA	NA	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 5 - Vehicle Maintenance Center																			
ERM-B-10	4/17/2003	<0.0002 UJ	0.074	<0.05	0.1	0.0086	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	<0.02	NA
ERM-B-11	4/17/2003	<0.0002 UJ	<0.05	<0.05	0.076	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	0.064 J	<0.02	<0.02	NA

Table 13-E
Comparison of Detected Chemical Concentrations to Tier-1 Standards
Comparison of Dissolved Metals Detected in Ground Water
Former United Airlines Oakland Maintenance Center
Oakland International Airport

Sample Location	Date Sampled	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	V	Zn	TDS
Airport Worker Tier-1 ESLs (mg/l)		IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP
Construction Worker Tier-1 ESLs (mg/l)		IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP
Ecological Receptor Tier-1 ESLs (mg/l)		0.000012	0.030	0.00014	1.0	0.0027	0.0022	0.18	0.0030	0.0031	0.0025	0.24	0.0082	0.0050	0.00019	0.0063	0.019	0.081	NS
W-B-1*	4/15/2003	<0.0008	<0.06	<0.005	**0.07**	<0.004	<0.005	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	NA
W-B-2*	4/15/2003	<0.0008	<0.06	<0.005	<0.05	<0.004	<0.005	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	NA
W-B-2	4/15/2003	<0.0002	<0.05	<0.05	**0.054**	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	<0.02	NA
W-B-3*	4/15/2003	<0.0008	<0.06	<0.005	**0.083**	<0.004	<0.005	**0.04**	<0.05	<0.05	<0.05	<0.05	**0.06**	<0.05	<0.01	<0.05	<0.05	<0.05	NA
W-B-3	4/15/2003	<0.0002	**0.055**	<0.05	**0.12**	<0.0061 UJ	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.050	<0.02	**0.0063**	NA
Area of Concern 7 - Former 90-Day Hazardous Waste Accumulation Area																			
W-B-16	4/17/2003	<0.0002 UJ	<0.05	<0.05	<0.05	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	**0.022**	0.054	<0.05	<0.005	<0.05	<0.02	<0.02	NA
W-B-16*	4/17/2003	<0.0008	<0.006	0.0055	<0.004	<0.005	<0.005	<0.02	<0.05	<0.05	<0.05	**0.13**	0.054	<0.05	<0.01	<0.005	<0.05	<0.05	NA
W-B-17	4/17/2003	<0.0002 UJ	<0.05	<0.05	<0.05	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	<0.02	**1,300**
W-B-17*	4/17/2003	<0.0008	<0.006	**0.012**	<0.004	<0.005	<0.005	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.005	<0.05	<0.05	NA
ERM-MW-17	12/30/2003	NA	NA	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-MW-17D	12/30/2003	NA	NA	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 8 - Current 90-Day Hazardous Waste Accumulation Area																			
ERM-B-12	4/17/2003	<0.0002	<0.05	<0.05	**0.24**	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	**0.031**		<0.05	<0.005	<0.05	<0.02	<0.02	NA
Area of Concern 9 - Hazardous Material Storage Areas																			
ERM-B-13	4/16/2003	<0.0002	<0.05	<0.05	**0.058**	**0.0059**	<0.005	<0.005	<0.02	<0.005	**0.057**	**0.029**	<0.02	<0.05	**0.0058**	<0.05	<0.02	**0.017**	NA
ERM-B-14	4/17/2003	<0.0002	<0.05	<0.05	**0.058**	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	**0.065** J	<0.02	<0.02	**3,300**
W-B-22	4/18/2003	<0.0002	<0.05	<0.05	<0.05	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	**0.0099**	NA
P-2/UAL-MW-5*	4/22/2003	<0.0008	<0.06	<0.5	**0.053**	<0.004	<0.005	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	<0.01	<0.05	<0.05	<0.05	NA
P-2/UAL-MW-5	11/6/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	NA	NA	NA
Area of Concern 11 - Aircraft Fueling/Defueling Equipment Areas																			
ERM-B-16	4/16/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**15,000**
Area of Concern 12 - Fire System Motors and Associated Fuel Tanks																			
ERM-B-20	4/17/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2,200**
Area of Concern 14 - Storm Drains																			
ERM-B-23	4/17/2003	<0.0002 UJ	<0.05	<0.05	**0.077**	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	<0.02	NA
W-B-32	4/16/2003	<0.0002	<0.05	<0.05	**0.12**	0.0055	<0.005	<0.005	<0.02	0.0056	0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	**0.021**	**1,900**
W-B-38	4/15/2003	<0.0002	<0.05	<0.05	<0.05	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	<0.02	NA
Area of Concern 15 - Aircraft Parking and Run Up Area																			
ERM-B-24	4/15/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1,300**
Area of Concern 17 - Former Vehicle Fuel USTs																			
UAL-MW-1*	4/15/2003	<0.0008	<0.06	0.009	**0.15**	<0.004	<0.005	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	NA
UAL-MW-1	11/6/2003	NA	<0.01	<0.005	NA	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
UAL-MW-2*	4/15/2003	<0.0008	<0.06	<0.005	**0.1**	<0.004	<0.005	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	NA
UAL-MW-2	11/6/2003	NA	<0.01	<0.005	NA	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
UAL-MW-3*	4/15/2003	<0.0008	<0.06	<0.005	<0.05	<0.004	<0.005	<0.02	<0.05	<0.05	<0.05	<0.05	0.1	<0.05	<0.01	<0.05	<0.05	<0.05	NA
UAL-MW-3	11/7/2003	NA	<0.01	<0.005	NA	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
P-1/UAL-MW-4*	4/22/2003	<0.0008	<0.06	0.047	**0.18**	<0.004	<0.005	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	<0.01	<0.01	<0.01	<0.01	NA
P-1/UAL-MW-4	11/6/2003	NA	<0.01	**0.047**	NA	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 18 - Offsite Solvent USTs																			
W-B-9*	4/18/2003	<0.0008	<0.06	<0.05	**0.12**	<0.0004	<0.0005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.001	<0.05	<0.005	<0.005	NA
W-B-18*	4/18/2003	<0.0008	<0.06	<0.05	**0.57**	<0.004	<0.005	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	NA
W-B-19*	4/18/2003	<0.0008	<0.06	<0.05	<0.005	<0.0004	<0.0005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.001	<0.05	<0.005	<0.005	NA
W-B-20*	4/18/2003	<0.0008	<0.06	<0.05	**0.099**	<0.0004	<0.0005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.001	<0.05	<0.005	<0.005	NA
W-B-20-A*	4/18/2003	<0.0008	<0.6	<0.5	**0.13**	<0.0004	<0.0005	<0.002	<0.005	<0.005	<0.005	<0.05	<0.005	<0.5	<0.001	<0.5	<0.005	<0.005	NA
Area of Concern 19 - Runoff from Pavement to Unpaved Area North of OMC																			
W-B-25	4/16/2003	<0.0002	<0.05	<0.05	<0.05	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	**0.0081**	NA
W-B-29	4/16/2003	<0.0002	<0.05	<0.05	**0.12**	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	**0.005**	NA
Number of Samples[1]		38	42	40	38	42	41	38	38	37	41	38	54	38	38	31	38	38	6
Number of Detections[1]		0	0	3	28	1	1	3	1	3	5	7	28	0	0	0	0	10	6

Sample Location	Date Sampled	Hg	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mo	Ni	Se	Ag	Tl	V	Zn	TDS
Airport Worker Tier-1 ESLs (mg/l)		IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP
Construction Worker Tier-1 ESLs (mg/l)		IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP
Ecological Receptor Tier-1 ESLs (mg/l)		0.000012	0.030	0.00014	1.0	0.0027	0.0022	0.18	0.0030	0.0031	0.0025	0.24	0.0082	0.0050	0.00019	0.0063	0.019	0.081	NS
Area of Concern 19 - Runoff from Pavement to Unpaved Area North of OMC																			
W-B-25	4/16/2003	<0.0002	<0.05	<0.05	<0.05	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	**0.0081**	NA
W-B-29	4/16/2003	<0.0002	<0.05	<0.05	**0.12**	<0.005	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02	<0.05	<0.005	<0.05	<0.02	**0.005**	NA
Number of Samples[1]		38	42	40	38	42	41	38	38	37	41	38	54	38	38	31	38	38	6
Number of Detections[1]		0	0	3	28	1	1	3	1	3	5	7	28	0	0	0	0	10	6
# of Detections above the Airport Worker Tier-1 ESL[1]		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
# of Detections above the Construction Tier-1 ESL[1]		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
# of Detections above the Ecological Tier-1 ESL[1]		0	0	3	0	1	1	0	1	3	5	0	27	0	0	0	0	2	0
Minimum Detection[1]		na	na	0.0055	0.053	0.0058	0.0056	0.0075	0.02	0.0054	0.02	0.022	0.006	na	na	na	na	0.005	1300
Maximum Detection[1]		na	na	0.847	0.60	0.0058	0.0056	0.052	0.02	0.017	0.05	0.13	0.59	na	na	na	na	0.79	15000
Median of Detections[1]		na	na	0.008	0.16	0.0058	0.0056	0.047	0.02	0.0056	0.033	0.051	0.076	na	na	na	na	0.01195	2050
Mean of Detections[1]		na	na	0.29	0.20	0.0058	0.0056	0.036	0.020	0.009	0.031	0.067	0.11	na	na	na	na	0.104	4167

Notes:

Sample concentrations reported in milligrams per liter (mg/L)
ERM prefix indicates a boring completed by ERM
W prefix indicates a boring completed by Weiss Associates
* Data Obtained from "United Maintenance Hanger Area, Metropolitan Oakland Airport", Weiss Associates, 27 May 2003
Airport Woker Tier-1 ESLs = Incomplete Pathway. There is no complete exposure pathway for airport workers to be exposed to metals in ground water; therefore, no standards are provided for this pathway.
Construction Woker Tier-1 ESLs = Incomplete Pathway. There is no complete exposure pathway for construction workers to be exposed to metals in ground water; therefore, no standards are provided for this pathway.
Ecological Receptor Tier-1 ESLs = Environmental screening levels for discharge to estuarine surface water were used as the Tier-1 ESLs for ecological receptors (Table F of *Screening for Environmental Concerns At Sites with Contaminated Soil and Groundwater*, RWQCB, July 2003).
[1] Duplicate samples not included in this count.
Bold values indicate concentrations detected above the laboratory method detection limit.

#	Indicates a concentration detected above the respective Tier-1 ESL for airport workers
#	Indicates a concentration detected above the respective Tier-1 ESLs for airport and construction workers
#	Indicates a concentration detected above the respective Tier-1 ESL for construction workers
#	Indicates a concentration detected above the respective Tier-1 ESLs for construction workers and ecological receptors
#	Indicates a concentration detected above the respective Tier-1 ESL for ecological receptors
#	Indicates a concentration detected above the respective Tier-1 ESLs for airport workers and ecological receptors
#	Indicates a concentration detected above the respective Tier-1 ESLs for airport and construction workers and ecological receptors
#	Indicates that sample results from these samples were not included in the statistical summary due to probable interference with iron and aluminum during analysis, as discussed below, or the subsequent installation and sampling of a nearby well
IP	Incomplete pathway
NS	Standard not established
NA	Not analyzed
na	Not applicable
0.21 / *<0.005**	**Bold** indicates the initial result by inductively coupled plasma / *Italicized* indicates the result after reanalysis by graphite furnace

The initial arsenic and thallium results were obtained using an inductively coupled plasma method. Concentrations of iron and aluminum within the samples can cause interferences for certain elements including arsenic and thallium. The reanalysis using the graphite furnace method indicates that this interference is occurring with the samples collected during this investigation and the samples most likely contain concentrations similar to that detected by the graphite furnace analysis.

Abbreviations:

Hg = Mercury
Sb = Antimony
As = Arsenic
Ba = Barium
Be = Beryllium
Cd = Cadmium
Cr = Chromium
Co = Cobalt
Cu = Copper
Pb = Lead
Mo = Molybdenum
Ni = Nickel
Se = Selenium
Ag = Silver
Tl = Thallium
V = Vanadium
Zn = Zinc
TDS = Total dissolved solids

ERM Qualifiers:

J = Estimated value
UJ = Estimated non-detected value

Table 14
Comparison of Tier-1 Exceedences in Ground Water for Airport Workers to Tier-2 Standards
Former United Airlines Oakland Maintenance Center
Oakland International Airport

Sample Location	Date Sampled	VOCs 1,1-DCA	VOCs NAP	VOCs XYL	TPH Diesel SGCU
	Airport Worker Tier-2 ESLs (µg/l)	3,500	31,000	160,000	NS[1]
Area of Concern 1 - Small Parts Wash Rack/Former World Airways Cleaning Room					
ERM-B-1	4/15/2003	39 J	<1.0	<0.50	NA
ERM-B-2	4/15/2003	47 J	<1.0	<0.50	NA
W-B-4	4/15/2003	16 J	<1.0	<0.50	NA
W-B-5	4/15/2003	35 J	<1.0	<0.50	NA
W-B-6	4/15/2003	33 J	<1.0	<0.50	NA
ERM-MW-1	5/9/2003	**23**	**26**	**4.9**	NA
ERM-MW-1D	5/9/2003	**22**	**17**	**4.3**	NA
ERM-MW-1	11/6/2003	**16**	**16**	<0.50	NA
ERM-MW-2	5/9/2003	**21**	<1.0	<0.50	NA
ERM-MW-2	11/6/2003	**16**	<0.50	<0.50	NA
ERM-MW-3	5/9/2003	**6.8**	<1.0	<0.50	NA
ERM-MW-3	11/6/2003	**16**	<0.50	<0.50	NA
ERM-MW-3DUP	11/6/2003	**16**	<0.50	<0.50	NA
ERM-MW-4	5/9/2003	**12**	<1.0	<0.50	NA
ERM-MW-4	11/7/2003	**33**	<1.2	<1	NA
ERM-MW-5	5/9/2003	**52**	<1.0	<0.50	NA
ERM-MW-5	11/6/2003	**36**	<0.50	<0.50	NA
ERM-MW-11	12/30/2003	**7.4**	<0.50	<0.50	NA
ERM-MW-12	12/29/2003	<0.50	<0.50	<0.50	NA
ERM-MW-13	12/29/2003	**9.9**	<0.50	<0.50	NA
ERM-MW-14	12/29/2003	**9.4**	<0.50	<0.50	NA
Area of Concern 2 - Aircraft Wash Rack					
ERM-B-3	4/15/2003	<0.50	<1.0	<0.50	NA
ERM-B-4	4/15/2003	<0.50	<1.0	<0.50	NA
ERM-B-5	4/15/2003	<5.0	28 J	14 J	NA
ERM-B-6	4/15/2003	<5.0	36 J	23 J	NA
ERM-B-7	4/15/2003	<0.50	<1.0	<0.50	NA
W-B-7	4/17/2003	<0.50	<1.0	<0.50	NA
W-B-8*	4/14/2003	<0.50	<1.0	<0.50	210
W-B-8	4/14/2003	<0.50	<1.0	<0.50	NA
ERM-MW-6	5/9/2003	<0.50	<1.0	<0.50	<50
ERM-MW-6	11/6/2003	<0.50	<1.0	<0.50	**110**
ERM-MW-7	5/9/2003	<0.50	<1.0	<0.50	**89**
ERM-MW-7	11/6/2003	<0.50	<0.50	<0.50	NA
ERM-MW-8	5/9/2003	<0.50	<1.0	<0.50	**170**
ERM-MW-8	11/6/2003	<0.50	<0.50	<0.50	**250x**
ERM-MW-9	5/9/2003	<0.50	**29**	**18**	**540**
ERM-MW-9	11/6/2003	<0.50	**9.8**	<0.50	**760**
Area of Concern 3 - Industrial Wastewater Vault					
W-B-10	4/15/2003	<0.50	<1.0	<0.50	NA
W-B-11	4/15/2003	<0.50	<1.0	<0.50	NA
W-B-12	4/15/2003	<0.50	<1.0	<0.50	NA
ERM-MW-10	5/9/2003	<0.50	<1.0	<0.50	**75**
ERM-MW-10	11/6/2003	<0.50	<0.50	<0.50	**180**

Table 14

Comparison of Tier-1 Exceedences in Ground Water for Airport Workers to Tier-2 Standards

Former United Airlines Oakland Maintenance Center

Oakland International Airport

Sample Location	Date Sampled	VOCs 1,1-DCA	VOCs NAP	VOCs XYL	TPH Diesel SGCU
	Airport Worker Tier-2 ESLs (µg/l)	3,500	31,000	160,000	NS[1]
Area of Concern 4 - Aboveground Fuel Storage Tank					
ERM-B-8	4/16/2003	NA	NA	<0.50	NA
ERM-B-9	4/16/2003	NA	NA	<0.50	NA
Area of Concern 5 - Vehicle Maintenance Center					
ERM-B-10	4/17/2003	0.61 J	<1.0	<0.50	NA
ERM-B-11	4/17/2003	1.6 J	<1.0	<0.50	NA
W-B-1*	4/15/2003	<2.5	<2.5	<2.5	110 o
W-B-2*	4/15/2003	<2.5	<2.5	<2.5	<50
W-B-2	4/15/2003	<0.50	<1.0	<0.50	NA
W-B-3*	4/15/2003	<2.5	<2.5	<2.5	95 o
W-B-3	4/15/2003	<0.50	<1.0	<0.50	NA
Area of Concern 6 - Boiler and Aboveground Diesel Storage Tank					
ERM-B-27	4/17/2003	NA	NA	<0.50	NA
Area of Concern 7 - Former 90-Day Hazardous Waste Accumulation Area					
W-B-16*	4/17/2003	**0.75** J	<0.50	<0.50	<50
W-B-16	4/17/2003	**0.75** J	<1.0	<0.50	NA
W-B-16-D	4/17/2003	**0.75** J	<1.0	<0.50	NA
W-B-17*	4/17/2003	45	<1.2	<1.2	<50
W-B-17	4/17/2003	54 J	<1.0	<0.50	NA
ERM-MW-17	12/30/2003	3.7	<0.50	<0.50	NA
ERM-MW-17D	12/30/2003	2.3	<0.50	<0.50	NA
Area of Concern 8 - Current 90-Day Hazardous Waste Accumulation Area					
ERM-B-12	4/17/2003	<0.50	<1.0	<0.50	NA
Area of Concern 9 - Hazardous Material Storage Areas					
ERM-B-13	4/16/2003	<0.50	<1.0	<0.50	NA
ERM-B-14	4/17/2003	<0.50	<1.0	<0.50	NA
ERM-B-14-D	4/17/2003	<0.50	<1.0	<0.50	NA
W-B-22	4/18/2003	**0.8** J	<1.0	<0.50	NA
W-B-22-D	4/18/2003	**0.8** J	<1.0	<0.50	NA
P-2/UAL-MW-5	4/18/2003	<0.50	<1.0	<0.50	NA
P-2/UAL-MW-5*	4/22/2003	<0.50	<0.5	<0.50	<50
P-2/UAL-MW-5	11/6/2003	<0.50	<0.5	<0.50	NA
Area of Concern 11 - Aircraft Fueling/Defueling Equipment Areas					
ERM-B-16	4/16/2003	NA	NA	<0.50	NA
ERM-B-17	4/16/2003	NA	NA	<0.50	NA
ERM-B-18	4/16/2003	NA	NA	<0.50	NA
ERM-B-19	4/16/2003	NA	NA	<0.50	NA
Area of Concern 12 - Fire System Motors and Associated Fuel Tanks					
ERM-B-20	4/17/2003	NA	NA	<0.50	NA
ERM-B-21	4/17/2003	NA	NA	<0.50	NA
Area of Concern 14 - Storm Drains					
ERM-B-23	4/17/2003	<0.50	<1.0	<0.50	NA
W-B-32	4/16/2003	<0.50	<1.0	<0.50	NA
W-B-38	4/15/2003	<0.50	<1.0	<0.50	NA
W-B-38 DUP	4/15/2003	<0.50	<1.0	<0.50	NA

Sample Location	Date Sampled	VOCs 1,1-DCA		VOCs NAP	VOCs XYL	TPH Diesel SGCU
	Airport Worker Tier-2 ESLs (µg/l)	3,500		31,000	160,000	NS[1]
Area of Concern 15 - Aircraft Parking and Run Up Area						
ERM-B-24	4/15/2003	NA		NA	<0.50	NA
ERM-B-25	4/15/2003	NA		NA	**1.5**	NA
ERM-B-26	4/16/2003	NA		NA	<0.50	NA
Area of Concern 16 - Reported Fuel Spill Area on Taxiway						
W-B-14	4/15/2003	NA		NA	<0.50	NA
Area of Concern 17 - Former Vehicle Fueling USTs						
UAL-MW-1	4/18/2003	<0.50		<1.0	<0.50	NA
UAL-MW-1*	4/15/2003	<0.50		<0.50	<0.50	<50
UAL-MW-1	11/6/2003	NA		NA	NA	NA
UAL-MW-2	4/18/2003	**3.4**	J	<1.0	<0.50	NA
UAL-MW-2*	4/15/2003	**2.1**		<0.50	<0.50	<50
UAL-MW-2	11/6/2003	NA		NA	NA	NA
UAL-MW-3	4/18/2003	**4.9**	J	<1.0	<0.50	NA
UAL-MW-3*	4/15/2003	**3**		<0.50	<0.50	<50
UAL-MW-3	11/7/2003	**3.7**		<1.2	<1	NA
P-1/UAL-MW-4	4/18/2003	**1.3**	J	<1.0	<0.50	NA
P-1/UAL-MW-4*	4/22/2003	<1.2		<1.2	<1.2	<50
Area of Concern 18 - Migration of Offsite Solvent Plume Onto OMC Property						
W-B-9*	4/18/2003	<0.5		<0.5	<0.5	<50
W-B-9	4/18/2003	<0.50		<1.0	<0.50	NA
W-B-18*	4/18/2003	<0.5		<0.5	<0.5	<50
W-B-19*	4/18/2003	<0.5		<0.5	<0.5	<50
W-B-19	4/18/2003	**0.59**	J	<1.0	<0.50	NA
W-B-20*	4/18/2003	<0.5		<0.5	<0.5	<50
W-B-20-DUP*	4/18/2003	<0.5		<0.5	<0.5	<50
Area of Concern 19 - Runoff from Pavement to Unpaved Area North of OMC						
W-B-25	4/16/2003	<0.50		<1.0	<0.50	NA
W-B-29	4/16/2003	<0.50		<1.0	<0.50	NA
	Number of Samples[2]	59		59	72	20
	Number of Detections[2]	26		4	3	8
	# of Detections above the Airport Worker Tier-2 ESL[2]	0		0	0	0
	Minimum Detection[2]	0.59		9.8	1.5	75
	Maximum Detection[2]	52		29	18	760
	Median of Detections[2]	7.1		21	4.9	175
	Mean of Detections[2]	11.6		20.2	8.1	272

Table 14
Comparison of Tier-1 Exceedences in Ground Water for Airport Workers to Tier-2 Standards
Former United Airlines Oakland Maintenance Center
Oakland International Airport

		VOCs			TPH
Sample Location	**Date Sampled**	**1,1-DCA**	**NAP**	**XYL**	**Diesel SGCU**
Airport Worker Tier-2 ESLs (µg/l)		3,500	31,000	160,000	NS[1]

Notes:

Sample concentrations reported in micrograms per liter (µg/L)
ERM prefix indicates a boring completed by ERM
W prefix indicates a boring completed by Weiss Associates

* Data Obtained from "United Maintenance Hanger Area, Metropolitan Oakland Airport", Weiss Associates, 27 May 2003
Airport Worker Tier-2 ESLs = Environmental screening levels for potential indoor air impacts due to impacted ground water under a commercial/industrial land use scenario with a high permeability vadose zone (conservative assumption) were used as the Tier-2 ESLs for airport worker receptors (Table E-1a of *Screening for Environmental Concerns At Sites with Contaminated Soil and Groundwater*, RWQCB, July 2003).

[1] No ESL for TPH has been established, instead the individual TPH constituent concentrations are compared to their respective ESLs for the Tier-2 comparison of chemical concentrations to ESLs.

[2] Duplicate samples not included in this count.

Bold values indicate concentrations detected above the laboratory method detection limit.

< 0.5	Compound not detected at or above the laboratory method detection limit
# (shaded)	Indicates a concentration detected above the respective Tier-2 ESL for airport workers
# (hatched)	Indicates that sample results from these samples were not included in the statistical summary due to the subsequent installation and sampling of a nearby well or analysis using silica gel clean-up
NS	Standard not established
NA	Not analyzed
na	Not applicable

Abbreviations:

VOCs = Volatile organic compounds
1,1-DCA = 1,1-Dichloroethane
NAP = Naphthalene
XYL = Xylenes
TPH = Total petroleum hydrocarbons
SGCU = Silica gel cleanup

ERM Qualifiers:

J = Estimated value

McCambell Analytical/Weiss Notes:

o = Oil range compounds are significant

Comparison of Tier-1 Exceedences for Construction Workers to Tier-2 Standards
Former United Airlines Oakland Maintenance Center
Oakland International Airport

Sample Location	Sample Depth (feet bgs)	Date Sampled	TPH: TPPH		TPH: TPH-D		TPH: TPH-JF	TPH: TPH-MO	Metals: As	Metals: Cd	Metals: Cr	Metals: Cu	Metals: Mo	Metals: Ni
Construction Worker Tier-2 ESLs (mg/kg)			23,000		23,000		23,000	23,000	16	38	58 [1]	31,000	3,900	1,000
Area of Concern 1 - Small Parts Wash Rack/Former World Airways Cleaning Room														
ERM-B-1	3.5	4/15/03	<1.0		NA		NA	NA	16	<1.0	18	38	<4.0	21
ERM-B-2	3.5	4/15/03	<1.0		NA		NA	NA	20	<1.0	15	4.9	<4.0	18
W-B-4*	0	4/14/03	1.7	g	57	o	<50	560	3.8	<0.5	40	19	<2	51
W-B-4*	3	4/14/03	<1		<1		<1	<5	3	<0.5	21	4.3	<2	21
W-B-4	3-4	4/14/03	<1.0		NA		NA	NA	16	<1.0	17	3.2	<4.0	17
W-B-5*	0	4/14/03	3.1	g	71	o	<50	810	4.6	0.86	[illegible]	23	<2	68
W-B-5*	3	4/14/03	<1		<1		<1	<5	2.7	<0.5	22	4.9	<2	24
W-B-5	3-4	4/14/03	<1.0		NA		NA	NA	17	<1.0	15	3.0	<4.0	18
W-B-6*	0	4/14/03	<1		4.1	o	1.8	31	4.2	0.66	43	19	<2	47
W-B-6*	3	4/14/03	<1		<1		<1	<5	2.8	<0.5	16	2.9	<2	19
W-B-6	3-4	4/14/03	<1.0		NA		NA	NA	30	<1.0	20	14	<4.0	35
Area of Concern 2 - Aircraft Wash Rack														
ERM-B-3	2.5	4/15/03	<1.0		NA		NA	NA	19	<1.0	17	6.0	<4.0	19
ERM-B-4	2.5	4/15/03	4.7		NA		NA	NA	19	<1.0	13	6.4	<4.0	17
ERM-B-5	2.5	4/15/03	1.4		NA		NA	NA	21	<1.0	22	7.0	<4.0	21
ERM-B-6	2.5	4/15/03	170		NA		NA	NA	15	<1.0	16	9.0	<4.0	17
W-B-7*	0	4/17/03	1,000	g	1,800	d	1,800	<500	<2.5	6.4	24	63	2.8	24
W-B-7	1-2	4/17/03	7.9		NA		NA	NA	21	<1.0	18	5.5	<4.0	22
W-B-7*	3	4/17/03	2.6	g	3.3	b,f	2.3	<5	3	<0.5	20	4.6	<2	20
W-B-8*	0	4/14/03	1.1	a	<50		<50	390	11	3.5	39	160	7.7	51
W-B-8	1.5-2.5	4/14/03	<1.0		NA		NA	NA	46	<1.0	19	25	<4.0	32
W-B-8*	3	4/14/03	1.7	g	81	o	<50	700	12	<0.5	20	18	<2	25
Area of Concern 3 - Industrial Wastewater Vault														
W-B-10*	0	4/15/03	NA		NA		NA	NA	<2.5	0.64	22	9.1	<2	24
W-B-10*	3	4/15/03	NA		NA		NA	NA	25	14	2.8	<3	<2	19
W-B-10	3-4	4/15/03	NA		NA		NA	NA	19	<1.0	18	3.6	<4.0	19
W-B-10*	6	4/15/03	NA		NA		NA	NA	<2.5	<0.5	16	3.8	<2	17
W-B-10*	0	4/15/03	<1		1.1	b	<1	<5	NA	NA	NA	NA	NA	NA
W-B-10*	3	4/15/03	<1		<1		<1	<5	NA	NA	NA	NA	NA	NA
W-B-10	3-4	4/15/03	<1.0		NA		NA	NA	NA	NA	NA	NA	NA	NA
W-B-10*	6	4/15/03	<1		<1		<1	<5	NA	NA	NA	NA	NA	NA
W-B-11*	0	4/15/03	<1		<1		<1	<5	<2.5	0.5	22	7.6	<2	25
W-B-11	1-2	4/15/03	<1.0		NA		NA	NA	29	<1.0	20	6.6	<4.0	26
W-B-11*	3	4/15/03	<1		<1		<1	<5	<2.5	<0.5	27	8.8	<2	34
W-B-11*	7.5	4/15/03	<1		<1		<1	<5	NA	NA	NA	NA	NA	NA
W-B-11*	8	4/15/03	NA		NA		NA	NA	<2.5	<0.5	16	3.2	<2	14
W-B-12*	0	4/15/03	3.3	g	34	b,o	9.9	100	<2.5	15	30	690	19	51
W-B-12	0.5	4/16/03	<1.0		NA		NA	NA	33	44	[illegible]	4,200	260	340
W-B-12*	3	4/15/03	1.7	g	140	b,o	77	600	12	14	28	580	16	50
W-B-12*	5.5	4/15/03	<1		7.4	b,o	3.9	22	NA	NA	NA	NA	NA	NA
W-B-12*	6	4/15/03	NA		NA		NA	NA	<2.5	<0.5	18	12	<2	20

Sample Location	Sample Depth (feet bgs)	Date Sampled	TPH: TPPH	TPH: TPH-D	TPH: TPH-JF	TPH: TPH-MO	Metals: As	Metals: Cd	Metals: Cr	Metals: Cu	Metals: Mo	Metals: Ni
Construction Worker Tier-2 ESLs (mg/kg)			23,000	23,000	23,000	23,000	16	38	58[1]	31,000	3,900	1,000
Area of Concern 4 - Aboveground Fuel Storage Tank												
ERM-B-8	4	4/16/03	<0.10	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-9	4.5	4/16/03	<0.10	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 5 - Vehicle Maintenance Center												
ERM-B-10	2.5	4/17/03	<1.0	NA	NA	NA	[redacted]	<1.0	19	4.7	<4.0	21
ERM-B-11	2.5	4/17/03	<1.0	NA	NA	NA	[redacted]	<1.0	18	4.1	<4.0	20
ERM-B-11	6.5	4/17/03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-B-1*	0	4/14/03	<1	13	<5	140	2.6	<0.5	[illegible]	16	<2	120
W-B-1*	3	4/14/03	<1	<1	<1	<5	<2.5	<0.5	20	13	<2	37
W-B-1*	10	4/14/03	<1	<1	<1	<5	NA	NA	NA	NA	NA	NA
W-B-2*	0	4/14/03	<1	6.3	<5	81	2.6	<0.5	[illegible]	17	<2	51
W-B-2*	3	4/14/03	<1	<1	<1	<5	<2.5	<0.5	47	10	<2	42
W-B-2	3.5-4.5	4/14/03	<1.0	NA	NA	NA	[redacted]	<1.0	12	2.6	<4.0	15
W-B-2*	10	4/14/03	<1	<1	<1	<5	NA	NA	NA	NA	NA	NA
W-B-3*	0	4/14/03	<1	10	<5	93	2.8	<0.5	[illegible]	17	<2	120
W-B-3*	3	4/14/03	<1	<1	<1	<5	<2.5	<0.5	41	12	<2	43
W-B-3	3-4	4/14/03	<1.0	NA	NA	NA	[redacted]	<1.0	19	4.6	<4.0	21
W-B-3*	7	4/14/03	<1	<1	<1	<5	NA	NA	NA	NA	NA	NA
Area of Concern 6 - Boiler and Aboveground Diesel Storage Tank												
ERM-B-27	2	4/17/03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 7 - Former 90-Day Hazardous Waste Accumulation Area												
W-B-16*	0	4/17/03	<1	<1	<1	<5	<2.5	<0.5	23	4.5	<2	23
W-B-16	1-2	4/17/03	<1.0	NA	NA	NA	[redacted]	<1.0	19	4.9	<4.0	22
W-B-16*	3	4/17/03	<1	<1	<1	<5	<2.5	<0.5	17	3.6	<2	19
W-B-17*	0	4/17/03	<1	<1	<1	<5	<2.5	<0.5	20	4.6	<2	23
W-B-17	1-2	4/17/03	<1.0	NA	NA	NA	[redacted]	<1.0	22	6.6	<4.0	25
W-B-17*	3	4/17/03	<1	<1	<1	<5	<2.5	<0.5	26	5.8	<2	25
Area of Concern 8 - Current 90-Day Hazardous Waste Accumulation Area												
ERM-B-12	2	4/17/03	<1.0	NA	NA	NA	[redacted]	<1.0	21	5.5	<4.0	24
Area of Concern 9 - Hazardous Material Storage Areas												
ERM-B-13	3.5	4/16/03	<1.0	NA	NA	NA	[redacted]	<1.0	11	4.0	<4.0	15
ERM-B-14	4.5	4/17/03	<1.0	NA	NA	NA	[redacted]	<1.0	23	8.0	<4.0	30
W-B-21*	0	4/17/03	<1	1.9	1.2	6.2	<2.5	<0.5	32	7.2	<2	32
W-B-21*	3	4/17/03	<1	<1	<1	<5	<2.5	<0.5	20	4.3	<2	24
W-B-22*	0	4/18/03	<1	<5	<5	57	2.6	<0.5	25	5.2	<2	25
W-B-22	2-3	4/18/03	<1.0	NA	NA	NA	[redacted]	<1.0	16	3.8	<4.0	18
W-B-22*	3	4/18/03	<1	<1	<1	<5	<2.5	<0.5	22	4.9	<2	24
W-B-23*	0	4/18/03	<1	<1	<1	<5	<2.5	<0.5	24	4.6	<2	25
W-B-23*	3	4/18/03	<1	<200	<200	2,100	2.6	<0.5	[illegible]	16	<2	80
Area of Concern 10 - Chemical Storage Area												
ERM-B-15	1	4/17/03	<1.0	NA	NA	NA	[redacted]	<1.0	17	3.9	<4.0	21

Sample Location	Sample Depth (feet bgs)	Date Sampled	TPH: TPPH	TPH: TPH-D		TPH: TPH-JF	TPH: TPH-MO	Metals: As	Metals: Cd	Metals: Cr	Metals: Cu	Metals: Mo	Metals: Ni
Construction Worker Tier-2 ESLs (mg/kg)			23,000	23,000		23,000	23,000	16	38	58 [1]	31,000	3,900	1,000
Area of Concern 11 - Aircraft Fueling/Defueling Equipment Areas													
ERM-B-16	4.5	4/16/03	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-17	3.5	4/16/03	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-18	4	4/16/03	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-19	4.5	4/16/03	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 12 - Fire System Motors and Associated Fuel Tanks													
ERM-B-20	3	4/16/03	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-21	2	4/17/03	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 13 - Paint Spray Booth													
ERM-B-22	1.5	4/17/03	<1.0	NA		NA	NA	[redacted]	<1.0	18	4	<4.0	20
Area of Concern 14 - Storm Drains													
ERM-B-23	4.5	4/17/03	<1.0	NA		NA	NA	[redacted]	<1.0	17	7.9	<4.0	21
W-B-32*	0	4/16/03	<1	3	b,o	<1	10	3.1	3.3	30	20	<2	26
W-B-32	1-2	4/16/03	<1.0	NA		NA	NA	22	4.2	26	23	<4.0	17
W-B-32*	3	4/16/03	<1	<1		<1	<5	<2.5	0.5	19	5.7	<2	20
W-B-32*	8	4/16/03	<1	7.6	b,o	10	<25	4.1	1.2	41	13	<2	40
W-B-38*	0	4/15/03	<1	<1		<1	<5	<2.5	<0.5	27	7	<2	32
W-B-38	2-3	4/15/03	<1.0	NA		NA	NA	[redacted]	<1.0	16	3.4	<4.0	20
W-B-38*	3	4/14/03	<1	<1		<1	<5	<2.5	<0.5	17	3.9	<2	21
W-B-38*	7.5	4/14/03	<1	<1		<1	<5	NA	NA	NA	NA	NA	NA
W-B-38*	8	4/14/03	NA	NA		NA	NA	<2.5	<0.5	14	3.4	<2	18
W-B-39*	0	4/14/03	<1	<1		<1	<5	<2.5	<0.5	21	6.1	<2	27
W-B-39*	3	4/14/03	<1	<1		<1	<5	<2.5	<0.5	15	3.9	<2	20
W-B-39*	8	4/14/03	<1	<1		<1	<5	<2.5	<0.5	24	5.6	<2	28
Area of Concern 15 - Aircraft Parking and Run Up Area													
ERM-B-24	2.5	4/15/03	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-25	3.5	4/15/03	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-26	2	4/16/03	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 16 - Reported Fuel Spill Area on Taxiway													
W-B-13*	0	4/15/03	<1	<1		<1	<5	2.8	<0.5	29	9.4	<2	34
W-B-13*	3	4/15/03	<1	<1		<1	<5	<2.5	<0.5	17	3.5	<2	18
W-B-13*	7.5	4/15/03	<1	<1		<1	<5	NA	NA	NA	NA	NA	NA
W-B-13*	8	4/15/03	NA	NA		NA	NA	<2.5	<0.5	17	3	<2	15
W-B-14*	0	4/15/03	<1	<1		<1	<5	<2.5	<0.5	19	4.6	<2	23
W-B-14	2-3	4/15/03	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA
W-B-14*	3	4/15/03	<1	<1		<1	<5	<2.5	<0.5	25	17	<2	28
W-B-14*	7.5	4/15/03	<1	<1		<1	<5	NA	NA	NA	NA	NA	NA
W-B-14*	8	4/15/03	NA	NA		NA	NA	<2.5	<0.5	16	3.7	<2	18
W-B-15*	0	4/15/03	<1	<1		<1	<5	<2.5	<0.5	32	8.6	<2	39
W-B-15*	7.5	4/15/03	<1	<1		<1	<5	NA	NA	NA	NA	NA	NA
W-B-15*	8	4/15/03	NA	NA		NA	NA	<2.5	<0.5	16	3.7	<2	18

Table 15
Comparison of Tier-1 Exceedences for Construction Workers to Tier-2 Standards
Former United Airlines Oakland Maintenance Center
Oakland International Airport

Sample Location	Sample Depth (feet bgs)	Date Sampled	TPH: TPPH		TPH: TPH-D		TPH: TPH-JF	TPH: TPH-MO	Metals: As	Metals: Cd	Metals: Cr	Metals: Cu	Metals: Mo	Metals: Ni
Construction Worker Tier-2 ESLs (mg/kg)			23,000		23,000		23,000	23,000	16	38	58[1]	31,000	3,900	1,000
Area of Concern 18 - Migration of Offsite Solvent Plume Onto OMC Property														
W-B-9	3-3.5	4/18/03	NA		NA		NA	NA	NA	NA	NA	NA	NA	NA
W-B-9*	4	4/18/03	<1		<1		<1	<5	<2.5	<0.5	23	4.5	<2	21
W-B-18*	4.5	4/18/03	<1		2	b,o	1.4	<5	<2.5	<0.5	25	6.2	<2	26
W-B-18*	7.5	4/18/03	<1		<1		<1	<5	<2.5	<0.5	22	4	<2	18
W-B-19	3-3.5	4/18/03	NA		NA		NA	NA	NA	NA	NA	NA	NA	NA
W-B-19*	4	4/18/03	<1		<1		<1	<5	<2.5	<0.5	20	4.5	<2	22
W-B-20*	3	4/18/03	<1		<1		<1	<5	<2.5	<0.5	24	6.7	<2	24
Area of Concern 19 - Runoff from Pavement to Unpaved Area North of OMC														
W-B-24*	0	4/14/03	<1		<1		<1	<5	<2.5	<0.5	20	18	<2	19
W-B-24*	3	4/14/03	<1		1.4	b	<1	<5	<2.5	0.55	30	9.3	<2	34
W-B-24*	7.5	4/14/03	<1		3.2	o	<1	17	NA	NA	NA	NA	NA	NA
W-B-24*	8	4/14/03	NA		NA		NA	NA	<2.5	<0.5	22	4.6	<2	26
W-B-25*	0	4/15/03	<1		<1		<1	<5	<2.5	<0.5	17	4.5	<2	18
W-B-25	1-2	4/15/03	<1		NA		NA	NA	82	<1.0	55	29	<4.0	22
W-B-25*	3	4/15/03	<1		<1		<1	<5	3.3	<0.5	[illegible]	12	<2	71
W-B-25*	8	4/15/03	<1		2	b,o	<1	7.9	<2.5	<0.5	22	6.2	<2	27
W-B-26*	0	4/16/03	<1		<1		<1	<5	<2.5	<0.5	28	5.4	<2	29
W-B-26*	3	4/16/03	<1		<1		<1	<5	<2.5	<0.5	18	3.6	<2	21
W-B-26*	11.5	4/16/03	<1		<1		<1	<5	NA	NA	NA	NA	NA	NA
W-B-26*	12	4/16/03	NA		NA		NA	NA	2.9	<0.5	28	5.4	<2	29
W-B-27*	0	4/16/03	<1		<1		<1	<5	<2.5	<0.5	18	4.4	<2	21
W-B-27*	3	4/16/03	<1		<1		<1	<5	<2.5	<0.5	15	2.7	<2	16
W-B-27*	8	4/16/03	<1		<1		<1	<5	<2.5	<0.5	19	3.9	<2	22
W-B-28*	0	4/16/03	<1		<1		<1	<5	3.2	7.5	31	150	3.4	39
W-B-28*	3	4/16/03	<1		<1		<1	<5	3.8	<0.5	14	2.3	<2	14
W-B-28*	7.5	4/16/03	<1		<1		<1	<5	NA	NA	NA	NA	NA	NA
W-B-28*	8	4/16/03	NA		NA		NA	NA	<2.5	<0.5	23	4.3	<2	24
W-B-29*	0	4/16/03	<1		<1		<1	<5	3.1	<0.5	29	8.2	<2	31
W-B-29	1-2	4/16/03	<1		NA		NA	NA	77	<1.0	56	20	<4.0	72
W-B-29*	3	4/16/03	<1		<1		<1	<5	<2.5	<0.5	21	3.9	<2	23
W-B-29*	8	4/16/03	<1		<1		<1	<5	2.9	<0.5	17	2.8	<2	17
W-B-30*	0	4/16/03	<1		<1		<1	<5	3.7	1	31	9.8	<2	32
W-B-30*	3	4/16/03	<1		<1		<1	<5	<2.5	<0.5	21	3.9	<2	24
W-B-30*	7.5	4/16/03	<1		<1		<1	<5	NA	NA	NA	NA	NA	NA
W-B-30*	8	4/16/03	NA		NA		NA	NA	2.8	<0.5	20	3.3	<2	20
W-B-31*	0	4/16/03	<1		<1		<1	<5	2.8	2.1	24	15	<2	25
W-B-31*	3	4/16/03	<1		7.1	o	<2	27	9.4	1.3	56	28	<2	56
W-B-31*	3.5	4/16/03	<1		11	o	<5	42	6.0	6.8	[illegible]	33	<2	53
W-B-33*	0	4/16/03	2.7	g	220	o	<200	2,100	3.9	6.4	38	37	<2	43
W-B-33*	2.5	4/16/03	<1		1.5	o	<1	8.8	4.3	1.1	31	9.9	<2	34
W-B-33*	3	4/16/03	<1		<1		<1	<5	2.9	0.82	34	8.3	<2	36

			TPH					Metals					
Sample Location	**Sample Depth (feet bgs)**	**Date Sampled**	**TPPH**	**TPH-D**		**TPH-JF**	**TPH-MO**	**As**	**Cd**	**Cr**	**Cu**	**Mo**	**Ni**
Construction Worker Tier-2 ESLs (mg/kg)			23,000	23,000		23,000	23,000	16	38	58 [1]	31,000	3,900	1,000
W-B-33*	8	4/16/03	<1	**12**	b,o	**10**	**27**	**3.8**	1.7	**47**	**18**	<2	**44**
W-B-34*	0	4/17/03	<1	<10		<10	**100**	32	<0.5	**22**	**24**	<2	**17**
W-B-34*	3	4/17/03	<1	**2.1**	b,o	<1	**7.9**	**6.1**	2	**50**	**23**	<2	**52**
W-B-35*	0	4/17/03	<1	1.1	o	<1	<5	**5.9**	1.2	**48**	**20**	<2	**43**
W-B-35*	3	4/17/03	<1	**6.8**	c,m	**1.1**	**12**	**2.5**	0.75	**25**	**12**	<2	**24**
W-B-36*	0	4/17/03	<1	<1		<1	<5	<2.5	<0.5	**24**	**6.1**	<2	**25**
W-B-36*	3	4/17/03	<1	<1		<1	<5	<2.5	<0.5	**19**	**4.3**	<2	**20**
W-B-37*	0	4/17/03	<1	**5.5**	o	<1	**42**	<2.5	4.8	**33**	**55**	<2	**21**
W-B-37*	3.5	4/17/03	<1	**15**	b,o	**4.6**	**17**	<2.5	<0.5	**23**	**4.9**	<2	**23**
Number of Samples			129	96		96	96	93	124	124	124	124	124
Number of Detections			13	30		12	27	38	28	124	123	6	124
# of Detections above the Construction Tier-2 ESL			0	0		0	0	2	1	8 [1]	0	0	0
Minimum Detection			1.1	1.1		1.1	6.2	2.5	0.5	2.8	2.3	2.8	14
Maximum Detection			1000	1,800		1,800	2,100	32	44	190	4,200	260	340
Median of Detections			2.7	6.95		4.25	42.0	3.25	1.85	22	6.1	11.85	24
Mean of Detections			92.5	84.4		160.3	300.3	5.595	5.2	29.3	56.6	51.5	31.9
East Bay Background Ranges			na	na		na	na	1.2 - 31	0.27 - 3.3	10 - 142	5.4 - 100	0.33 - 11.4	16 - 144

Notes:

Sample concentrations reported in milligrams per kilogram (mg/kg)

ERM prefix indicates a boring completed by ERM

W prefix indicates a boring completed by Weiss Associates

* Data Obtained from "*United Maintenance Hanger Area, Metropolitan Oakland Airport*", Weiss Associates, 27 May 2003

Construction Worker Tier-2 ESLs = Environmental screening levels for direct exposure with impacted soil under a construction worker exposure scenario were used as the Tier-2 ESLs for construction worker receptors (Table K-3 of *Screening for Environmental Concerns At Sites with Contaminated Soil and Groundwater*, RWQCB, July 2003).

[1] No standard was established for total chromium in Table K-3 of *Screening for Environmental Concerns At Sites with Contaminated Soil and Groundwater* (RWQCB, July 2003); therefore, the results for this compound were retained for the Tier-3 evaluation, as discussed in the text. The standard presented is the Tier-1 ESL for total chromium, which also serves as the basis for comparison in the Tier-3 analysis.

Bold values indicate concentrations detected above the laboratory method detection limit.

<0.5	Compound not detected at or above the laboratory method detection limit
# (yellow)	Indicates a concentration detected above the respective Tier-2 ESL for construction workers
# (blue)	Indicates a total chromium concentration detected above the respective Tier-1 ESL for construction workers. No Tier-2 standard exists for total chromium; therefore, results for this compound were further assessed in the Tier-3 evaluation using the statistical methods discussed in the text.
# (grey)	Indicates that a sample result was not included in the statistical summary due to probable interference with iron and aluminum during analysis, as discussed below.
NA	Not analyzed
na	Not applicable
feet bgs	Feet below ground surface
380/*<0.42**	**Bold** indicates the initial result by inductively coupled plasma/*Italicized* indicates the result after reanalysis by graphite furnace

The initial arsenic and thallium results in samples collected by ERM were obtained using an inductively coupled plasma method. Concentrations of iron and aluminum within the samples can cause interferences for certain elements including arsenic and thallium. The reanalysis using the graphite furnace method indicates that this interference is occurring with the samples collected during this investigation and the samples most likely contain concentrations similar to that detected by the graphite furnace analysis.

			TPH				Metals					
Sample Location	Sample Depth (feet bgs)	Date Sampled	TPPH	TPH-D	TPH-JF	TPH-MO	As	Cd	Cr	Cu	Mo	Ni
Construction Worker Tier-2 ESLs (mg/kg)			23,000	23,000	23,000	23,000	16	38	58 [1]	31,000	3,900	1,000

Abbreviations:

- **TPH =** Total petroleum hydrocarbons
- **TPPH =** Total purgeable petroleum hydrocarbons
- **TPH-D =** Total petroleum hydrocarbons as diesel
- **TPH-JF =** Total petroleum hydrocarbons as jet fuel
- **TPH-MO =** Total petroleum hydrocarbons as motor oil
- **As =** Arsenic
- **Cd =** Cadmium
- **Cr =** Chromium
- **Cu =** Copper
- **Mo =** Molybdenum
- **Ni =** Nickel

McCampbell Analytical/Weiss Notes:

- **a =** Unmodified or weakly modified gasoline is significant
- **b =** Diesel range compounds are significant; no recognizable pattern
- **c =** Aged diesel is significant
- **d =** Gasoline range compounds are significant
- **f =** One to a few isolated peaks present
- **g =** Strongly aged gasoline or diesel range compounds are significant
- **m =** Fuel oil
- **o =** Oil range compounds are significant

Table 16
Calculation of 95th Percentile
Upper Confidence Limit of the Mean Concentrations for
Chemicals Exceeding Tier-2 Soil Standards
Former UAL Oakland Maintenance Center
Oakland, California

Location	Depth (feet)	Arsenic (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)
W-B-1*	0	**2.6**	*0.25*	190
W-B-1*	3	*1.25*	*0.25*	20
W-B-2*	0	**2.6**	*0.25*	80
W-B-2*	3	*1.25*	*0.25*	**47**
W-B-2	3.5-4.5	†	*0.5*	**12**
W-B-3*	0	**2.8**	*0.25*	180
W-B-3*	3	*1.25*	*0.25*	**41**
W-B-3	3-4	†	*0.5*	**19**
W-B-4*	0	**3.8**	*0.25*	**40**
W-B-4*	3	**3**	*0.25*	**21**
W-B-4	3-4	†	*0.5*	**17**
W-B-5*	0	**4.6**	**0.86**	70
W-B-5*	3	**2.7**	*0.25*	**22**
W-B-5	3-4	†	*0.5*	**15**
W-B-6*	0	**4.2**	**0.66**	**43**
W-B-6*	3	**2.8**	*0.25*	**16**
W-B-6	3-4	†	*0.5*	**20**
W-B-7*	0	*1.25*	**6.4**	**24**
W-B-7	1-2	†	*0.5*	**18**
W-B-7*	3	**3**	*0.25*	**20**
W-B-8*	0	**11**	**3.5**	**39**
W-B-8	1.5-2.5	†	*0.5*	**19**
W-B-8*	3	**12**	*0.25*	**20**
W-B-9*	4	*1.25*	*0.25*	**23**
W-B-10*	0	*1.25*	**0.64**	**22**
W-B-10*	3	**25**	**14**	**2.8**
W-B-10	3-4	†	*0.5*	**18**
W-B-10*	6	*1.25*	*0.25*	**16**
W-B-11*	0	*1.25*	**0.5**	**22**
W-B-11	1-2	†	*0.5*	**20**
W-B-11*	3	*1.25*	*0.25*	**27**
W-B-11*	8	*1.25*	*0.25*	**16**
W-B-12*	0	*1.25*	**15**	**30**
W-B-12	0.5	†	**44**	90
W-B-12*	3	**12**	**14**	**28**
W-B-12*	6	*1.25*	*0.25*	**18**
W-B-13*	0	**2.8**	*0.25*	**29**
W-B-13*	3	*1.25*	*0.25*	**17**
W-B-13*	8	*1.25*	*0.25*	**17**
W-B-14*	0	*1.25*	*0.25*	**19**
W-B-14*	3	*1.25*	*0.25*	**25**
W-B-14*	8	*1.25*	*0.25*	**16**
W-B-15*	0	*1.25*	*0.25*	**32**

Table 16
Calculation of 95th Percentile
Upper Confidence Limit of the Mean Concentrations for
Chemicals Exceeding Tier-2 Soil Standards
Former UAL Oakland Maintenance Center
Oakland, California

Location	Depth (feet)	Arsenic (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)
W-B-15*	8	1.25	0.25	16
W-B-16*	0	1.25	0.25	23
W-B-16	1-2	†	0.5	19
W-B-16*	3	1.25	0.25	17
W-B-17*	0	1.25	0.25	20
W-B-17	1-2	†	0.5	22
W-B-17*	3	1.25	0.25	26
W-B-18*	4.5	1.25	0.25	25
W-B-18*	7.5	1.25	0.25	22
W-B-19*	4	1.25	0.25	20
W-B-20*	3	1.25	0.25	24
W-B-21*	0	1.25	0.25	32
W-B-21*	3	1.25	0.25	20
W-B-22*	0	2.6	0.25	25
W-B-22	2-3	†	0.5	16
W-B-22*	3	1.25	0.25	22
W-B-23*	0	1.25	0.25	24
W-B-23*	3	2.6	0.25	[illegible]
W-B-24*	0	1.25	0.25	20
W-B-24*	3	1.25	0.55	30
W-B-24*	8	1.25	0.25	22
W-B-25*	0	1.25	0.25	17
W-B-25	1-2	†	0.5	55
W-B-25*	3	3.3	0.25	[illegible]
W-B-25*	8	1.25	0.25	22
W-B-26*	0	1.25	0.25	28
W-B-26*	3	1.25	0.25	18
W-B-26*	12	2.9	0.25	28
W-B-27*	0	1.25	0.25	18
W-B-27*	3	1.25	0.25	15
W-B-27*	8	1.25	0.25	19
W-B-28*	0	3.2	7.5	31
W-B-28*	3	3.8	0.25	14
W-B-28*	8	1.25	0.25	23
W-B-29*	0	3.1	0.25	29
W-B-29	1-2	†	0.5	56
W-B-29*	3	1.25	0.25	21
W-B-29*	8	2.9	0.25	17
W-B-30*	0	3.7	1	31
W-B-30*	3	1.25	0.25	21
W-B-30*	8	2.8	0.25	20
W-B-31*	0	2.8	2.1	24
W-B-31*	3	9.4	1.3	56

Table 16
Calculation of 95th Percentile
Upper Confidence Limit of the Mean Concentrations for
Chemicals Exceeding Tier-2 Soil Standards
Former UAL Oakland Maintenance Center
Oakland, California

Location	Depth (feet)	Arsenic (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)
W-B-31*	3.5	6.0	6.8	[illegible]
W-B-32*	0	3.1	3.3	30
W-B-32	1-2	†	4.2	26
W-B-32*	3	*1.25*	0.5	19
W-B-32*	8	4.1	1.2	41
W-B-33*	0	3.9	6.4	38
W-B-33*	2.5	4.3	1.1	31
W-B-33*	3	2.9	0.82	34
W-B-33*	8	3.8	1.7	47
W-B-34*	0	32	*0.25*	22
W-B-34*	3	6.1	2	50
W-B-35*	0	5.9	1.2	48
W-B-35*	3	2.5	0.75	25
W-B-36*	0	*1.25*	*0.25*	24
W-B-36*	3	*1.25*	*0.25*	19
W-B-37*	0	*1.25*	4.8	33
W-B-37*	3.5	*1.25*	*0.25*	23
W-B-38*	0	*1.25*	*0.25*	38
W-B-38	2-3	†	*0.5*	11
W-B-38*	3	*1.25*	*0.25*	14
W-B-38*	8	*1.25*	*0.25*	12
W-B-39*	0	*1.25*	*0.25*	41
W-B-39*	3	*1.25*	*0.25*	10
W-B-39*	8	*1.25*	*0.25*	31
ERM-B-1	3.5	†	*0.5*	18
ERM-B-2	3.5	†	*0.5*	15
ERM-B-3	2.5	†	*0.5*	17
ERM-B-4	2.5	†	*0.5*	13
ERM-B-5	2.5	†	*0.5*	22
ERM-B-6	2.5	†	*0.5*	16
ERM-B-7	-	†	NA	NA
ERM-B-8	-	†	NA	NA
ERM-B-9	-	†	NA	NA
ERM-B-10	2.5	†	*0.5*	19
ERM-B-11	2.5	†	*0.5*	18
ERM-B-12	2	†	*0.5*	21
ERM-B-13	3.5	†	*0.5*	11
ERM-B-14	4.5	†	*0.5*	23
ERM-B-15	1	†	*0.5*	17
ERM-B-16	-	†	NA	NA
ERM-B-17	-	†	NA	NA
ERM-B-18	-	†	NA	NA
ERM-B-19	-	†	NA	NA

Location	Depth (feet)	Arsenic (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)
ERM-B-20	-	†	NA	NA
ERM-B-21	-	†	NA	NA
ERM-B-22	1.5	†	*0.5*	**18**
ERM-B-23	4.5	†	*0.5*	**17**
ERM-B-24	-	†	NA	NA
ERM-B-25	-	†	NA	NA
ERM-B-26	-	†	NA	NA
ERM-B-27	-	†	NA	NA
Normal Distribution				
Mean		3.0253	1.4357	29.4661
Standard Deviation		4.4218	4.5788	25.7697
Number of Samples		93	124	124
$t_{0.05}$		1.6641	1.6575	1.6575
Confidence Interval (+/-)		0.7630	0.6816	3.8358
95% LCL		2.2623	0.7542	25.6303
95% UCL		**3.7883**	**2.1173**	**33.3019**
Lognormal Distribution				
Mean of Transformed Data		0.7241	-0.7170	3.1970
Standard Deviation of Transformed Data		0.7257	1.0667	0.5519
Number of Samples		93	124	124
$H_{0.95}$		2.0431	2.3066	1.8387
95% UCL		**3.1330**	**1.0765**	**31.2101**
Non-parametric Distribution				
Mean		3.0253	1.4357	29.4661
Population Standard Deviation		4.3980	4.5603	25.6656
Skewness		4.6681	7.1543	4.1181
Number of Samples		93	124	124
$Q_{0.05}$		-0.1606	-0.1066	-0.1531
$W(Q_{0.05})$		-0.2599	-0.1875	-0.2167
95% UCL		**4.1681**	**2.2910**	**35.0282**
Tier-2 Standard (mg/kg)		16	38	58

Notes:

mg/kg = milligrams per kilogram

LCL = Lower confidence limit

UCL = Upper confidence limit

#	Indicates the concentration exceeds the Tier-2 Standard
#	Indicates the concentration exceeds the Tier-1 Standard, where no Tier-2 standard exists

Non-detected concentrations were replaced with half the detection limit for this analysis; these sample concentrations have been italiciz

* Data Obtained from "United Maintenance Hanger Area, Metropolitan Oakland Airport", Weiss Associates, 27 May 2003

† Data not included in the statistical evaluation due to probable interference with iron and aluminum during analysis

For normally distributed data, the 95% UCL of the mean is calculated according to the following formula:

$$UCL = \overline{X} + st_{0.05} / \sqrt{n}$$

Location	Depth (feet)	Arsenic (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)

For lognormally distributed data, the 95% UCL of the mean is calculated according to the following formula:

$$UCL = \exp(\overline{X} + 0.5s^2 + H_{0.95}s / \sqrt{n-1})$$

where $\overline{X}$ and s are the mean and standard deviation of the natural-logarithm transformed data, respectively

For non-parametric data, the UCL of the mean using Hall's bootstrap method is calculated using the following methodology:

The mean $(\overline{X})$, population standard deviation (s), and skewness (k) are calculated using the following formulas:

$$s = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(X_i - \overline{X})^2}$$

$$k = \frac{1}{ns^3}\sum_{i=1}^{n}(X_i - \overline{X})^3$$

For each of 5000 bootstrap data sets, the mean $(\overline{X}_b)$, population standard deviation (s_b), and skewness (k_b) are calculated, from which the studentized mean (W) and Hall's statistic (Q) are evaluated

$$s_b = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(X_{ib} - \overline{X}_b)^2}$$

$$k_b = \frac{1}{ns^3}\sum_{i=1}^{n}(X_{ib} - \overline{X}_b)^3$$

$$W = \frac{(\overline{X}_b - \overline{X})}{s_b}$$

$$Q = W + kW^2/3 + k_b^2W^3/27 + k_b/(6n)$$

For the 95% UCL of the mean, the lower 5% value ($Q_{0.05}$) is determined from the 5000 Q values. From this value, $W(Q_{0.05})$ and finally the UCL are calculated using the following formulas:

$$W(Q_{0.05}) = \frac{3}{k}\left(\left(1 + k\left(Q_{0.05} - \frac{k}{6n}\right)\right)^{1/3} - 1\right)$$

$$UCL = \overline{X} - W(Q_{0.05})s$$

Table 17
Comparison of Tier-1 Exceedences for Ecological Receptors to Tier-2 Standards
Former United Airlines Oakland Maintenance Center
Oakland International Airport

Sample Location	Date Sampled	VOCs: 1,1-DCA	VOCs: 1,1-DCE	VOCs: NAP	VOCs: XYL	TPH: Diesel SGCU	Metals: As	Metals: Be	Metals: Cd	Metals: Co	Metals: Cu	Metals: Pb	Metals: Ni	Metals: Zn
	Ecological Receptor Tier-2 ESLs	1,293	688	578	358	17,600	0.99	0.074	0.061	0.083	0.085	0.069	0.23	2.23
Area of Concern 1 - Small Parts Wash Rack/Former World Airways Cleaning Room														
ERM-B-1	4/15/2003	39 J	3.2 J	<1.0	<0.50	NA	<0.05	<0.005	<0 005	0.02	<0.005	<0.05	0.19	0.0065
ERM-B-2	4/15/2003	47 J	3 J	<1.0	<0.50	NA	<0.05	<0.005	<0.005	<0.02	<0.005	<0 05	0.13	<0.005
W-B-4	4/15/2003	16 J	2.7 J	<1.0	<0.50	NA	<0.05	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02
W-B-5	4/15/2003	38 J	4.4 J	<1.0	<0.50	NA	<0.05	<0.005	<0.005	<0.02	<0.005	<0.05	0.064	<0.02
W-B-6	4/15/2003	33 J	5 J	<1.0	<0.50	NA	<0.05	<0.0055 UJ	<0.005	<0.02	<0.005	<0.05	0.031	<0.02
ERM-MW-01	5/9/2003	23	2	26	4.9	NA	NA	NA	NA	NA	NA	NA	0.09	NA
ERM-MW-01D	5/9/2003	22	1.9	17	4.3	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-MW-01	11/6/2003	16	1.1	16	<0.50	NA	NA	NA	NA	NA	NA	NA	0.19	NA
ERM-MW-02	5/9/2003	21	2.8	<1.0	<0.50	NA	NA	NA	NA	NA	NA	NA	0.036	NA
ERM-MW-02	11/6/2003	16	2.6	<0.50	<0.50	NA	NA	NA	NA	NA	NA	NA	0.015	NA
ERM-MW-03	5/9/2003	6.8	1.1	<1.0	<0.50	NA	NA	NA	NA	NA	NA	NA	<0.03	NA
ERM-MW-03	11/6/2003	16	2.4	<0.50	<0.50	NA	NA	NA	NA	NA	NA	NA	0.049	NA
ERM-MW-03DUP	11/6/2003	16	2.3	<0.50	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-MW-04	5/9/2003	12	<0.50	<1.0	<0.50	NA	NA	NA	NA	NA	NA	NA	0.062	NA
ERM-MW-04	11/7/2003	33	<0.5	<1.2	<1	NA	NA	NA	NA	NA	NA	NA	0.20	NA
ERM-MW-05	5/9/2003	52	4.2	<1.0	<0.50	NA	NA	NA	NA	NA	NA	NA	<0.03	NA
ERM-MW-05	11/6/2003	36	3.1	<0.50	<0.50	NA	NA	NA	NA	NA	NA	NA	0.045	NA
ERM-MW-11	12/30/2003	7.4	0.66	<0.50	<0.50	NA	NA	NA	NA	NA	NA	NA	0.014	NA
ERM-MW-12	12/29/2003	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	NA	NA	0.010	NA
ERM-MW-13	12/29/2003	9.9	<0.50	<0 50	<0.50	NA	NA	NA	NA	NA	NA	NA	0.16	NA
ERM-MW-14	12/29/2003	9.4	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	NA	NA	0.59	NA
Area of Concern 2 - Aircraft Wash Rack														
ERM-B-3	4/15/2003	<0.50	<0.50	<1.0	<0.50	NA	<0.05	<0.005	<0.005	<0.02	<0.005	<0.05	0.12	<0.005
ERM-B-4	4/15/2003	<0.50	<0.50	<1.0	<0.50	NA	<0.05	<0.005	<0.005	<0.02	<0.005	<0.05	0.16	<0.005
ERM-B-5	4/15/2003	<5.0	<5.0	28 J	14 J	NA	<0.05	<0.005	<0.005	<0.02	<0.005	<0.05	0.23	0.0066
ERM-B-6	4/15/2003	<5.0	<5.0	36 J	21 J	NA	<0.05	<0.005	<0.005	<0.02	<0.005	<0.05	0.26	<0.005
ERM-B-7	4/15/2003	<0.50	<0.50	<1.0	<0.50	NA	<0.05	<0.005	0.0056	<0.02	0.0054	<0.05	0.092	0.014
W-B-7	4/17/2003	<0.50	<0.50	<1.0	<0.50	NA	<0.05	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02
W-B-8*	4/14/2003	<0.50	<0.50	<1.0	<0.50	210	<0.05	<0.004	<0.005	<0.05	0.094	0.96	0.1	0.14
W-B-8	4/14/2003	<0.50	<0.50	<1.0	<0.50	NA	<0.05	<0.005	<0.005	<0.02	0.048	1.9	0.052	0.79
ERM-MW-06	5/9/2003	<0.50	<0.50	<1.0	<0.50	<50	NA	NA	<0.005	NA	NA	<0.05	<0.03	NA
ERM-MW-06	11/6/2003	<0.50	<0.50	<1.0	<0.50	110	NA	NA	<0.005	NA	NA	0.021	0.01	NA
ERM-MW-06	12/30/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.017	NA	NA	NA
ERM-MW-07	5/9/2003	<0.50	<0.50	<1.0	<0.50	89	NA	NA	<0.005	NA	NA	<0.05	0.084	NA
ERM-MW-07	11/6/2003	<0.50	<0.50	<0 50	<0.50	NA	NA	NA	<0.005	NA	NA	0.033	0.07	NA
ERM-MW-08	5/9/2003	<0.50	<0.50	<1.0	<0.50	170	NA	NA	<0.005	NA	NA	<0.05	0.11	NA
ERM-MW-08	11/6/2003	<0.50	<0.50	<0.50	<0.50	250x	NA	NA	<0.005	NA	NA	0.033	0.24	NA
ERM-MW-09	5/9/2003	<0.50	<0.50	29	18	540	NA	NA	<0.005	NA	NA	<0.05	0.23	NA
ERM-MW-09	11/6/2003	<0.50	<0.50	9.8	<0.50	760	NA	NA	<0.005	NA	NA	0.02	0.37	NA
ERM-MW-15	12/30/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.006	NA
ERM-MW-16	12/30/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.013	NA

		VOCs				TPH	Metals							
Sample Location	**Date Sampled**	**1,1-DCA**	**1,1-DCE**	**NAP**	**XYL**	**Diesel SGCU**	**As**	**Be**	**Cd**	**Co**	**Cu**	**Pb**	**Ni**	**Zn**
	Ecological Receptor Tier-2 ESLs	1,293	688	578	358	17,600	0.99	0.074	0.061	0.083	0.085	0.069	0.23	2.23
Area of Concern 3 - Industrial Wastewater Vault														
W-B-10	4/15/2003	<0.50	<0.50	<1.0	<0.50	NA	<0.05	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02
W-B-11	4/15/2003	<0.50	<0.50	<1.0	<0.50	NA	<0.05	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02
W-B-12	4/15/2003	<0.50	<0.50	<1.0	<0.50	NA	<0.05	<0.005	0.038	<0.02	0.22	<0.05	0.063	**0.036**
ERM-MW-10	5/9/2003	<0.50	<0.50	<1.0	<0.50	**75**	NA	NA	<0.005	NA	NA	<0.05	**0.082**	NA
ERM-MW-10	11/6/2003	<0.50	<0.50	<0.50	<0.50	**180**	NA	NA	<0.005	NA	NA	<0.015	**0.12**	NA
ERM-MW-10	12/30/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.005	NA	NA	NA
Area of Concern 4 - Aboveground Fuel Storage Tank														
ERM-B-8	4/16/2003	NA	NA	NA	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-9	4/16/2003	NA	NA	NA	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 5 - Vehicle Maintenance Center														
ERM-B-10	4/17/2003	0.61 J	<0.50	<1.0	<0.50	NA	<0.05	0.0066	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02
ERM-B-11	4/17/2003	**1.6** J	<0.50	<1.0	<0.50	NA	<0.05	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02
W-B-1*	4/15/2003	<2.5	<2.5	<2.5	<2.5	110 o	<0.005	<0.004	<0.005	<0.05	<0.05	<0.05	<0.05	<0.05
W-B-2*	4/15/2003	<2.5	<2.5	<2.5	<2.5	<50	<0.005	<0.004	<0.005	<0.05	<0.05	<0.05	<0.05	<0.05
W-B-2	4/15/2003	<0.50	<0.50	<1.0	<0.50	NA	<0.05	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02
W-B-3*	4/15/2003	<2.5	<2.5	<2.5	<2.5	96 o	<0.005	<0.004	<0.005	<0.05	<0.05	<0.05	0.06	<0.05
W-B-3	4/15/2003	<0.50	<0.50	<1.0	<0.50	NA	<0.05	<0.0061 UJ	<0.005	<0.02	<0.005	<0.05	<0.02	0.0063
Area of Concern 6 - Boiler and Aboveground Diesel Storage Tank														
ERM-B-27	4/17/2003	NA	NA	NA	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 7 - Former 90-Day Hazardous Waste Accumulation Area														
W-B-16*	4/17/2003	**0.75** J	**0.56**	<0.50	<0.50	<50	**0.0055**	<0.005	<0.005	<0.05	<0.05	<0.05	**0.054**	<0.05
W-B-16	4/17/2003	**0.75** J	**0.55** J	<1.0	<0.50	NA	<0.05	<0.005	<0.005	<0.02	<0.005	<0.05	**0.054**	<0.02
W-B-16-D	4/17/2003	**0.75** J	**0.59** J	<1.0	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-B-17*	4/17/2003	45	53	<1.2	<1.2	<50	0.012	<0.005	<0.005	<0.05	<0.05	<0.05	<0.05	<0.05
W-B-17	4/17/2003	54 J	59 J	<1.0	<0.50	NA	<0.05	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02
ERM-MW-17	12/30/2003	**3.7**	**3.9**	<0.50	<0.50	NA	<0.005	NA	NA	NA	NA	NA	NA	NA
ERM-MW-17D	12/30/2003	**2.3**	**2.3**	<0.50	<0.50	NA	<0.005	NA	NA	NA	NA	NA	NA	NA
Area of Concern 8 - Current 90-Day Hazardous Waste Accumulation Area														
ERM-B-12	4/17/2003	<0.50	<0.50	<1.0	<0.50	NA	<0.05	<0.005	<0.005	<0.02	<0.005	<0.05	**0.063**	<0.02
Area of Concern 9 - Hazardous Material Storage Areas														
ERM-B-13	4/16/2003	<0.50	<0.50	<1.0	<0.50	NA	<0.05	0.0059	<0.005	<0.02	<0.005	0.057	<0.02	0.017
ERM-B-14	4/17/2003	<0.50	<0.50	<1.0	<0.50	NA	<0.05	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02
ERM-B-14-D	4/17/2003	<0.50	<0.50	<1.0	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-B-22	4/18/2003	**0.8** J	<0.50	<1.0	<0.50	NA	<0.05	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	**0.0099**
W-B-22-D	4/18/2003	**0.8** J	<0.50	<1.0	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA
P-2/UAL-MW-5	4/18/2003	<0.50	<0.50	<1.0	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA
P-2/UAL-MW-5*	4/22/2003	<0.50	<0.50	<0.5	<0.50	<50	<0.5	<0.004	<0.005	<0.05	<0.05	<0.05	<0.05	<0.05
P-2/UAL-MW-5	11/6/2003	<0.50	<0.50	<0.5	<0.50	NA	NA	NA	NA	NA	NA	NA	<0.005	NA
Area of Concern 11 - Aircraft Fueling/Defueling Equipment Areas														
ERM-B-16	4/16/2003	NA	NA	NA	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-17	4/16/2003	NA	NA	NA	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-18	4/16/2003	NA	NA	NA	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-19	4/16/2003	NA	NA	NA	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA

		VOCs				TPH	Metals							
Sample Location	**Date Sampled**	**1,1-DCA**	**1,1-DCE**	**NAP**	**XYL**	**Diesel SGCU**	**As**	**Be**	**Cd**	**Co**	**Cu**	**Pb**	**Ni**	**Zn**
Ecological Receptor Tier-2 ESLs		1,293	688	578	358	17,600	0.99	0.074	0.061	0.083	0.085	0.069	0.23	2.23
Area of Concern 12 - Fire System Motors and Associated Fuel Tanks														
ERM-B-20	4/17/2003	NA	NA	NA	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-21	4/17/2003	NA	NA	NA	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 14 - Storm Drains														
ERM-B-23	4/17/2003	<0.50	<0.50	<1.0	<0.50	NA	<0.05	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02
W-B-32	4/16/2003	<0.50	<0.50	<1.0	<0.50	NA	<0.05	**0.0058**	<0.005	<0.02	**0.0056**	**0.05**	<0.02	**0.021**
W-B-38	4/15/2003	<0.50	<0.50	<1.0	<0.50	NA	<0.05	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	<0.02
W-B-38 DUP	4/15/2003	<0.50	<0.50	<1.0	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 15 - Aircraft Parking and Run Up Area														
ERM-B-24	4/15/2003	NA	NA	NA	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-25	4/15/2003	NA	NA	NA	**1.5**	NA	NA	NA	NA	NA	NA	NA	NA	NA
ERM-B-26	4/16/2003	NA	NA	NA	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 16 - Reported Fuel Spill Area on Taxiway														
W-B-14	4/15/2003	NA	NA	NA	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA
Area of Concern 17 - Former Vehicle Fueling USTs														
UAL-MW-1	4/18/2003	<0.50	<0.50	<1.0	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA
UAL-MW-1*	4/15/2003	<0.50	<0.50	<0.50	<0.50	<50	**0.008**	<0.004	<0.005	<0.05	<0.05	<0.05	<0.05	<0.05
UAL-MW-1	11/6/2003	NA	NA	NA	NA	NA	<0.005	<0.005	NA	NA	NA	NA	NA	NA
UAL-MW-2	4/18/2003	**3.4** J	<0.50	<1.0	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA
UAL-MW-2*	4/15/2003	**2.1**	<0.50	<0.50	<0.50	<50	<0.005	<0.004	<0.005	<0.05	<0.05	<0.05	<0.05	<0.05
UAL-MW-2	11/6/2003	NA	NA	NA	NA	NA	<0.005	<0.005	NA	NA	NA	NA	NA	NA
UAL-MW-3	4/18/2003	**4.9** J	<0.50	<1.0	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA
UAL-MW-3*	4/15/2003	**3**	<0.50	<0.50	<0.50	<50	<0.005	<0.004	<0.005	<0.05	<0.05	<0.05	**0.1**	<0.05
UAL-MW-3	11/7/2003	**3.7**	<0.50	<1.2	<1	NA	<0.005	<0.005	NA	NA	NA	NA	NA	NA
P-1/UAL-MW-4	4/18/2003	**1.3** J	<0.50	<1.0	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA
P-1/UAL-MW-4*	4/22/2003	<1.2	<1.2	<1.2	<1.2	<50	**0.847**	<0.004	<0.005	<0.05	<0.05	<0.05	<0.05	<0.01
P-1/UAL-MW-4	11/6/2003	NA	NA	NA	NA	NA	**0.047**	<0.005	NA	NA	NA	NA	NA	NA
Area of Concern 18 - Migration of Offsite Solvent Plume Onto OMC Property														
W-B-9*	4/18/2003	<0.5	<0.5	<0.5	<0.5	<50	<0.05	<0.0004	<0.0005	<0.005	<0.005	<0.05	<0.005	<0.005
W-B-9	4/18/2003	<0.50	<0.50	<1.0	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-B-18*	4/18/2003	<0.5	<0.5	<0.5	<0.5	<50	<0.05	<0.004	<0.005	<0.05	<0.05	<0.05	<0.05	<0.05
W-B-19*	4/18/2003	<0.5	<0.5	<0.5	<0.5	<50	<0.05	<0.0004	<0.0005	<0.005	<0.005	<0.005	<0.005	<0.005
W-B-19	4/18/2003	**0.59** J	<0.50	<1.0	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-B-20*	4/18/2003	<0.5	<0.5	<0.5	<0.5	<50	<0.05	<0.0004	<0.0005	<0.005	<0.005	<0.005	<0.005	<0.005
W-B-20-DUP*	4/18/2003	<0.5	<0.5	<0.5	<0.5	<50	<0.5	<0.0004	<0.0005	<0.005	<0.005	<0.005	<0.005	<0.005
Area of Concern 19 - Runoff from Pavement to Unpaved Area North of OMC														
W-B-25	4/16/2003	<0.50	<0.50	<1.0	<0.50	NA	<0.05	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	**0.0081**
W-B-29	4/16/2003	<0.50	<0.50	<1.0	<0.50	NA	<0.05	<0.005	<0.005	<0.02	<0.005	<0.05	<0.02	**0.005**

Sample Location	Date Sampled	VOCs				TPH	Metals							
		1,1-DCA	1,1-DCE	NAP	XYL	Diesel SGCU	As	Be	Cd	Co	Cu	Pb	Ni	Zn
Ecological Receptor Tier-2 ESLs		1,293	688	578	358	17,600	0.99	0.074	0.061	0.083	0.085	0.069	0.23	2.23
Number of Samples[1]		59	59	59	72	20	40	42	41	38	37	41	54	38
Number of Detections[1]		26	13	4	3	8	3	1	1	1	3	5	28	10
# of Detections above the Ecological Tier-2 ESL[1]		0	0	0	0	0	0	0	0	0	0	0	3	0
Minimum Detection[1]		0.59	0.55	9.8	1.5	75	0.0055	0.0058	0.0056	0.020	0.0054	0.02	0.006	0.005
Maximum Detection[1]		52	4.2	29	18	760	0.847	0.0058	0.0056	0.020	0.017	0.05	0.59	0.79
Median of Detections[1]		7.1	2.4	21	4.9	175	0.008	0.0058	0.0056	0.020	0.0056	0.033	0.076	0.0120
Mean of Detections[1]		11.6	2.1	20.2	8.1	272	0.29	0.0058	0.0056	0.020	0.0093	0.031	0.11	0.104

Notes:

VOC and TPH sample concentrations and ESLs reported in micrograms per liter (µg/L); metals sample concentrations and ESLs reported in milligrams per liter (mg/L)
ERM prefix indicates a boring completed by ERM
W prefix indicates a boring completed by Weiss Associates
* Data Obtained from "United Maintenance Hanger Area, Metropolitan Oakland Airport", Weiss Associates, 27 May 2003
Ecological Receptor Tier-2 ESLs = Environmental screening levels for chronic aquatic habitat toxicity in estuarine surface water times a dilution/attenuation factor were used as the Tier-1 ESLs for ecological receptors (Table F-4a of *Screening for Environmental Concerns At Sites with Contaminated Soil and Groundwater*, RWQCB, July 2003).

[1] Duplicate samples not included in this count.
Bold values indicate concentrations detected above the laboratory method detection limit.

< 0.5	Compound not detected at or above the laboratory method detection limit
#	Indicates a concentration detected above the respective Tier-2 ESL for ecological receptors
#	Indicates that these sample results were not included in the statistical summary due to probable interference with iron and aluminum during analysis, as discussed below, or the subsequent installation and sampling of a nearby well
NA	Not analyzed
na	Not applicable
0.21/*<0.005**	**Bold** indicates the initial result by inductively coupled plasma/*Italicized* indicates the result after reanalysis by graphite furnace

The initial arsenic and thallium results were obtained using an inductively coupled plasma method. Concentrations of iron and aluminum within the samples can cause interferences for certain elements including arsenic and thallium. The reanalysis using the graphite furnace method indicates that this interference is occurring with the samples collected during this investigation and the samples most likely contain concentrations similar to that detected by the graphite furnace analysis

Abbreviations:

VOCs = Volatile organic compounds
1,1-DCA = 1,1-Dichloroethane
1,1-DCE = 1,1-Dichloroethene
NAP = Naphthalene
XYL = Xylenes
TPH = Total petroleum hydrocarbons
SGCU = Silica gel cleanup
As = Arsenic
Be = Beryllium
Cd = Cadmium
Co = Cobalt
Cu = Copper
Pb = Lead
Ni = Nickel
Zn = Zinc

ERM Qualifiers:

J = Estimated value
UJ = Estimated non-detected value

McCambell Analytical/Weiss Notes:

o = Oil range compounds are significant

Table 18
Calculation of 95th Percentile
Upper Confidence Limit of the Mean Concentrations for
Chemicals Exceeding Tier-2 Ground Water Standards
Former UAL Oakland Maintenance Center
Oakland, California

Location	Nickel (mg/L)
UAL-MW-1	*0.025*
UAL-MW-2	*0.025*
UAL-MW-3	**0.1**
UAL-MW-4	*0.025*
UAL-MW-5	*0.025*
ERM-MW-01	**0.19**
ERM-MW-02	**0.036**
ERM-MW-03	**0.049**
ERM-MW-04	**0.20**
ERM-MW-05	**0.045**
ERM-MW-06	**0.01**
ERM-MW-07	**0.084**
ERM-MW-08	**0.24**
ERM-MW-09	**0.37**
ERM-MW-10	**0.12**
ERM-MW-11	**0.014**
ERM-MW-12	**0.010**
ERM-MW-13	**0.16**
ERM-MW-14	**0.59**
ERM-MW-15	**0.006**
ERM-MW-16	**0.013**
ERM-MW-17	NA
ERM-B-7	**0.092**
ERM-B-11	*0.01*
ERM-B-12	**0.063**
ERM-B-14	*0.01*
ERM-B-23	*0.01*
W-B-4	*0.01*
W-B-7	*0.01*
W-B-9	*0.0025*
W-B-10	*0.01*
W-B-11	*0.01*
W-B-16	**0.054**
W-B-17	*0.025*
W-B-18	*0.025*
W-B-19	*0.0025*
W-B-20	*0.0025*
W-B-22	*0.01*
W-B-25	*0.01*

Table 18
Calculation of 95th Percentile
Upper Confidence Limit of the Mean Concentrations for
Chemicals Exceeding Tier-2 Ground Water Standards
Former UAL Oakland Maintenance Center
Oakland, California

Location	Nickel (mg/L)
W-B-29	*0.01*
W-B-32	*0.01*
W-B-38	*0.01*
Normal Distribution	
Mean	0.0664
Standard Deviation	0.1142
Number of Samples	41
$t_{0.05}$	1.684
Confidence Interval (+/-)	0.0300
95% LCL	0.0364
95% UCL	**0.0965**
Lognormal Distribution	
Mean of Transformed Data	-3.6773
Standard Deviation of Transformed Data	1.3660
Number of Samples	41
$H_{0.95}$	2.7923
95% UCL	**0.1175**
Non-parametric Distribution	
Mean	0.0664
Population Standard Deviation	0.1128
Skewness	3.0223
Number of Samples	41
$Q_{0.05}$	-0.2510
$W(Q_{0.05})$	-0.4081
95% UCL	**0.1125**
Tier-2 Standard (mg/L)	0.24

Notes:

mg/L = milligrams per liter

LCL = Lower confidence limit

UCL = Upper confidence limit

# Indicates the concentration exceeds the Tier-2 Standard

Non-detected concentrations were replaced with half the detection limit for this analysis;
these sample concentrations have been italicized.

The highest concentration at each location was used for this analysis. Data collected from grab samples was not included in the analysis in cases where a monitoring well was subsequently installed and sampled for nickel.

For normally distributed data, the 95% UCL of the mean is calculated according to the following formula:

$$UCL = \overline{X} + st_{0.05} / \sqrt{n}$$

Location	**Nickel (mg/L)**

For lognormally distributed data, the 95% UCL of the mean is calculated according to the following formula:

$$UCL = \exp(\overline{X} + 0.5s^2 + H_{0.95}s / \sqrt{n-1})$$

where $\overline{X}$ and s are the mean and standard deviation of the natural-logarithm transformed data, respectively

For non-parametric data, the UCL of the mean using Hall's bootstrap method is calculated using the following methodology:

The mean $(\overline{X})$, population standard deviation (s), and skewness (k) are calculated using the following formulas:

$$s = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(X_i - \overline{X})^2}$$

$$k = \frac{1}{ns^3}\sum_{i=1}^{n}(X_i - \overline{X})^3$$

For each of 5000 bootstrap data sets, the mean $(\overline{X}_b)$, population standard deviation (s_b), and skewness (k_b) are calculated, from which the studentized mean (W) and Hall's statistic (Q) are evaluated

$$s_b = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(X_{ib} - \overline{X}_b)^2}$$

$$k_b = \frac{1}{ns^3}\sum_{i=1}^{n}(X_{ib} - \overline{X}_b)^3$$

$$W = \frac{(\overline{X}_b - \overline{X})}{s_b}$$

$$Q = W + kW^2/3 + k_b^2W^3/27 + k_b/(6n)$$

For the 95% UCL of the mean, the lower 5% value ($Q_{0.05}$) is determined from the 5000 Q values. From this value, $W(Q_{0.05})$ and finally the UCL are calculated using the following formulas:

$$W(Q_{0.05}) = \frac{3}{k}\left(\left(1 + k\left(Q_{0.05} - \frac{k}{6n}\right)\right)^{1/3} - 1\right)$$

$$UCL = \overline{X} - W(Q_{0.05})s$$

Domenico Analytical Solute Transport Model
LDEQ Risk Evaluation/Corrective Action Program
Revision date: 07/10/2002
Run date: 1/12/04

General assumptions:

1. A single continuous source of one chemical compound dissolved in the groundwater. No NAPL.
2. No initial groundwater contamination.
3. Chemical compound is non-reactive.
4. Groundwater flow is in one direction.
5. Saturated zone is homogeneous and isotropic.
6. Contaminant plume is a planar source spreading laterally infinitely in two directions and vertically finitely in one direction.
7. The point "X" is behind the point where "X = v * time since spill".
8. The DAF is based on the estimated contaminant concentration (Cxi) at the center line of the plume.

Two possible model cases exist:
(1) The plume's vertical depth is or is assumed to be the full thickness of the groundwater stratum.
(2) The plume's vertical depth is less than the full thickness of the groundwater stratum.

Based on site hydrogeology discussed in Section 4 of the text, the depth of the plume is assumed to be the full thickness of the ground water stratum.

Calculations of the Groundwater Dilution Attenuation Factor

Site-specific inputs (Default value)

80 (ft) = Sw = groundwater plume width perpendicular to groundwater flow.
10 (ft) = Sd = vertical depth of plume (measured vertical extent of affected groundwater plume or the full thickness of the groundwater stratum).
10 (ft) = H = thickness of groundwater stratum.
400 (ft) = X = distance downgradient from source.

22.5 (ft/yr) = Dv = K*i = Darcy groundwater velocity.
0.25 (dimensionless) = O = soil porosity.
90 (ft/yr) = Dv / O = v = linear Darcy groundwater transport velocity.
40 (ft) = Ax = longitudinal groundwater dispersivity.
13.33333 (ft) = Ay = transverse groundwater dispersivity.
2 (ft) = Az = vertical groundwater dispersivity.

1 (dimensionless) = Ri = retardation factor of constituent i.
0 (yr-1) = Yi = first-order degradation constant for constituent i.

(1) The plume's vertical depth is or is assumed to be the full thickness of the groundwater stratum. Therefore, spreading in the vertical direction is ignored and the Erf term containing Sd is removed from the Domenico model.

Model equation when Sd = H:
(Csi/Cxi)= DAF = 1/[EXP(X/(2*Ax) * (1-SQRT(1+(4*Yi*Ax*Ri/v))))
* Erf(Sw/(4*SQRT(Ay*X)))]
= #NAME? (dimensionless)

Source: Louisiana Department of Environmental Quality. 10 July 2002. Domenico Model. Online Posting. Accessed 12 January 2004. <http://www.deq.state.la.us/technology/recap/recapfiles/03DOMDAF.XLS>

Area of Concern	Exposure Population	Chemicals Detected Above Tier-1 Soil Standard	Chemicals Detected Above Tier-1 Ground Water Standard	Chemicals Detected Above Tier-2 Soil Standard	Chemicals Detected Above Tier-2 Ground Water Standard	Notes Regarding Tier-2 Exceedances/Tier-3 Evaluation	Recommendation
1 - Small Parts Wash Rack	Airport Workers	-	1,1-DCA Naphthalene	-	-		No Further Action
	Construction Workers	Chromium	-	Chromium[1]	-	See note [1] below, 95% UCL mean of chromium concentrations below Tier-1, likely background	
	Ecological Receptors	-	1,1-DCA 1,1-DCE Naphthalene Cobalt Nickel	-	Nickel	95% UCL mean of nickel concentrations below Tier-1, limited extent	
2 - Aircraft Wash Rack	Airport Workers	TPPH TPH as Diesel TPH as Jet Fuel	Naphthalene Xylenes TPH as Diesel	-	-		No Further Action
	Construction Workers	TPPH TPH as Diesel TPH as Jet Fuel Arsenic	-	-	-		
	Ecological Receptors	-	Naphthalene Xylenes TPH as Diesel Cadmium Copper Lead Nickel Zinc	-	Nickel	95% UCL mean of nickel concentrations below Tier-1, limited extent, the elevated detections were only detected during one of two sampling events	
3 - Industrial Wastewater Vault	Airport Workers	-	-	-	-		No Further Action
	Construction Workers	Arsenic Cadmium Chromium Copper Molybdenum Nickel	-	Arsenic Cadmium Chromium[1]	-	95% UCL mean of arsenic concentrations below Tier-1, likely background 95% UCL mean of cadmium concentrations below Tier-1, limited extent See note [1] below, 95% UCL mean of chromium concentrations below Tier-1, likely background	
	Ecological Receptors	-	Nickel	-	-		
4 - Aboveground Fuel Storage Tank	Airport Workers	-	-	-	-		No Further Action
	Construction Workers	-	-	-	-		
	Ecological Receptors	-	-	-	-		
5 - Vehicle Maintenance Center	Airport Workers	-	-	-	-		No Further Action
	Construction Workers	Chromium	-	Chromium[1]	-	See note [1] below, 95% UCL mean of chromium concentrations below Tier-1, likely background	
	Ecological Receptors	-	-	-	-		
6 - Boiler and Aboveground Diesel Storage Tank	Airport Workers	-	-	-	-		No Further Action
	Construction Workers	-	-	-	-		
	Ecological Receptors	-	-	-	-		
7 - Former 90-Day Hazardous Waste Accumulation Area	Airport Workers	-	-	-	-		No Further Action
	Construction Workers	-	-	-	-		
	Ecological Receptors	-	1,1-DCE Arsenic Nickel	-	-		
8 - Current 90-Day Hazardous Waste Accumulation Area	Airport Workers	-	-	-	-		No Further Action
	Construction Workers	-	-	-	-		
	Ecological Receptors	-	-	-	-		
9 - Hazardous Material Storage Areas	Airport Workers	TPH as Motor Oil	-	-	-		No Further Action
	Construction Workers	TPH as Motor Oil Chromium	-	Chromium[1]	-	See note [1] below, 95% UCL mean of chromium concentrations below Tier-1, likely background	
	Ecological Receptors	-	-				
10 - Chemical Storage Area	Airport Workers	-	-	-	-		No Further Action
	Construction Workers	-	-	-	-		
	Ecological Receptors	-	-	-	-		

Area of Concern	Exposure Population	Chemicals Detected Above Tier-1 Soil Standard	Chemicals Detected Above Tier-1 Ground Water Standard	Chemicals Detected Above Tier-2 Soil Standard	Chemicals Detected Above Tier-2 Ground Water Standard	Notes Regarding Tier-2 Exceedances/Tier-3 Evaluation	Recommendation
11 - Aircraft Fueling/Defueling Equipment Area	Airport Workers	-	-	-	-		No Further Action
	Construction Workers	-	-	-	-		
	Ecological Receptors	-	-	-	-		
12 - Fire System Motors and Associated Fuel Tanks	Airport Workers	-	-	-	-		No Further Action
	Construction Workers	-	-	-	-		
	Ecological Receptors	-	-	-	-		
13 - Paint Spray Booth	Airport Workers	-	-	-	-		No Further Action
	Construction Workers	-	-	-	-		
	Ecological Receptors	-	-	-	-		
14 - Storm Drains	Airport Workers	-	-	-	-		No Further Action
	Construction Workers	-	-	-	-		
	Ecological Receptors	-	Beryllium Copper Lead	-	-		
15 - Aircraft Parking and Run Up Area	Airport Workers	-	-	-	-		No Further Action
	Construction Workers	-	-	-	-		
	Ecological Receptors	-	-	-	-		
16 - Fuel Spill Area on Taxiway	Airport Workers	-	-	-	-		No Further Action
	Construction Workers	-	-	-	-		
	Ecological Receptors	-	-	-	-		
17 - Former Vehicle Fueling USTs	Airport Workers	-	-	-	-		No Further Action
	Construction Workers	-	-	-	-		
	Ecological Receptors	-	Arsenic Nickel	-	-		
18 - Migration of Off-Site Solvent Plume onto OMC Property	Airport Workers	-	-	-	-		No Further Action
	Construction Workers	-	-	-	-		
	Ecological Receptors	-	-	-	-		
19 - Runoff From Pavement to Unpaved Area North of OMC	Airport Workers	TPH as Motor Oil	-	-	-		No Further Action
	Construction Workers	TPH as Motor Oil Arsenic Cadmium Chromium	-	Arsenic Chromium[1]	-	95% UCL mean of arsenic concentrations below Tier-1, likely background See note [1] below, 95% UCL mean of chromium concentrations below Tier-1, likely background	
	Ecological Receptors	-	-	-	-		

Notes:
[1]No Tier-2 standard was available for comparison of total chromium concentrations, so further analysis was conducted
TPH - Total Petroleum Hydrocarbons
DCA - Dichloroethane
DCE - Dichloroethene
TPPH = Total purgeable petroleum hydrocarbons

Appendix A
Fuel Spill Documentation

ENVIRONMENTAL SPILL REPORT
INCIDENT NUMBER 01-OAKC-1215

Report Date: 12/15/01 Reporter: MIKE MAREK

Spill Location: West Ramp Bay 2 Responsible Dept.: OAKUM.

How was Spill Discovered?/By Whom? DURING FUEL MAINTENANCE BY FUEL MECHANICS.

Date Spill Discovered? 12/15/01 Time Spill Discovered: 0830 (a.m.)/p.m.

Was Agency Notification Made? (Yes)/No Date and Time: 0830/12-15

Agencies Noftified FIRE DEPT.

and Name of

Contact

Spilled Material: JET A.

Volume of Material Spilled: ~25 GAL

Are Site Pictures Attached? Yes/(No)

Did Material Reach a Sewer? Yes/(No) Sewer Type: Industrial Drain Sanitary Sewer

Did Material Soak into Soil? Yes/(No) Estimated Volume:

Did Material Leave Property? Yes/(No) Volume:

Property (ies) /Stream (s) Effected? NONE.

Action Taken: (Containment, Disposal, Etc.) LEAK FROM AIRCRAFT FUEL FITTING - Stopped Leak - Applied ABSORBENT AND CLEANED UP AREA. F.D. Standby only - NO ACTION. PIAZZA MOBIL SWEEP CLEANED AREA AGAIN AFTER SPILL RESPONSE CLEAN-UP.

(Continue on Back)

Amount of Waste Generated: 110 GAL - Solid. How Marked: HAZ WASTE.

Waste Location: HAZ MAT YARD

Comments: See incident Report Attached

UNITED AIRLINES

OAKLAND MAINTENANCE CENTER

SECURITY - INCIDENT REPORT

DATE OF OCCURANCE: DEC 15,01 APPROX. TIME: 08:29 HRS

LOCATION OF INCIDENT: Oakum maintenance center - Outside , bay 2, ramp

VICTIMS NAME:	F/N :	ADDRESS:	SUPERVISOR :
747 aircraft #8194			
WITNESS NAME:		OAKUM	

SUSPECTS NAME:

AUTHORITIES NOTIFIED: yes

NOTES: Fuel spill - bay 2, Oakland Fire Dept. contacted. To respond -moc

NARRATIVE OF FACTS SURROUNDING INCIDENT: (INCLUDING ACTIONS & CONVERSATION BY SUSPECT(S), VICTIM(S) ,WITNESS, & OTHER EVENTS NOT PREVIOUSLY COVERED.

On the date & time mention above , I received a telephone call from bay 2, informing me to contact the Oakland Fire Dept, due to a fuel spill, that occurred on Aircraft 8194 (747) parked outside bay 2 , on the ramp.

At 08:30 hrs I contacted the Oakland Fire Dept. to respond to bay 2 .

At 08:38 hrs the Oakland Fire Dept. (1 unit) was on scene - bay 2 .standing-by , while united airlines personnel contain, laying absorbent around the fuel spill , prevent it to spread .

At 08:55 hrs , the Oakland Fire Dept. departed. All under control.

Summary : appearently the #2 main fuel line sump pump valve malfuntions. Causing fuel leak of 25 plus gallons on fuel .

Fuel containment area approx. 15by 25 yds.

Report prepare by : R. Jay lead Security ofc.,

1100 Airport dr.
Oakland , Ca. 94621

AIRLINES

(Ref.: Reg. 5-12)

Ch

ACCIDENT DATE (mm/dd/yy)	OCCURRENCE TIME 0-2	REPORTED DATE TO MGMT	EMPLOYEE NAME (First, MI, Last)
12-15-01	0:8:30	8:35	Mike Marek

AIRPORT CODE | LOCATION DETAIL

HOME ADDRESS [redacted]

WITNESS (File Number # UAI NAME, ADDRESS, WORK PHONE NUMBER

CITY, STATE, ZIP [redacted]

ORGANIZATION NUMBER [redacted] JOB GROUP [redacted] JOB CODE [redacted] JOB TITLE

PHYSICIAN'S NAME/FACILITY

EMPLOYEE TYPE (F.T., P. Other) [redacted] COMPANY SENIORITY DATE [redacted] JOB CLASS 5

STREET ADDRESS

SOCIAL SECURITY NUMBER [redacted] DATE OF BIRTH [redacted] SEX

CITY, STATE, ZIP

TIME EMPLOYEE BEGAN WORK [redacted] DUTY TIME INJURY Yes / No DATE OF DEATH FITNESS FOR

DAYS LOST	ESTIMATED Yes / No	FROM DATE (mm/dd/yy)	TO DATE (mm/dd/yy)
DAYS RESTRICTED	ESTIMATED Yes / No	FROM DATE (mm/dd/yy)	TO DATE (mm/dd/yy)

BRIEF DESCRIPTION OF INJURY/ILLNESS [redacted]

REQUESTED / CONDUCTED / ON DATE

DAMAGE — DAMAGE TO

NATURE: ☑ Aircraft ☐ Ground Equipment ☐ Facilities ☐ Aircraft Removable Equipment — OTHER: ☐ Fire ☐ Flammable Liquid Spill ☐ Potential Accident

EQUIP DAMAGE: AIRCRAFT NUMBER | AIRCRAFT TYPE | GROUND EQUIPMENT MAKE | GROUND EQUIPMENT MODEL

EQUIP PT DAMAGE: COST TO REPAIR (List each unit separately) ☐ Estimated ☐ Actual $

SOURCE | ACCIDENT TYPE | HAZARD COND | AGENCY | AGENCY PART | UNSAFE ACT | LOCATION | UPLINE STATION | FLIGHT NUMBER | COST | DELAY | CANCELLATION

NATURE AND EXTENT OF INJURY / ILLNESS / DESCRIPTION OF DAMAGE

Fuel mechanic Mike Marek File 92736 was assigned to Aircraft 8194, which was being returned to service after being in storage. The aircraft was parked outside of bay two on the ramp. He was sumping the fuel tanks using the bottle method. To accomplish this you have to insert the tool onto the sump drain and it opens both the lower out side the tank poppet valve and the upper inside the tank poppet valve. When he started the process on the number 3 main fuel tank he inserted sump tool into the drain and then removed it after he got the fuel sample, and both valves stuck in the open position. He tried to reseat the valves with the sump tool without success. Mike saw me in bay two and told me what was happening. I phoned security and asked for the fire trucks to be sent to the aircraft. I called the control center and had them announce base wide for help combating the fuel spill. Mike moved a fuel drum out to the aircraft and put it under the spill and he and other mechanics started to build a berm around the spill, other mechanics brought more fuel containers to the sight and helped contain the spill. Mechanic Kam Thompson file 104391 then started working trying to get the poppet valves to close with a long screwdriver, and we started to pump fuel from 3 main to other tanks. After a few tries Kam was successful in getting one of the poppet valves to close and stopped the spill. Note * Kam Thompson work under these stressful conditions of an active fuel spill was outstanding and I personally will be given him letter of accommodation. The spill that hit the ground was approximately forty gallons in an area about thirty five feet by forty feet. I meet with the fire chief on sight and he was satisfied with our action in containing the spill and the clean up in progress, he took vital information from me and then they departed. After the fuel was removed from the 3 tank the lower poppet valve was removed and was replaced with a new unit. The upper valve was checked for proper operation and was not replaced. After the inspection and repair was accomplished we then filled number 3 tank and checked valves for proper operation several times with no problems. The control center sent Dis*27995 to all required parties. Piazza Mobil Sweep has been called and will sweep the area again.

United Notification Group ____

COMPANY ADDRESS CODES:

Alexsis Notification Yes / No ____

UA Contact Name: ____

Phone ____

Workers' Comp Review Requested Yes / No ____

INVESTIGATOR			APPROVED BY		
Please Type:	FILE NUMBER	DATE	Please Type:	FILE NUMBER	DATE
Name:					

ENSR International
10324 Placer Lane
Suite 200
Sacramento, CA 95827-2511
(916) 362-7100
FAX (916) 362-8100
www.ensr.com

August 21, 2001
Project 6908-185-100

Mr. Barny Chan
Alameda County Department of Environmental Health
1131 Harbor Bay Parkway, 2nd Floor
Alameda, California, 94502

Subject: **Taxiway Fuel Spill and Response**
Oakland International Airport
Taxi-way B-10, 1100 Airport Drive
Oakland, California

Dear Mr. Chan:

ENSR Corporation (ENSR) on behalf of United Airlines, is submitting this letter-report documenting a taxi-way fuel spill, soil removal, and soil sampling performed at the Oakland International Airport, Taxi-way B-10, 1100 Airport Drive, Oakland, California **(Figure 1).**

Spill Response

On July 2, 2001, approximately 15-gallons of jet fuel spilled from the wings of an airplane, while being refueled on taxiway B-10. Mr. Herman Amaral with United Airlines contacted the Alameda County Fire Department and Foss Environmental to perform spill response activities. The fire department washed down the taxiway, which resulted in the run-off of spilled fuel and wash water onto the adjacent soils located east and west of the taxiway **(Figure 2)**. Foss Environmental hand shoveled impacted surface soil into 55-gallon drums. Mr. Peter Rasco with ENSR was contacted to perform over-site and soil sampling activities.

On July 3, 2001, a backhoe was used to excavate the remaining impacted soil to depths of 2.0 feet to 4.0 feet below grade surface (bgs) for the west area, and to a depth of three-inches for the east area. A total of 13.17 tons of jet fuel impacted soil was removed, loaded, and transported to TPS Technologies Inc., located in Richmond, California, and remediated by thermal desorption. A copy of the waste manifest is presented in **Appendix A**. For safety reasons the excavation was back-filled on the same day.

Soil Sampling

On July 3, 2001, ENSR collected a total of seven soil samples from the excavation sidewalls and excavation floors. Grab soil samples were collected in pre-cleaned glass jars, sealed, labeled and placed in an ice chest pending delivery to the analytical laboratory.

On July 18, 2001, ENSR collected a total of eight soil samples using a hand auger and slide hammer. The purpose of the soil sampling was to further define the lateral and vertical extent of impacted soil. The sampling equipment was decontaminated prior to collecting each sample. Soil samples were collected in pre-cleaned 2-inch by 6-inch brass sample sleeves. All sample containers were sealed, labeled and kept in an ice chest pending delivery to the analytical laboratory. Soil sample SS-5 @ 3' was put on hold pending the result of soil sample SS-4 @ 1.5'. Shallow surface soils encountered consisted of fine sand. Selected soil sample locations are shown on **Figure 2**.

Laboratory Analysis and Results

Soil samples were submitted, in accordance with chain-of-custody protocol, to McCampbell Analytical Inc., a California state certified analytical laboratory, for chemical analysis. Soil samples were analyzed by the following Environmental Protection Agency (EPA) analytical methods:

- EPA Method 8015, for total petroleum hydrocarbons (TPH) as jet fuel; and
- EPA Method 8020, for Benzene, Toluene, Xylenes, and Ethylbenzene (BTXE).

Soil sample results are summarized below and in **Table 1**. The laboratory analytical report is presented in **Appendix B**. The following constituents of concern were detected in soil samples collected from the excavations:

- In soil sample 'North Wall', laboratory analysis detected the presence of TPH as jet fuel at 630 milligrams per kilogram (mg/kg), ethylbenzene at 0.17 mg/kg, and xylenes at 1.3 mg/kg;
- In soil sample 'West Wall', laboratory analysis detected the presence of TPH as jet fuel at 4.0 mg/kg;

- In soil sample 'East Area', laboratory analysis detected the presence of TPH as jet fuel at 330 mg/kg, toluene at 0.17 mg/kg, ethylbenzene at 0.82 mg/kg, and xylenes at 4.4 mg/kg;

- In soil sample 'FLOOR', laboratory analysis detected the presence of TPH as jet fuel at 1.2 mg/kg; and

- In soil sample SS-8 @ 0-0.5", laboratory results detected the presence of TPH as jet fuel at 3.0 mg/kg.

Conclusions

Based on laboratory analytical results the lateral and vertical extent of petroleum hydrocarbon impacted soil has been defined and the majority of the impacted soil was removed. The occurrence of TPH as jet fuel at concentrations exceeding 100 mg/kg is limited to near surface soil at two locations. Benzene was not detected in any soil samples. Natural attenuation processes will reduce the remaining localized residual hydrocarbon mass in shallow soil.

Based on source removal actions, limited extent of impact and no apparent threat to human health or the environment, ENSR is requesting **"No Further Action"** for this site, from the Alameda County Environmental Health Department, and the San Francisco Bay Regional Water Quality Control Board (RWQCB).

Limitations

This report documents the procedures and results of soil sampling associated with a taxi-way fuel spill, and has been prepared on behalf of United Airlines, under the master service agreement dated December 31, 1996. In performing our professional services, we have attempted to apply present engineering and scientific judgment and use a level of effort consistent with the standard of practice measured on the date the work was performed in the locale of the project site for similar type studies.

ENSR INTERNATIONAL

If you have any questions or comments regarding this letter report, please call Alan Klein at (916) 362-7100.

Sincerely,
ENSR Corporation

Alan J. Klein, R.E.A. II
Sr. Environmental Scientist

Mark Capps, R.G.
Senior Project Geologist

Attachments: Figures 1 and 2
Appendix A – Waste Manifest
Appendix B – Analytical Laboratory Report

cc: Mr. Dennis Moulton, United Airlines
Mr. Dale Klettke, Port of Oakland Environmental Compliance Department

TAE . 1

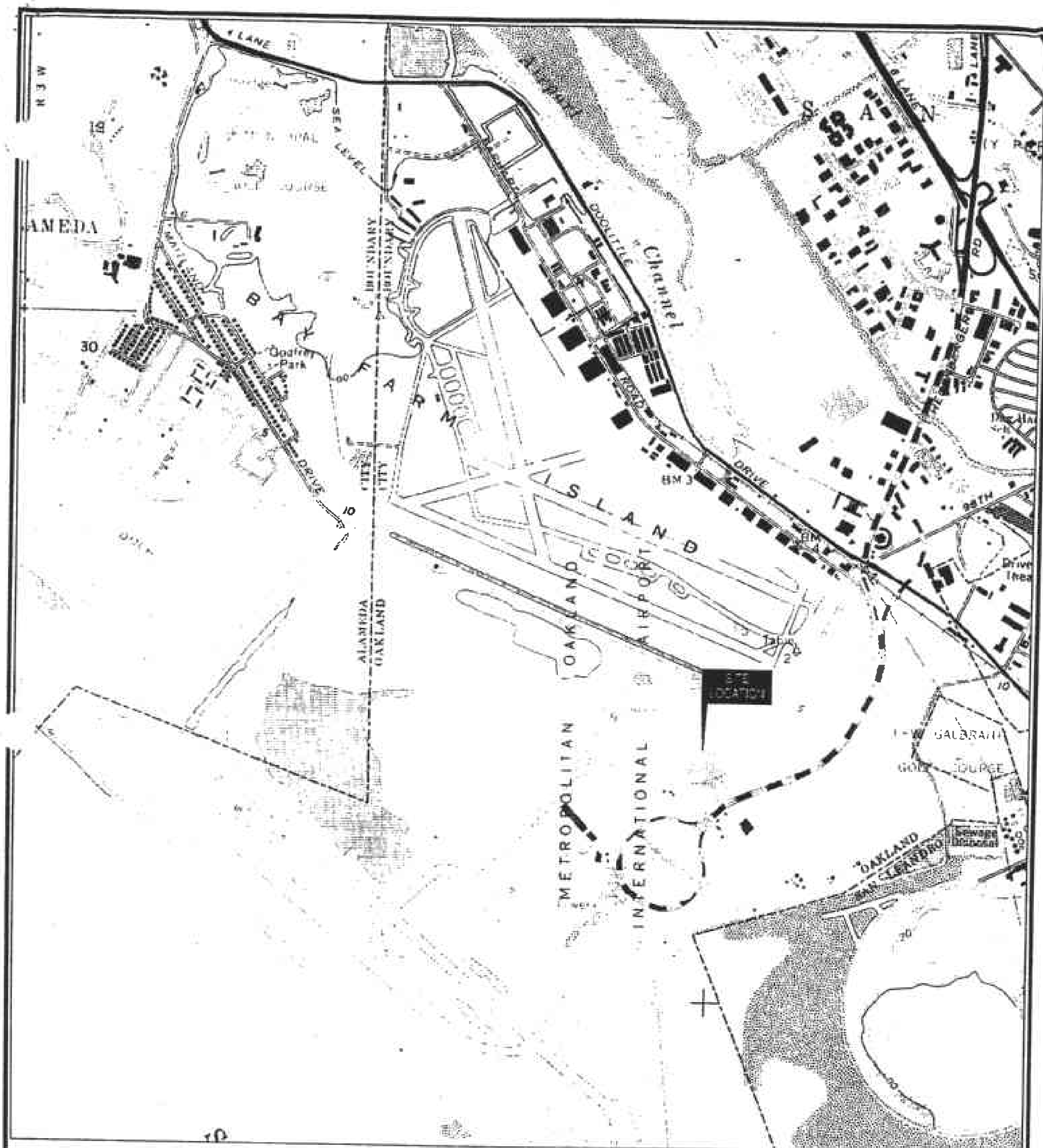
United Airlines – Oakland Airport
Soil Sampling Results

SAMPLE ID	SAMPLE DATE	Results in mg/kg				
		TPH (jf)	Benzene	Toluene	Ethylbenzene	Xylenes
WEST WALL	07/03/01	4.0	<0.005	<0.005	<0.005	<0.005
EAST WALL	07/03/01	<1.0	<0.005	<0.005	<0.005	<0.005
NORTH WALL	07/03/01	630	<0.005	ND<0.020	0.17	1.3
SOUTH WALL	07/03/01	<1.0	<0.005	<0.005	<0.005	<0.005
FLOOR	07/03/01	1.2	<0.005	<0.005	<0.005	<0.005
SUB FLOOR	07/03/01	<1.0	<0.005	<0.005	<0.005	<0.005
EAST AREA	07/03/01	330	<0.005	0.17	0.82	4.4
SS-1	07/18/01	<1.0	<0.005	<0.005	<0.005	<0.005
SS-2 @ 2'	07/18/01	<1.0	<0.005	<0.005	<0.005	<0.005
SS-3 @ 4'	07/18/01	<1.0	<0.005	<0.005	<0.005	<0.005
SS-4 @ 1.5'	07/18/01	<1.0	<0.005	<0.005	<0.005	<0.005
SS-6 @ 0-0.5'	07/18/01	<1.0	<0.005	<0.005	<0.005	<0.005
SS-7 @ 0-0.5'	07/18/01	<1.0	<0.005	<0.005	<0.005	<0.005
SS-8 @ 0-0.5'	07/18/01	3.0	<0.005	<0.005	<0.005	<0.005

Notes:

TPH (jf) = Total petroleum hydrocarbons as jet fuel

mg/kg = milligrams per kilograms



USGS 7.5 MINUTE TOPOGRAPHICAL QUADRANGLE
SAN LEANDRO, CA; 1959, PHOTOREVISED 1980

NORTH

0 — 2000'
SCALE

ENSR

FIGURE 1

SITE LOCATION MAP

United Airlines
Oakland International Airport
Oakland, California

Drawn By: A. Churchill	Date: 8/8/01	PROJECT NO.	REV.
File Name: Cad:\ENSR\6908\185\fig 1		06908-185-200	

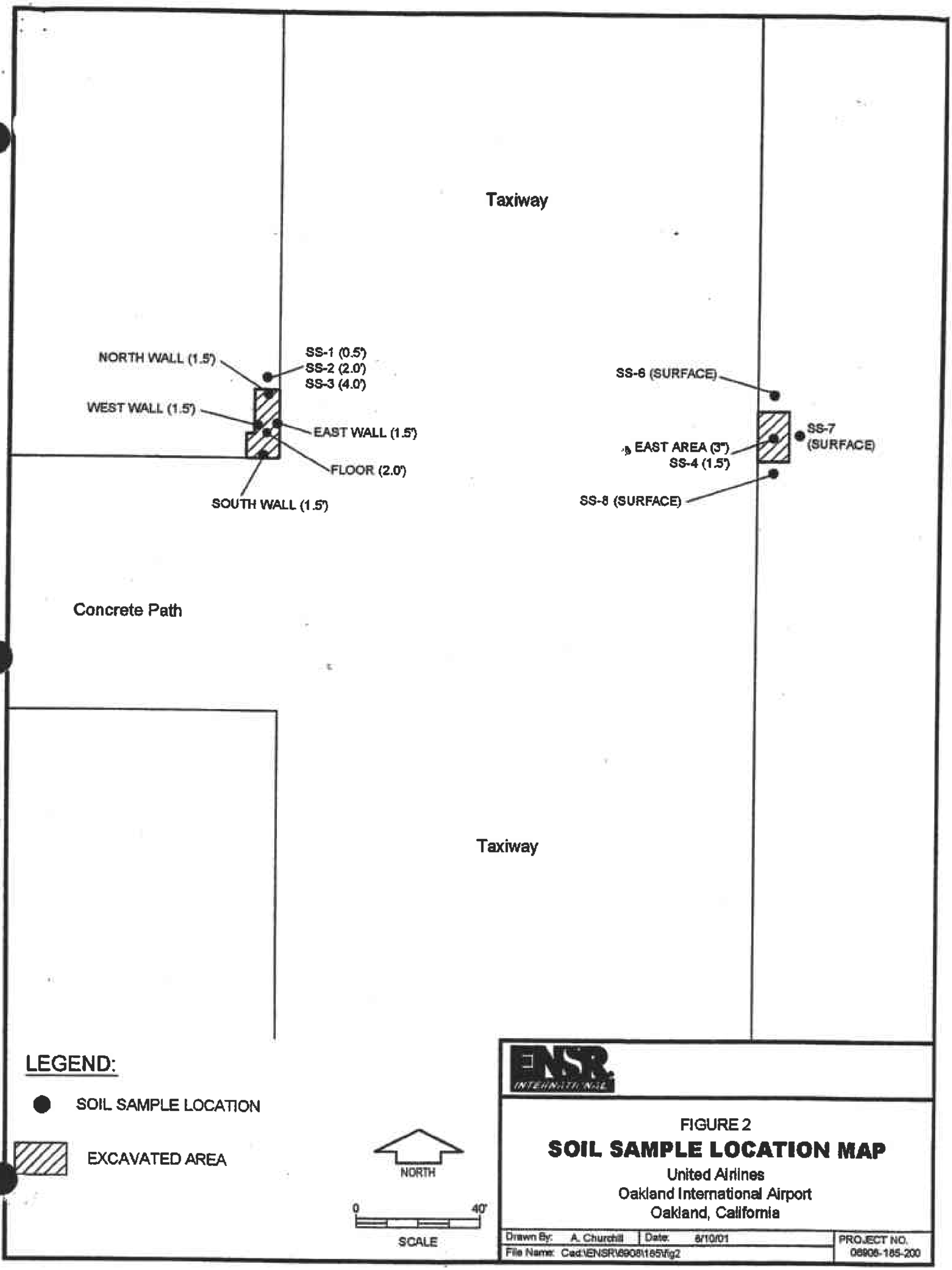


FIGURE 2
SOIL SAMPLE LOCATION MAP
United Airlines
Oakland International Airport
Oakland, California

APPENDIX A

WASTE MANIFESTS

Soil Master (c)

TPS Technologies, Inc.

Customer Job Report

Gross & Tare Weight Codes: M=Manual; S=Scale; T=Trk File

Job Number Name	SiteAddress	SiteCity	State	ZipCode
A04 -- 00942 United Airlines	1100 Airport Drive	Oakland	CA	94621

Load #	Date & Time Out	Transporter #	Truck & Trailer Number	Gross (lb)	Tare (lb)	Net (lb)	Net Wt (tons)
1	07/12/01 09:24			52,380M	26,040M	26,340	13.17

Completed Loads	Manifests Received	Completed Weight	Estimated Weight	TOTAL Net Wt:
100.00%	1	131.70%	10.00 (tons)	13.17 (tons)

Manifest

Bay Soil Remediation

Non-Hazardous Soils

Date of Shipment:	Responsible for Payment: Generator	Transporter Truck#:	Facility #: A04	Job No. 00942	Load # 001

Generator and/or Consultant

Generator's Name and Billing Address: United Airlines, 1100 Airport Drive, Oakland, CA 94621 USA	Generator's Phone # (510) 382-8020	Generator's US EPA ID NO.
	Person to Contact: Dennis Moulton	
	FAX # (510) 382-8046	Customer Account Number: 4OAKAIR
Consultant's Name and Billing Address: ENSR, 1420 Harbor Bay Parkway, Suite 120, Alameda, CA 00000 USA	Consultant's Phone #	
	Person to Contact: Peter Rasco	
	FAX # (510) 748-6799	Customer Account Number: 4ENSRAL
Generation Site (Transport from): *(name & address)* United Airlines, 1100 Airport Drive, Oakland, CA 94621 USA	Site Phone # (510) 382-8020	BTEX Levels
	Person to Contact: Dennis Moulton	TPH Levels
	FAX # (510) 382-8046	AVG. Levels
Designated Facility (Transport to): *(name & address)* Bay Soil Remediation, 20 Recycling Lane, Richmond, CA 94801 USA	Facility Phone # 415-235-8778	Facility Permit Numbers
	Person to Contact: Debra Tuchsen	
	FAX # 510-231-4154	
Transporter Name and Mailing Address:	Transporter's Phone #	Transporter's US EPS ID No.:
	Person to Contact	Transporter's DOT No.:
	FAX #	Customer Account Number:

Description of Soil	Moisture Content	Contaminated by:	Approx.Qty:	Description of Delivery	Gross LBS	Tare LBS	Net LBS
Sand ☐ Organic ☐ Clay ☐ Other ☐	0-10% ☐ 10-20% ☐ 20% -over ☐	Gas ☐ Diesel ☐ Other ☐			380	040	340
Sand ☐ Organic ☐ Clay ☐ Other ☐	0-10% ☐ 10-20% ☐ 20% -over ☐	Gas ☐ Diesel ☐ Other ☐			51,	26,	25,
List any exception to items listed above.							13.17

Generator's and/or certification: I/We certify that the soil referenced herein is taken entirely from those soils described in the Soil Data Sheet completed and certified by me/us for the Generation site shown above and nothing has been added or done to such soil that would alter it in any way.

Print or Type Name: Generator ☐ Consultant ☐ | Signature and date: Month Day Year

Transporter

Transporter's certification: I/We acknowledge receipt of the soil described above and certify that such soil is being delivered in exactly the same condition as when received. I/We further certify that this soils is being directly transported from the Generation Site to the Designated Facility without off-loading, adding to, subtracting from or in any way delaying delivery to such site.

Print or Type Name: | Signature and date: Month Day Year

Recycling Facility

Discrepancies:

[signature] 7/12/01

Recycling Facility certifies the receipt of the soil covered by this manifest except as noted above:

Print or Type Name: X Joe Lopez | Signature and date: X [signature]

Manifest

Bay Soil Remediation

Non-Hazardous Soils

Manifest

Date of Shipment:	Responsible for Payment:	Transporter Truck#:	Facility #:	Job No.	Load #
	Generator		A04	00942	001

Generator's Name and Billing Address: United Airlines, 1100 Airport Drive, Oakland, CA 94621 USA
Generator's Phone #: (510) 382-8020
Person to Contact: Dennis Moulton
FAX #: (510) 382-8046
Generator's US EPA ID NO.:
Customer Account Number: 4OAKAIR

Consultant's Name and Billing Address: ENSR, 1420 Harbor Bay Parkway, Suite 120, Alameda, CA 00000 USA
Consultant's Phone #:
Person to Contact: Peter Rasco
FAX #: (510) 748-6799
Customer Account Number: 4ENSRAL

Generation Site (Transport from): (name & address) United Airlines, 1100 Airport Drive, Oakland, CA 94621 USA
Site Phone #: (510) 382-8020
Person to Contact: Dennis Moulton
FAX #: (510) 382-8046
BTEX Levels:
TPH Levels:
AVG. Levels:

Designated Facility (Transport to): (name & address) Bay Soil Remediation, 20 Recycling Lane, Richmond, CA 94801 USA
Facility Phone #: 510-231-8778
Person to Contact: Debra Tuchsen
FAX #: 510-231-4154
Facility Permit Numbers:

Transporter Name and Mailing Address: FOSS ENVIRONMENTAL SERVICES Co, 1605 FERRY POINT, ALAMEDA, CA 94501
Transporter's Phone #: 510-749-1390
Person to Contact: RICH LODGE
FAX #:
Transporter's US EPS ID No.:
Transporter's DOT No.:
Customer Account Number:

Description of Soil	Moisture Content	Contaminated by:	Approx. Qty:	Description of Delivery	Gross LBS	Tare LBS	Net LBS
Sand ☒ Organic ☐ Clay ☐ Other ☐	0-10% ☒ 10-20% ☐ 20% -over ☐	Gas ☐ Diesel ☐ Other ☒ JET FUEL	10 CY				
Sand ☐ Organic ☐ Clay ☐ Other ☐	0-10% ☐ 10-20% ☐ 20% -over ☐	Gas ☐ Diesel ☐ Other ☐					
List any exception to items listed above.							

Generator's and/or certification: I/We certify that the soil referenced herein is taken entirely from those soils described in the Soil Data Sheet completed and certified by me/us for the Generation site shown above and nothing has been added or done to such soil that would alter it in any way.

Print or Type Name: DENNIS MOULTON Generator ☒ Consultant ☐
Signature and date: [signature] Month Day Year

Transporter

Transporter's certification: I/We acknowledge receipt of the soil described above and certify that such soil is being delivered in exactly the same condition as when received. I/We further certify that this soils is being directly transported from the Generation Site to the Designated Facility without off-loading, adding to, subtracting from or in any way delaying delivery to such site.

Print or Type Name:
Signature and date: Month Day Year

Recycling Facility

Discrepancies:

Recycling Facility certifies the receipt of the soil covered by this manifest except as noted above:

Print or Type Name:
Signature and date

Generator and/or Consultant

FACILITY COPY

Richmond, California
Soil Recycling Facility

BAY SOIL REMEDIATION
Soil Data and Certification Sheet

Date. 7/09/01

Generator/Client: UNITED AIRLINES	Consultant: ENSR
Mailing Address: 1100 AIRPORT DR	Address: 1420 HARBOR BAY PARKWAY Suite 120
OAKLAND, CA 94621	
Phone: 510-382-8020	Phone: 510 748 6700
Contact Name: DENNIS MOULTON	Contact Name: PETER RASCO
Fax: 510 382-8046	Fax: 510 748-6799
	Testing Lab: McCAMPBELL ANALYTICAL INC
Site Name: SAME	State Certification No: 644
Address:	Address: 110 2nd AVE South #D7
	PACHECO, CA 94553
Phone: SAME	Phone: 925-798-1620
Contact Name:	Contact Name:
Fax:	Fax: 925-798-1622

SITE HISTORY

Type of Contamination: unleaded/leaded gas, diesel, waste oil, coal tar, etc: Virgin Jet Fuel Est. Qty. (Tons): 10

Source of Contamination: ☐UST ☐AST ☒Spill ☐ Other: ______

Sampling Procedure: ☒Stockpile ☐ In-situ Please attach a map of sample location(s)

Please check appropriate box below and attach all required analytical reports. Unless otherwise noted, composite samples should be collected with the following frequency: 1 sample for 100 cu. yds. or less; 3 samples for 500 cu. yds. or less; 5 samples for 1,000 cu. yds or less; and an additional 1 sample for each additional 500 cu. yds. greater than 1,000 cu. yds.

☐ I/We certify that the soil referenced herein is contaminated solely by virgin petroleum products from leaking underground storage tank(s) at a non-industrial site. Attached is analytical data from a state-certified lab for the following:

I. Total Petroleum Hydrocarbons (TPH, EPA mod. Method 8015)
II. Benzene/Toluene/Ethylbenzene/Xylene (BTEX, EPA Method 8020)

NOTE: For contamination from leaded petroleum products or from an industrial site, the following additional testing is required:

III. Total lead (EPA 7420 or 7421)
IV. Additional analytical data as required.

☒ I/We certify that some or all of the contaminants in the soil referenced herein is waste oil or some other non virgin petroleum product, or virgin petroleum product from something other than a leaking underground storage tank. Attached is analytical data from a state-certified lab for the following:

I. Total metals concentration for a) through q) below (TTLC test)

a)Antimony	g)Cobalt	m)Selenium	NOTE: If the total metals concentration for any item a) thru q) is greater than 10 times its Soluble Threshold Limit Concentration (STLC), the soluble metal concentration must be determined
b)Arsenic	h)Copper	n)Silver	
c)Barium	i)Lead	o)Thalium	
d)Beryllium	j)Mercury	p)Vanadium	
e)Cadmium	k)Molybdenum	q)Zinc	
f)Chromium	l)Nickel		

II. TPH by either EPA Method 418.1 or EPA Modified Method 8015
III. BTEX by EPA Method 8020
IV. Total Organic Halogens (TOX) by EPA Method 9020 with a min. 10 ppm detection limit, or EPA 8240 and 8080 (Acceptable substitutes for an 8240 are EPA Methods 8010 and 8260)
V. Additional analytical data as required. by the Waste Extraction Test (WET) Procedure

No soils referenced herein may be delivered until the foregoing certificate is received and approved by TPST, and TPST issues manifests and assigns a delivery date. If any soils delivered to TPST are found to be "hazardous waste" pursuant to federal or state regulations, Client shall be solely responsible for their removal. If Client fails to so remove such soils, TPST, acting as Client's agent, may arrange for such removal at Client's expense.

This is a complete and accurate description of the soil referenced herein; no deliberate or willful omissions have been made and all known or suspected hazards have been disclosed herein. I/We certify that the soil is not "hazardous" as defined by U.S. Department of Transportation (DOT), U.S. Environmental Protection Agency (EPA), State or local regulations. I/We further Certify that the soils referenced herein contain no free liquids. All required analysis reports are attached.

Company Authorized Signature Type (Please check one). ☐Engineer/Environmental Firm ☒Generator

Authorized Signatory: [signature] Date: 7/09/01

Print Name: DENNIS MOULTON Title: Sr STAFF REPRESENTATIVE - ENVIRONMENTAL SAFETY

APPENDIX B

LABORATORY ANALYTICAL REPORT

McCAMPBELL ANALYTICAL INC.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
http://www.mccampbell.com E-mail: main@mccampbell.com

ENSR 1420 Harbor Bay Parkway Suite 120 Alameda, CA 94502	Client Project ID: #6908-XXX; United Fuel Spill	Date Sampled: 07/03/01
		Date Received: 07/03/01
	Client Contact: Peter Russo	Date Extracted: 07/03/01
	Client P.O:	Date Analyzed: 07/03/01

07/10/2001

Dear Alan:

Enclosed are:

1). the results of 7 samples from your **#6908-XXX; United Fuel Spill** project,

2). a QC report for the above samples

3). a copy of the chain of custody, and

4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
http://www.mccampbell.com E-mail: main@mccampbell.com

ENSR 1420 Harbor Bay Parkway Suite 120 Alameda, CA 94502	Client Project ID: #6908-XXX; United Fuel Spill	Date Sampled: 07/03/01
		Date Received: 07/03/01
	Client Contact: Peter Russo	Date Extracted: 07/03/01
	Client P.O:	Date Analyzed: 07/03-07/10/01

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with Methyl tert-Butyl Ether* & BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g)[+]	MTBE	Benzene	Toluene	Ethyl-benzene	Xylenes	% Recovery Surrogate
71802	West Wall	S	---	---	ND	ND	ND	ND	97
71803	East Wall	S	---	---	ND	ND	ND	ND	101
71804	North Wall	S	---	---	ND	ND<0.020	0.17	1.3	111
71805	South Wall	S	---	---	ND	ND	ND	ND	95
71806	Floor	S	---	---	ND	ND	ND	ND	97
71807	Sub Floor	S	---	---	ND	ND	ND	ND	106
71808	East Area	S	---	---	ND	0.17	0.82	4.4	111
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	5.0	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.05	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP and SPLP extracts in ug/L

cluttered chromatogram; sample peak coelutes with surrogate peak

+The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5 vol. % sediment; j) no recognizable pattern.

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
http://www.mccampbell.com E-mail: main@mccampbell.com

ENSR 1420 Harbor Bay Parkway Suite 120 Alameda, CA 94502	Client Project ID: #6908-XXX; United Fuel Spill	Date Sampled: 07/03/01
		Date Received: 07/03/01
	Client Contact: Peter Russo	Date Extracted: 07/03/01
	Client P.O:	Date Analyzed: 07/03-07/06/01

Jet Fuel Range (C9-C18) Extractable Hydrocarbons as Jet Fuel *

EPA methods modified 8015, and 3550 or 3510; California RWQCB (SF Bay Region) method GCFID(3550) or GCFID(3510)

Lab ID	Client ID	Matrix	TPH(jf)+	% Recovery Surrogate
71802	West Wall	S	4.0,e	100
71803	East Wall	S	ND	101
71804	North Wall	S	630,e	100
71805	South Wall	S	ND	101
71806	Floor	S	1.2,e	97
71807	Sub Floor	S	ND	102
71808	East Area	S	330,e	105
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	
		S	1.0 mg/kg	

* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP / STLC / SPLP extracts in ug/L

cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

+The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified diesel is significant; b) diesel range compounds are significant; no recognizable pattern; c) aged diesel? is significant); d) gasoline range compounds are significant; e) medium boiling point pattern that does not match diesel (kerosene?); f) one to a few isolated peaks present; g) oil range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5 vol. % sediment.

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC.

110 2nd Ave. South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
http://www.mccampbell.com E-mail: main@mccampbell.com

QC REPORT

EPA 8015m + 8020

Date: 07/03/01

Matrix: Soil

Compound	Concentration: ug/kg				%Recovery		RPD
	Sample	MS	MSD	Amount Spiked	MS	MSD	
SampleID: 70201	Extraction: EPA 5030				Instrument: GC-3		
Surrogate1	ND	98.000	99.000	100.00	98	99	1.0
Xylenes	ND	0.317	0.308	0.30	106	103	2.9
Ethylbenzene	ND	0.104	0.101	0.10	104	101	2.9
Toluene	ND	0.102	0.098	0.10	102	98	4.0
Benzene	ND	0.098	0.095	0.10	98	95	3.1
MTBE	ND	0.107	0.104	0.10	107	104	2.8
TPH (gas)	ND	0.965	0.967	1.00	96	97	0.2
SampleID: 62901	Extraction: TTLC				Instrument: MB-1		
Oil & Grease	ND	20.000	20.000	20.80	96	96	0.0
SampleID: 70201	Extraction: EPA 3550				Instrument: GC-11 B		
Surrogate1	ND	112.000	112.000	100.00	112	112	0.0
TPH (diesel)	ND	165.000	164.000	150.00	110	109	0.6

$$\% \text{ Recovery} = \frac{(MS - Sample)}{AmountSpiked} \cdot 100$$

CHAIN OF CU ODY RECORD 2665ENS 72.d

Client/Project Name	Project Location
UNITED - FUEL SPILL	Oakland, CA
Project No. 6908-XXX	**Field Logbook No.**
Sampler: (Signature) Pete Rasco	**Chain of Custody Tape No.**

ANALYSES: ~~[illegible]~~ BTEX; TPH modified as Jet Fuel w/BTEX

Sample No./ Identification	Date	Time	Lab Sample Number	Type of Sample	Analysis			REMARKS
WESTWALL	7/3/01	1515	71802	soil	X			REGULAR TURNAROUND
EASTWALL	↓	1520	71803	↓	X			
NORTHWALL		1525			X			
SOUTH WALL		1530	71804		X			
FLOOR		1535			X			
SUB FLOOR		1540	71805		X			
EAST AREA		1545	71806		X			

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Pete Rasco	7/3/01	16:40	Am TLC		
Am TLC	7/3	17:38	Received by: 71807		
Relinquished by: (Signature)			Received for Laboratory: (Signature) [signature]	7/3	17:38
Sample Disposal Method:			Disposed of by: (Signature) 71808		

ICE/t° ✓ | PRESERVATION | VOAS | O&G | METALS | OTHER

GOOD CONDITION ✓ | APPROPRIATE CONTAINERS ✓

HEAD SPACE ABSENT ____

SAMPLE COLLECTOR

ENSR Consulting and Engineering
1220 Avenida Acaso
Camarillo, Ca. 93010
~~(805) 388-3775~~ 510-748-6700

ANALYTICAL LABORATORY

McCampbell Analytical
Pacheco, CA 94553
925-798-1620

ENSR

Nº 5370

1974-3-84

McCAMPBELL ANALYTICAL INC.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
http://www.mccampbell.com E-mail: main@mccampbell.com

ENSR 10324 Placer Lane, #200 Sacramento, CA 95827	Client Project ID: #6908-185.200; UAL Oakland	Date Sampled: 07/18/01 Date Received: 07/18/01
	Client Contact: Alan J. Klein	Date Extracted: 07/18/01
	Client P.O:	Date Analyzed: 07/18/01

07/25/2001

Dear Alan:

Enclosed are:

1). the results of 7 samples from your **#6908-185.200; UAL Oakland** project,

2). a QC report for the above samples

3). a copy of the chain of custody, and

4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Edward Hamilton, Lab Director

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http://www.mccampbell.com E-mail: main@mccampbell.com

ENSR 10324 Placer Lane, #200 Sacramento, CA 95827	Client Project ID: #6908-185.200; UAL Oakland	Date Sampled: 07/18/01 Date Received: 07/18/01
	Client Contact: Alan J. Klein	Date Extracted: 07/18-07/24/01
	Client P.O:	Date Analyzed: 07/19-07/24/01

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with Methyl tert-Butyl Ether* & BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g)⁺	MTBE	Benzene	Toluene	Ethyl-benzene	Xylenes	% Recovery Surrogate
72838	SS-1	S	ND	ND	ND	ND	ND	ND	108
72839	SS-2 @ 2'	S	ND	ND	ND	ND	ND	ND	109
72840	SS-3 @ 4'	S	ND	ND	ND	ND	ND	ND	102
72841	SS-4 @ 1.5'	S	ND	ND	ND	ND	ND	ND	97
72843	SS-6 @ 0-0.5'	S	ND	ND	ND	ND	ND	ND	111
72844	SS-7 @ 0-0.5'	S	ND	ND	ND	ND	ND	ND	111
72845	SS-8 @ 0-0.5'	S	ND	ND	ND	ND	ND	ND	105
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	5.0	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.05	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP and SPLP extracts in ug/L

cluttered chromatogram; sample peak coelutes with surrogate peak

⁺The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5 vol. % sediment; j) no recognizable pattern.

DHS Certification No. 1644

Edward Hamilton, Lab Director

M901376

26848 :ens74

ENSR

CHAIN OF CUSTODY RECORD

Page 1 of 1

Client/Project Name: UAL - OAKLAND

Project Location: OAKLAND

Project Number: 6908-185.200

Field Logbook No.:

Chain of Custody Tape No.:

Sampler: (Print Name) /Affiliation: ALAN J. KLEIN

Signature: Alan J. Klein

Send Results/Report to: ALAN KLEIN - SACRAMENTO

Analysis Requested: TPH - Jet FUEL; AND BTEX

Field Sample No./ Identification	Date	Time	Grab	Comp	Sample Container (Size/Mat'l)	Sample Type (Liquid, Sludge, Etc.)	Preservative	Field Filtered	TPH - Jet FUEL	AND BTEX			Lab No.	Remarks
SS-1@	7/18	11:45	X		BRASS 2"x6"	SOIL	ICE		X	X			72838	
SS-2@2'	↓	11:50	↓		↓	↓	↓		↓	↓			72839	
SS-3@4'	↓	12:05	↓		↓	↓	↓		↓	↓			72840	
SS-4@1.5'	↓	12:15	↓		↓	↓	↓		↓	↓			72841	
SS-5@3'	↓	12:25	↓		↓	↓	↓		↓	↓			72842 H	
SS-6@0-0.5	↓	12:35	↓		↓	↓	↓		↓	↓			72843	HOLD *
SS-7@0-0.5'	↓	12:45	↓		↓	↓	↓		↓	↓			72844	
SS-8@0-0.5'	↓	12:50	↓		↓	↓	↓		↓	↓			72845	

Relinquished by: (Print Name)	Date / Time	Received by: (Print Name)	Date / Time
ALAN J. KLEIN; Signature: Alan J. Klein	Date: 7/18; Time:	Maria Venegas; Signature: MAI	Date: 7/18; Time: 1517
Relinquished by: (Print Name); Signature:	Date:; Time:	Received by: (Print Name); Signature:	Date:; Time:
Relinquished by: (Print Name); Signature:	Date:; Time:	Received by: (Print Name); Signature:	Date:; Time:

Analytical Laboratory (Destination):
McCampbell Analytical Inc.
Pacheco, CA.
925/798-1620

Serial No. 35806

L:SV

Appendix B

Regulatory Closure Letters

MF-23/24

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

ENVIRONMI
ENVIRONMENTAL PROTECTION (LOP)
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

October 24, 1996
StID #1049

Mr. Jeffrey Rubin
Port of Oakland
530 Water St.
P.O. Box 2064
Oakland CA 94604-2064

Re: Tanks MF-23 and MF-24 at 1100 Airport Drive, Oakland International Airport

Dear Mr. Rubin:

Pursuant to our recent conversation regarding the above referenced tanks at the Oakland Airport site, this letter confirms that no further work will be required by our office in regards to the petroleum release from these two tanks. You should schedule the closure of the three monitoring wells at this site at your earliest convenience.

As you recall, since the above address also includes the site of former underground tanks MF-25 & MF-26, which have an on-going subsurface investigation, site closure and the Remedial Action Completion Certificate (RACC) will be withheld until the tank investigation for these tanks is complete.

You may contact me at (510) 567-6765 if you have any questions.

Sincerely,

Barney M Chan

Barney M. Chan
Hazardous Materials Specialist

c: B. Chan, files
Mr. N. Werner, Port of Oakland, P.O. Box 2064, Oakland CA, 94604-2064

MF23&24

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

April 23, 2001
StID # 1049

Mr. Dennis Moulton
United Airlines
1100 Airport Drive
Oakland CA 94621

Re: Underground Tank Investigation for UAL Building M-110, 1100 Airport Drive, Oakland, CA 94621

Dear Mr. Moulton:

This letter serves to notify you that no further work will be required from our office at this time regarding the underground tank investigation of the former 10,000 gallon gasoline and 10,000 gallon diesel tanks removed at the above site on January 1999. These tanks have been designated tanks MF35 and MF36 by the Port of Oakland. However, because this address, 1100 Airport Drive, has been used for two additional underground tank site investigations and one of these sites is still under County oversight, a formal "No Further Action" letter cannot be issued. In addition, our office cannot recommend monitoring well closure at this site since this is requested at the time of site closure.

We do not anticipate any additional work other than well closure for tanks MF35 and MF36, but we recommend waiting for site closure before well decommissioning.

You may contact me at (510) 567-6765 if you have any questions.

Sincerely,

Barney M. Chan

Barney M. Chan
Hazardous Materials Specialist

C: B. Chan, files
Mr. A. Klein, ENSR, 10324 Placer Lane, Suite 200, Sacramento, CA 95827
Mr. D. Klettke, Port of Oakland, 530 Water St., P.O. Box 2064, Oakland 94604-2064

Status1100Airport

cc - UA Ted Wells

Appendix C
Investigation Methods and Summary

APPENDIX C – INVESTIGATION METHODS AND SUMMARY

INVESTIGATION METHODS

The methods used for conducting pre-field, field, and laboratory tasks during the soil and ground water investigations are described in the following subsections. Figures and tables referenced in this appendix are located following the main text to this report.

Permits

Prior to initiation of the April 2003 investigation and subsequent well installation events in May and December 2003, ERM obtained boring and well permits from the Alameda County Public Works Agency, Water Resources Section. ERM also notified the Port of Oakland of the planned drilling activities.

Utility Clearance and Mapping

ERM marked the locations of the proposed borings and wells using white paint on paved areas and wooden stakes in unpaved areas. ERM and/or Weiss notified Underground Service Alert 48 hours prior to commencing drilling activities to facilitate the clearing of utilities within the OMC. In addition, ERM obtained underground utility maps from UAL and coordinated with OMC personnel to ensure that the proposed borings and wells were not placed in areas of underground utilities. A private utility locating subcontractor (Foresite, Inc., of Pleasant Hill, California) was contracted to clear each of the proposed ERM drilling locations. For the December 2003 well installations, Weiss contracted Norcal Geophysical Consultants, Inc., to perform private utility locating prior to drilling. Finally, each boring location was cleared to a minimum of 5 feet bgs using a hand auger or air-vacuum excavation equipment to ensure that underground utilities were not disrupted during drilling.

In addition, ERM reviewed OMC building drawings provided by the Port to identify and locate potential utility corridors at the OMC. The identified utility corridors in the vicinity of AOCs 1, 2, and 3 were verified and surveyed during the December 2003 fieldwork by Foresite, Inc., to determine if the potential for preferential migration of impacted ground water along utility corridors exists within these AOCs.

Soil Boring Drilling and Grab Soil and Ground Water Sampling Methods

Vironex, a Hayward, California, drilling contractor, completed the soil borings using direct-push methods with a Geoprobe rig. As described above, a hand auger or air-vacuum excavation equipment was used to clear each location to a depth of 5 feet bgs. ERM personnel screened samples of the soil from the hand auger for soil type and evidence of chemical impact using an organic vapor analyzer with a photoionization detector (PID). The results of this screening were recorded on the boring logs. At each location, soil samples were collected within 2 feet of the bottom of the pavement using a slide hammer apparatus. Upon reaching 5 feet bgs, soil samples were collected continuously to the ground water table using the direct-push rig. Ground water was generally encountered at approximately 8 feet bgs, although it was encountered between approximately 2 and 5 feet bgs within a number of borings completed along the northern portion of the property. An ERM geologist logged the soil from each of the borings using the Unified Soil Classification System. All soil samples were also screened for the presence of organic vapors using a PID and the results of this screening are recorded on the boring logs. Boring logs are presented in Appendix D.

In general, a minimum of one unsaturated zone soil sample was collected from each boring within 2 feet below the bottom of the pavement or ground surface at unpaved locations. A second vadose zone soil sample was collected approximately 2 to 3 feet below the initial sample within borings containing over 6 feet of unsaturated zone. This sample was submitted to the laboratory and held for possible use if laboratory analysis of the upper sample exhibited significant impact. In addition, due to slow recharge of ground water within the initial locations completed during the investigation, a saturated soil sample was collected at most locations and submitted to the laboratory to hold for use in the event that a ground water sample could not be collected. However, ground water samples were obtained from all of the borings and none of these samples were analyzed.

Soil samples selected for analysis were properly sealed in brass tubes using Teflon tape and plastic caps, and placed in iced coolers. A trip blank was also placed in coolers during collection and transport to the laboratory each day and analyzed for VOCs. The samples were labeled with relevant sampling information and a chain-of-custody form was completed and maintained with the samples. Analytical samples were submitted to Sequoia Analytical, a California-certified laboratory in Sacramento, California, and analyzed on a 1- to 2-day turnaround time.

Upon completion of the soil sampling activities, temporary 1-inch-diameter, machine-slotted PVC ground water sampling points were placed in each boring. Ground water samples were collected from each boring location using a peristaltic pump. Ground water samples were collected in appropriate containers, properly sealed and preserved, and placed in iced coolers. A trip blank was also placed in coolers during collection and transport to the laboratory each day and analyzed for VOCs. Samples collected for metals analyses were field filtered and collected in preserved containers. Samples were managed as described above and submitted to Sequoia Analytical for analysis.

Upon completion of the ground water sampling activities, the borings were backfilled to within approximately 1 foot of the ground surface with cement grout. The remainder of the hole was filled with material to match the surrounding surface and was of equal or greater strength than the existing pavement in paved areas.

Monitoring Well Installation, Development, and Sampling Methods

Ten monitoring wells (ERM-MW-01 through ERM-MW-10) were installed, developed, and sampled in May 2003. An additional seven monitoring wells (ERM-MW-11 through ERM-MW-17) were installed, developed, and sampled in December 2003. Vironex installed the ten monitoring wells in May 2003 using a hollow-stem auger (HSA) drill rig. Gregg Drilling and Testing, a Martinez, California, drilling subcontractor installed the seven monitoring wells in December 2003 also using HSA methods. Soil samples were collected continuously from just below the pavement to the water table (5 to 10 feet bgs in AOCs 1 and 7; and 2 to 5 feet bgs in AOCs 2 and 3). Soils were logged by an ERM or Weiss geologist and screened using an organic vapor analyzer with a PID. The results of the field screening were recorded on the well logs (Appendix D).

During the May 2003 well installation event, monitoring wells were constructed using 1-inch-diameter, Schedule 40 PVC casing with 10 feet of 0.020-inch, machine-slotted screen. ERM-MW-10 was an exception that was constructed with 7 feet of 0.020-inch slotted screen. Monitoring wells installed in December 2003 were constructed using 2-inch-diameter, Schedule 40 PVC casing with 10 feet of 0.010-inch, machine-slotted screen. The monitoring wells installed at the OMC had total depths ranging from 10 to 17 feet bgs with screen intervals across the water table. A sand filter pack was used to fill each borehole annulus from the bottom of the hole to approximately 1 foot above the top of the screened interval. A minimum 1-foot bentonite seal was emplaced above the filter pack and the remainder of each borehole was backfilled with bentonite cement grout. The wells were completed with flush-mounted well boxes, with the exception of wells installed within the unpaved area adjacent to the wastewater vault (ERM-MW-10 and ERM-MW-15), which were completed with aboveground stovepipes. The well boxes were set in cement and sloped to create surface water flow away from the well. All wells were outfitted with a lockable cap.

Following installation, the new monitoring wells were developed using swab (surge block) and bail (suction bailer) techniques and sampled using a peristaltic pump. Ground water levels were measured and recorded prior to development. Ground water samples were collected in appropriate containers, properly sealed and preserved, and placed in iced coolers. A trip blank was also placed in coolers during collection and transport to the laboratory each day and analyzed for VOCs. Samples collected for metals analyses were field-filtered and collected in preserved containers. Samples collected during May 2003 were submitted to Sequoia Analytical for analysis, whereas samples collected in December were submitted to Entech Analytical Labs, Inc. (Entech), a California-certified laboratory in Santa Clara, California.

During the investigations, ground water samples were collected from three monitoring wells installed to address the former UST site (UAL-MW-1 through -3), as well as from two monitoring well discovered during the site inspection (P-1/UAL-MW-4 and P-2/UAL-MW-5), using the procedures described above.

Analytical Methods

The operational and historical evaluation identified the classes of chemicals used at OMC that had the potential to have impacted site soil and ground water. These chemical classes include VOCs, TPH, metals, semivolatile organic compounds (SVOCs), and polychlorinated biphenyls (PCBs). A number of grab ground water samples were analyzed for total dissolved solids (TDS) to assess beneficial use. In addition, ground water samples collected from AOC 1 and 17 monitoring wells in November 2003 were analyzed for natural attenuation parameters including nitrate, sulfate, total alkalinity, dissolved iron, dissolved manganese, carbon dioxide, methane, ethane, and ethane.

Analytical methods utilized on soil and ground water samples collected during this investigation included:

- VOCs by United States Environmental Protection Agency (USEPA) Methods 8260 or 8021;
- Volatile and extractable TPH as USEPA Method 8015M;
- Metals by USEPA Methods 200.7, 6020, 6010, and 7000 series;
- SVOCs by USEPA Method 8270;
- PCBs by USEPA Method 8081;
- TDS by USEPA Method 160.1;
- Chloride, nitrate, and sulfate by USEPA Method 300.0;
- Total alkalinity by USEPA Method 310.1; and

- Methane, ethane, ethene, and carbon dioxide by RSK-175.

The analyses performed for each sample collected during the investigation are described below and summarized in Table 1. The analytical methods used for each sample are presented on the analytical results tables presented in Section 4.0 of the main report text. Analytical data for each sample are provided in Adobe Acrobat® (pdf) format on the compact disc included in Appendix E.

Silica gel cleanup methods were performed on all soil and ground water samples containing detectable concentrations of extractable TPH (TEPH) to remove concentrations of naturally occurring organic material and eliminate the potential for false positives. The TEPH results following the silica gel cleanup procedure are more representative of fuel hydrocarbons in soil and, therefore, were used for the TEPH evaluation.

In addition, the decision to run certain analyses on samples was based on the results of initial analyses. For example, soil and ground water samples containing initial concentrations of TEPH above approximately one-half the risk-based screening levels were analyzed for SVOCs. This approach is based on the fact that naphthalene and other SVOCs are components of TEPH. A maximum of one sample per matrix per AOC was analyzed for SVOCs.

Data Review

Data generated during the investigation were subjected to a rigorous data review by an ERM chemist. The quality of the data was assessed and qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (October 1999) and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (July 2002). This process includes protocols for data handling from the point of data receipt to the filing and reporting of analytical results. In addition, a discussion of iron interference of metals analyses performed by inductively coupled plasma (ICP) methods for samples collected during the April 2003 investigation is included in the review. A summary of the data quality review conducted is provided as Appendix E. Based on the results of the data review, ERM concludes that the analytical data set generated by the investigation is adequate for site characterization and risk evaluation to establish the regulatory status of the OMC.

Surveying

The Port of Oakland surveyed all soil boring locations for horizontal control. Horizontal coordinates are expressed in feet north and east based on the California Coordinate System Zone 3, North American Datum 1983 (NAD 82) converted to US feet. Survey coordinates for the soil borings are included as Appendix F of this report.

Kavanagh Engineering of Burlingame, California, surveyed the new monitoring wells for vertical and horizontal control. Elevations were measured from Port of Oakland datum "United 1" and are referenced to Mean Lower Low Water. Port of Oakland vertical datum elevations can be converted to National Geodetic Vertical Datum of 1929, which is referenced to mean sea level, by adding 3.2 feet to the Port datum elevations. Horizontal coordinates are expressed in feet north and east based on the California Coordinate System Zone 3, North American Datum 1983 (NAD 82) converted to US feet. Survey coordinates for the monitoring wells are included as Appendix F of this report.

Investigation-Derived Waste Management

Investigation-derived wastes (IDW) generated during the investigation included soil, purged ground water, and decontamination water. IDW was segregated based on media and stored in properly labeled 55-gallon drums. Fourteen drums of soil waste and five drums of water were generated during the investigation. The labeled drums were stored adjacent to the current hazardous waste storage area pending analyses. Based on the analytical results, the soil and ground water drums were transported as a non-hazardous waste by Clearwater Environmental Management, Inc. (Clearwater), a California-licensed waste transport company, to Alviso Independent Oil, a Class C transfer site in Alviso, California.

Slug Testing

Aquifer slug tests were performed on six monitoring wells at the OMC between 8 and 9 December 2003. The slug tests were conducted to determine the hydraulic conductivity of the fill unit above the Bay Mud so that ground water flow rates within the fill zone could be calculated. The six wells include UAL-MW-1, UAL-MW-3, P2/UAL-MW-5, ERM-MW-3, ERM-MW-7, and ERM-MW-9. The wells are presented on Figure 4.

Slug tests were conducted by initially measuring water levels in all of the monitoring wells. Upon completion of the measuring event, pressure transducers with data loggers were installed within each of the wells. The data loggers were programmed to collect data every second prior to installation in the wells. In addition, a pressure transducer/data logger was installed within UAL-MW-2 to provide background fluctuations in the water table elevation within the slug test period. Following installation of the pressure transducer/data logger, a solid cylinder of known volume was emplaced in each of the wells. The change in water level over time was measured by the pressure transducer in one-second increments and recorded by the data logger. Once water levels equilibrated to the pre-cylinder introduction levels (±0.02 feet), the water level and time was noted and the cylinder was removed. As described above, the resulting change in water level was measured by the pressure transducer in one-second increments and recorded by the data logger. Upon return to the pre-test water level (±0.02 feet), the slug test procedure was repeated.

The data generated during the slug tests were downloaded and evaluated using aquifer testing analysis software (Waterloo Hydrogeologic, 1997). Water level data was input electronically into the analysis software. An ERM hydrogeologist completed well geometry input, data reduction, and curve-fitting evaluations. The results of the aquifer testing are presented in Section 4.1.2 of the main report text and Appendix G.

Water Supply Well Survey and Beneficial Use Evaluation

ERM conducted a well survey to locate water supply wells near the OMC. ERM reviewed the results of the Environmental Data Resources, Inc. (EDR) report, which reviews federal, state, and county databases to identify water supply wells within a 1-mile radius of the site. In addition, ERM contacted the Alameda County Department of Health Services and Alameda County Public Works Agency, Water Resources Section, to confirm the EDR results. ERM spoke with Mr. James Yoo of Alameda County Public Works Agency, Water Resources Section on 14 July 2003. Mr. Yoo provided ERM with information on wells within 1.5 miles of the OMC. This information includes well locations, specific use, depth, diameter, and drill date, when available. Mr. Yoo indicated that the county database is derived from the California Department of Water Resources (DWR), which compiles the most comprehensive list of existing wells throughout California. The results of the water supply well survey are presented in Section 4.2.1 of the main report and Appendix H.

San Francisco Bay RWQCB conducted an evaluation of the beneficial uses of ground water within the East Bay Plain Ground Water Basin, within which the OMC lies. The results are summarized in the RWQCB's May 2003 *East Bay Plain Groundwater Basin Beneficial Use Evaluation Report* (Beneficial Use Evaluation Report). The report presents a comprehensive evaluation of the beneficial uses of ground water within the East Bay Plain and provides context to evaluate site-specific cleanup issues within the Basin. The report will be used as the technical basis for the amendment of the Basin Plan, which is the master policy document that describes the legal, technical, and program bases of water quality regulation in the San Francisco Bay area. ERM reviewed this document to incorporate potential fill unit water use into the risk evaluation. The results of this review are presented in Section 4.2.2 of the main report and Appendix H.

INVESTIGATION SUMMARY

The investigation activities conducted in each AOC are presented below and a sample summary is provided in Table 1. Figure 4 presents boring and monitoring well locations.

Small Parts Wash Rack/Former World Airways Cleaning Room (AOC 1)

A total of five borings were installed in this area to evaluate the potential impact to soil and ground water from historical operations. Weiss installed three borings in the area of the wash rack outside of the building, including one adjacent to the sump within the bermed area (W-B-6) and two outside the bermed area (W-B-4 and -5). ERM installed two borings inside the former cleaning room adjacent to the wash rack (ERM-B-1 and -2). ERM collected split samples from the Weiss borings.

One to two unsaturated zone soil samples were collected at each boring location based on depth to ground water and thickness of the unsaturated zone. Also, a soil sample was collected from the saturated zone at four of the five locations. A ground water sample was collected at each boring location. A total of 11 soil and five ground water samples were collected and submitted to the laboratory. The shallowest soil sample from each boring and ground water samples were analyzed for VOCs, TEPH, purgeable TPH (TPPH), and Title 22 metals. Based on the results of the initial TPH analyses, one ground water sample (ERM-B-2) was analyzed for SVOCs. In addition, silica gel cleanup was performed on the TEPH extracts from four ground water samples (ERM-B-1, -2, W-B-4, and -6).

Nine monitoring wells (ERM-MW-01 through ERM-MW-05 and ERM-MW-11 through ERM-MW-14) were installed within AOC 1 in May and December 2003 to confirm the analytical results of grab ground water and monitoring well samples. One well (ERM-MW-01) was installed within the bermed area and the remaining eight were installed to determine the extent of VOCs and nickel in ground water. Samples were collected from ERM-MW-01 through ERM-MW-05 during two events (May and November 2003); samples were collected from ERM-MW-11 through ERM-MW-14 following installation in December 2003.

Aircraft Wash Rack (AOC 2)

A total of seven borings were installed in the wash rack area to assess potential impacts from chemicals washed off of aircraft. Weiss installed two borings within the wash pad area (W-B-7 and -8) and ERM installed five borings, including three borings within the pad area at seams and/or cracks (ERM-B-3, -4, and -6) and two borings adjacent to two wash rack collection sumps (ERM-B-5 and -7). ERM collected split samples from the Weiss borings.

One to two unsaturated zone soil samples were collected from six of the seven boring locations based on depth to ground water and thickness of the unsaturated zone. An unsaturated sample was not collected from ERM-B-7 due to the presence of ground water directly under the pavement base at a depth of approximately 2 feet bgs. A soil sample was also collected from the saturated zone at three of the seven locations. A ground water sample was collected at each boring location. A total of nine soil and seven ground water samples were collected and submitted to the laboratory. The shallowest soil sample from each boring and ground water samples were analyzed for VOCs, TEPH, TPPH, and Title 22 metals. Based on the results of the initial TPH analyses, one soil sample (ERM-B-6-2.5) and one ground water sample (ERM-B-5) were analyzed for SVOCs. In addition, silica gel cleanup was performed on the TEPH extracts on four of the six soil samples (ERM-B-4, -5, -6, and W-B-7) and all of the ground water samples.

Four monitoring wells (ERM-MW-06 through ERM-MW-09) were installed within AOC 2 in May 2003. The wells were installed adjacent to boring locations to confirm the analytical results of grab ground water samples collected from these borings. Ground water samples were collected from each well and analyzed for VOCs, volatile and extractable TPH, and selected metals (nickel, cadmium, and lead). Silica gel cleanup procedures were performed on all of the TEPH extracts. A second round of samples was collected from these wells in November 2003 to confirm the results of the May 2003 sampling event.

Based on the November 2003 monitoring well results, two additional wells (ERM-MW-15 and ERM-MW-16) were installed, developed, and sampled in December 2003 to provide further delineation of nickel in ground water. Ground water samples from these wells were analyzed for nickel only.

Industrial Wastewater System Vault (AOC 3)

Weiss completed three borings (W-B-10, -11, and -12) in this area to determine whether leaks from the vault or infiltration from the diversion channel may have impacted soil and/or ground water in this area. Two borings were completed adjacent to the vault (W-B-10 and -11) and one boring (W-B-12) was completed along the diversion channel near the outfall from the vault. ERM collected split samples from each boring.

One unsaturated zone soil sample was collected above the water table at two of the boring locations (W-B-10 and -11). The two soil samples collected at the remaining location within the diversion channel were saturated due to the presence of water within the diversion channel. A ground water sample was collected at each boring location. A total of four soil and three ground water samples were collected. The shallowest soil sample from each boring and all ground water samples were analyzed for VOCs, TEPH, TPPH, and Title 22 metals. Based on the results of the initial TPH analyses, one ground water sample (W-B-12) was analyzed for SVOCs. In addition, silica gel cleanup was performed on the TEPH extracts from one soil (W-B-12) and all ground water samples.

One monitoring well (ERM-MW-10) was installed within AOC 3 in May 2003. The well was installed adjacent to boring W-B-12 to confirm the analytical results of the grab ground water sample collected from this boring. Ground water samples were collected from ERM-MW-10 in May, November, and December 2003. The ground water samples collected from this well in May and November 2003 were analyzed for VOCs, volatile and extractable TPH, and selected metals (nickel, cadmium, and lead). Silica gel cleanup procedures were performed on all of the TEPH extracts. The ground water sample collected in December 2003 was analyzed for copper.

Aboveground Fuel Storage Tank (AOC 4)

ERM installed two borings around the existing fuel ASTs. One boring was installed at the fueling island (ERM-B-9) and the other was installed adjacent to the oil storage shed (ERM-B-8). One to two unsaturated zone soil samples were collected at each boring location based on depth to ground water and thickness of the unsaturated zone. A soil sample was also collected from the saturated zone at each location. A ground water sample was collected at each boring location. A total of four soil and two ground water samples were collected from the two borings completed within this area. The shallowest soil sample from each boring and ground water samples were analyzed for TEPH, TPPH, benzene, toluene, ethylbenzene, total xylenes (BTEX), and methyl tertiary-butyl ether (MTBE). Based on the results of the initial TEPH analyses, one soil sample (ERM-B-9) was analyzed for SVOCs. In addition, silica gel cleanup was performed on the TEPH extracts from one soil (ERM-B-9) and both ground water samples.

Vehicle Maintenance Center (AOC 5)

Five borings were completed in this AOC to investigate impacts that may have resulted from vehicle maintenance. Potential impacts from the former hydraulic lift were also considered within this area. Weiss completed three borings outside of the building (W-B-1 through -3) and ERM completed two borings within the building (ERM-10 and -11). Split samples were collected by ERM from two of the three borings installed by Weiss (W-B-2 and -3).

One to two unsaturated zone soil samples were collected at each boring location based on depth to ground water and thickness of the unsaturated zone. A soil sample was also collected from the saturated zone at two of the five locations. A ground water sample was collected at each boring location. A total of eight soil and five ground water samples were collected and submitted to the laboratory. The shallowest soil sample in each boring and all ground water samples were analyzed for VOCs, TEPH, TPPH, and Title 22 metals. In addition, to address the presence of the hydraulic lift cylinder, both samples collected from the unsaturated zone in ERM-B-11 were analyzed for TEPH and PCBs. Based on the results of the initial TEPH analyses, one ground water sample (W-B-2) was analyzed for SVOCs. In addition, silica gel cleanup was performed on the TEPH extracts from all ground water samples.

Boiler and Aboveground Diesel Storage Tank (AOC 6)

ERM completed one boring (ERM-B-27) adjacent to the diesel AST within the reported area of the diesel spill and soil removal. Weiss did not complete any borings within this area. One unsaturated zone and one saturated soil sample were collected at the boring location. A ground water sample was also collected. The unsaturated zone soil sample and ground water sample were analyzed for TEPH as well as BTEX. Based on the results of the initial TEPH analyses, the ground water sample was analyzed for SVOCs. In addition, silica gel cleanup was performed on the TEPH extract from the ground water sample.

Former 90-Day Hazardous Waste Accumulation Area (AOC 7)

Weiss installed two borings (W-B-16 and -17) to investigate potential impacts from wastes formerly stored in this area. One boring was installed adjacent to the former drum storage area (W-B-17) and the other was installed adjacent to the former compactor area (W-B-16). ERM collected split samples from each boring.

One unsaturated zone soil sample was collected at each boring location. A ground water sample was collected at each boring location. A total of two soil and two ground water samples were collected. Soil and ground water samples were analyzed for VOCs, TEPH, TPPH, and Title 22 metals. The grab ground water sample from W-B-17 was analyzed for TDS. Based on initial TEPH results, the ground water sample from W-B-17 was also analyzed for SVOCs. In addition, silica gel cleanup was performed on the TEPH extracts from the two ground water samples.

Monitoring well ERM-MW-17 was installed in December 2003 adjacent to W-B-17 to confirm the results of the grab samples. The ground water sample collected from this well was analyzed for VOCs and arsenic based on grab ground water sampling results.

Recent 90-Day Hazardous Waste Accumulation Area (AOC 8)

ERM completed one boring (ERM-B-12) to investigate potential impacts from wastes stored in this area. Based on the thickness of the vadose zone, one unsaturated zone soil sample was collected. A ground water sample was also collected. Soil and ground water samples were analyzed for VOCs, TEPH, TPPH, and Title 22 metals.

Hazardous Material Storage Areas (AOC 9)

Soil borings were completed at the door of each of the four hazardous material storage buildings (one storage shed was addressed by one of the borings for the fuel ASTs, see AOC 4 and Figure 4). Weiss completed three borings in front of the two sheds south of the hangar (W-B-21 through -23) and ERM completed one boring at each of the two sheds north of the hangar (ERM-B-13 and -14). ERM collected split samples from one of the three borings completed by Weiss (W-B-22).

One unsaturated zone soil sample was collected at each boring location based on depth to ground water and thickness of the unsaturated zone. A soil sample was also collected from the saturated zone at two of the five locations. A ground water sample was collected from three borings (ERM-B-13, ERM-B-14, and W-B-22). A total of five soil and three ground water samples were collected and submitted to the laboratory. The shallowest soil sample from each boring and all ground water samples were analyzed for VOCs, TEPH, TPPH, and Title 22 metals. The grab ground water sample from ERM-B-14 was also analyzed for TDS. Based on initial TEPH results, the ground water sample from ERM-B-14 was analyzed for SVOCs. In addition, silica gel cleanup was performed on the TEPH extracts from two ground water samples (ERM-B-13 and -14).

In addition, ERM collected a ground water sample from a well discovered adjacent to ERM-B-13 during a site walk (P-2/UAL-MW-5; see Figure 4). This well has a measured depth of approximately 15 feet bgs. The well was purged of three casing volumes prior to sampling to ensure a representative formation sample was obtained. The sample was analyzed for TEPH, TPPH, and VOCs. An additional sample was collected from this well during November 2003 to provide information on the extent of VOCs and nickel from AOC 1.

Chemical Storage Area (AOC 10)

ERM completed one boring (ERM-B-15) to assess the potential for impacts from potential chemical spills or drips in this area. One soil sample was collected from this boring directly under the concrete slab within the storage area. A ground water sample was not collected. The soil sample was analyzed for VOCs, TEPH, TPPH, and Title 22 metals.

Aircraft Fueling/Defueling Equipment Areas (AOC 11)

ERM completed four borings (ERM-B-16 through -19) to assess potential impacts from drips and spills in these areas. The borings were installed approximately 50 feet outside of each of the four hangar door entrances. One unsaturated zone soil sample and one saturated zone sample were collected at each boring location based on depth to ground water and thickness of the unsaturated zone. A ground water sample was also collected from each boring. A total of eight soil and four ground water samples were collected and submitted to the laboratory. The unsaturated zone soil samples and ground water samples were analyzed for TEPH and BTEX. In addition, the ground water sample from ERM-B-16 was also analyzed for TDS. Based on initial TEPH results, silica gel cleanup was performed on the TEPH extract from one soil sample (ERM-B-17) and all of the ground water samples.

Fire System Generators (AOC 12)

ERM completed two borings (ERM-B-20 and -21) around the vault containing the fire system pump motors and their associated diesel fuel tanks. One boring was completed on the southern side of the vault (ERM-B-20) and the other boring was completed on the northern side of the vault within the hangar (ERM-B-21). Two unsaturated zone soil samples and one saturated zone sample were collected at each boring location based on depth to ground water and thickness of the unsaturated zone. A ground water sample was also collected from each boring. A total of six soil and two ground water samples were collected and submitted to the laboratory. The shallowest unsaturated zone soil sample from each boring and all ground water samples were analyzed for TEPH and BTEX. Based on initial TEPH results, the ground water sample from ERM-B-21 was also analyzed for SVOCs. In addition, silica gel cleanup was performed on the TEPH extracts from the two ground water samples.

Paint Spray Booth (AOC 13)

ERM completed one boring (ERM-B-22) within the waterfall-style paint spray booth adjacent to a floor drain to determine if historical operations impacted soils underlying the concrete. One soil sample was collected directly under the concrete slab. A ground water sample was not collected. The soil sample was analyzed for VOCs, TEPH, TPPH, and Title 22 metals.

Storm Drains (AOC 14)

One boring was completed adjacent to each of the storm drains at locations near the property boundary to determine if migration of chemicals along storm drains had occurred. Weiss completed four borings in the northern portion of the property (W-B-32 and W-B-37 through -39) and ERM completed one boring in the southern portion of the property (ERM-B-23). ERM collected split samples from three of the four borings installed by Weiss (W-B-32, -37, and -38).

One unsaturated zone soil sample was collected at each boring location based on depth to ground water and thickness of the unsaturated zone. The split soil sample from W-B-37 was saturated due to the presence of water within the storm channel. A ground water sample was also collected from each boring. A total of four soil samples and four ground water samples were collected and submitted to the laboratory. The shallowest unsaturated zone soil sample and ground water from three of the four borings (ERM-B-23, W-B-32, and -38) were analyzed for VOCs, TEPH, TPPH, and Title 22 metals. The ground water sample from W-B-32 was also analyzed for TDS. Based on initial TEPH results, the ground water sample from W-B-32 was also analyzed for SVOCs. In addition, silica gel cleanup was performed on the TEPH extracts from one soil sample (W-B-32) and two ground water samples (W-B-32 and -38).

Aircraft Parking and Run Up Area (AOC 15)

ERM completed three borings (ERM-24 through -26) to determine if releases occurred in the area. One unsaturated zone soil sample and one saturated zone soil sample were collected from each location. A ground water sample was also collected from each boring. A total of six soil and three ground water samples were collected and submitted to the laboratory. The unsaturated zone soil samples and ground water samples were analyzed for TEPH and BTEX. The ground water sample from ERM-B-24 was analyzed for TDS. Based on initial TEPH results, the ground water sample from ERM-B-24 was also analyzed for SVOCs. In addition, a silica gel cleanup method was performed on the TEPH extracts from all three ground water samples.

Reported Fuel Spill Area on Taxiway (AOC 16)

Weiss completed three borings (W-B-13 through -15) in the area of the reported fuel spill to assess whether any residual impacts from the spill exist. ERM collected split samples from one of the three borings installed by Weiss (W-B-14).

One unsaturated zone soil sample was collected from W-B-14 based on depth to ground water and thickness of the unsaturated zone. A ground water sample was also collected from the boring. The soil and ground water samples were analyzed for TEPH and BTEX. Based on initial extractable TEPH results, silica gel cleanup was performed on the TEPH extract from the ground water sample.

Former Vehicle Fueling USTs (AOC 17)

ERM collected samples from the three monitoring wells (UAL-MW-1 through -3) previously installed for the former vehicle fueling USTs during April and November 2003 to confirm the concentrations presented in the closure report. In addition, ERM sampled an adjacent monitoring well discovered during the site walk (Figure 4; P-1/UAL-MW-4) during April 2003. This well had a measured depth of 38 feet bgs and its screened interval is unknown. The wells were purged of three casing volumes prior to sampling to ensure that a representative formation sample was obtained. The ground water samples collected in April 2003 were analyzed for TEPH, TPPH, and VOCs. Based on initial TEPH results, the April 2003 ground water sample from UAL-MW-2 was also analyzed for SVOCs. In addition, silica gel cleanup was performed on the TEPH extracts from two ground water samples collected in April 2003 (UAL-MW-2 and -3). The ground water samples collected in November 2003 were analyzed for VOCs, TPPH, TEPH, and selected metals (antimony, arsenic, and beryllium). The samples were analyzed for metals to confirm previous results and address detections in adjacent AOC 5.

Migration of Off-Site Solvent Plume onto OMC Property (AOC 18)

To investigate whether the ground water solvent plume emanating from former USTs in the economy parking lot west of the OMC is migrating onto the property, Weiss completed four borings (W-B-9, W-B-18 through -20) along the fence on the western property boundary. ERM collected split samples from two of the four borings (W-B-9 and -19).

One unsaturated soil sample was collected at each boring location based on depth to ground water and thickness of the unsaturated zone. A ground water sample was also collected from each boring. A total of two soil and two ground water samples were collected and submitted to the laboratory. Soil and ground water samples were analyzed for VOCs.

Runoff from Pavement to Unpaved Area North of OMC (AOC 19)

To assess the potential for runoff from the paved areas of the property to have caused impacts to soil and ground water in the unpaved area north of the property, Weiss completed 12 borings (W-B-24 through -31 and W-B-33 through -36) in the unpaved areas just off of the OMC property. ERM collected split samples from two of the 12 borings (W-B-25 and -29).

One unsaturated soil sample was collected at each boring location and no saturated soil samples were collected. A ground water sample was also collected at the two boring locations. A total of two soil and two ground water samples were collected and submitted to the laboratory. The soil and ground water samples were analyzed for VOCs, TEPH, TPPH, and Title 22 metals.

Appendix D
Boring and Well Logs

ERM

Drilling Log

Project: UAL - Oakland OMC Owner: UAL

Location: Oakland Project Number: 5266.00

Boring Number: ERM-B-1 Total Depth of Auger: 12' Auger Diameter: 2"

Surface Elevation: ____ Water Level: Initial 8.82' 24-hrs ____

Total Depth of Soil Sampler: 12' Total Depth of Ground Water Sampler: 12'

Ground Water Sample Interval(s): 2-12' bgs

Drilling Company: Vironex Drilling Method: Direct Push

Driller: Brian Log By: DEM Date Drilled: 4/15/03

Sketch Map

Notes - Hand Auger to 5' bgs

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
					Start: 0845
0					Surface: Concrete 6"
	Pea gravel				Pea Gravel
1					SAND, fine grained, tan, loose, dry
2			0		As above
					As above
3			0		As above
			0	0900	As above (ERM-B-1-3.5 & 4.0)
4			0		As above Collected with slide hammer
					As above
5	SP		0		As above, Olive green, damp
			0	0935	SAND, as above (ERM-B-1-5.5 & 6.0')
6			0		As above Hold
			0		As above
7			0		As above, slightly moist
			0		As above, saturated
8			0	NO Rec	
					As above, trace silt
9			0	0950	As above
					As above (ERM-B-1-9.5 & 10.0')
10			0		As above Hold
					As above
11			0		As above
					As above
12			0		As above
					0930 - WL tagged at 8.82'
					Set temporary screen 2-12' bgs

ERM

Drilling Log

Project UAL Oakland OMC Owner UAL
Location Oakland Project Number 5266.00
Boring Number ERM-B-2 Total Depth of Auger 12' Auger Diameter 2"
Surface Elevation ______ Water Level: Initial 9.8' 24-hrs ______
Total Depth of Soil Sampler 12' Total Depth of Ground Water Sampler 12'
Ground Water Sample Interval(s) 2-12' bgs
Drilling Company Vironex Drilling Method Direct Push
Driller Brian Log By DEM Date Drilled 4/15/03

Sketch Map

Notes - Hand auger to 5' bgs

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter) start: 0955
0					Surface: Concrete 7"
	Pea Gravel				Pea Gravel
1			0		SAND, fine grained, tan, loose, dry
					As above
2					As above
					As above
3			0	1005	As above (ERM-B-2-3.5 & 4.0')
			0		As above Collected with Slide Hammer
4			0		As above
					As above
5	SP		0		As above
				1025	As above, damp, olive green (ERM-B-2-6.0 & 6.5')
6			0		As above Hold
					As above
7			0		As above moist to saturated at bottom
			0	No Rec	
8			0		As above, gray
			0		As above
9			0	1035	As above (ERM-B-2-9.5 & 10.0')
			0		As above Hold
10			0		As above
			0		As above
11			0		As above
			0		As above
12			0		

WL tagged at 9.8' bgs
Set temporary screen 2-12' bgs

ERM

Drilling Log

Project: UAL OMC　Owner: UAL

Location: Oakland　Project Number: 5266.00

Boring Number: ERM-B-3　Total Depth of Auger: 8'　Auger Diameter: 2"

Surface Elevation: ____　Water Level: Initial 4'　24-hrs ____

Total Depth of Soil Sampler: 8'　Total Depth of Ground Water Sampler: 8'

Ground Water Sample Interval(s): 3-8' bgs

Drilling Company: Vironex　Drilling Method: Direct Push

Driller: Brian　Log By: DEM　Date Drilled: 4/15/03

Sketch Map

Notes - Hand auger to 5' bgs

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter) start: 1540
0					Surface: Concrete 1'
1					SAND, fine grained, tan, loose, dry
					As above
2			0	1542	As above, olive green (ERM-B-3-2.5 & 3.0')
			0		As above
3	SP		0		As above
					As above, slightly moist
4					As above saturated
5			0		SAND, fine grained, shell fragments, dark gray, saturated
					SAND, silty, fine grained, olive green, shell fragments, saturated
6	SM		0	1600	As above (ERM-B-3-6.5 & 7.0') Hold
7			0		As above
					As above
8	ML		0		SILT, clayey, olive green, very moist
9					1555 - WL tagged at 4.0' bgs
					1625 - WL tagged at 2.61' bgs
10					Set temporary screen 3-8' bgs

ERM

Drilling Log

Project: UAL OMC
Owner: UAL
Location: Oakland
Project Number: 5622.00
Boring Number: ERM-B-4
Total Depth of Auger: 8'
Auger Diameter: 2"
Surface Elevation:
Water Level: Initial 4'
24-hrs:
Total Depth of Soil Sampler: 8'
Total Depth of Ground Water Sampler: 8'
Ground Water Sample Interval(s): 0-8' bgs
Drilling Company: Vironex
Drilling Method: Direct Push
Driller: Brian
Log By: DEM
Date Drilled: 4/15/03

Sketch Map

Notes - Hand auger to 5' bgs

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter) Start: 1605
0					Surface: Concrete 11"
1			0		SAND, fine grained, tan, loose, dry
2			4	1610	As above, olive green
			4		As above, slight hydrocarbon-like odor
3			10		As above (ERM-B-4-2.5 & 3.0')
					As above
4	SP				As above, trace hydrocarbon-like odor
					SAND, as above, slightly moist
5			0	1630	SAND, fine to medium grained, dark gray, shell fragments, very moist to saturated (ERM-B-4-5.5 & 6.0') Hold
6			0		As above, olive green
					As above
7			0		As above
					As above
8	CL		0		As above, sampler shoe had CLAY, silty, olive green, very soft, very moist
9					
10					

1620 - WL tagged at 4' bgs
1635 - WL tagged at 2.45' bgs
Set temporary screen 0-8' bgs

ERM

Drilling Log

Project: UAL OMC — Owner: UAL

Location: Oakland — Project Number: 5266-00

Boring Number: ERM-B-5 — Total Depth of Auger: 5' — Auger Diameter: 2"

Surface Elevation: ______ — Water Level: Initial 2.4' — 24-hrs: ______

Total Depth of Soil Sampler: 5' — Total Depth of Ground Water Sampler: 5'

Ground Water Sample Interval(s): 0-5' bgs

Drilling Company: Vironex — Drilling Method: Hand Auger

Driller: Brian — Log By: DEM — Date Drilled: 4/15/03

Sketch Map

Notes

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter) Start: 1640
0		0–5			Surface: Concrete 14"
1	Pea gravel				Pea Gravel
					SAND, silty, olive green, fine grained, dry
2				1645 (2.0–3.0)	As above (ERM-B-5-2.5 & 3.0)
3	SM				As above, damp
					As above, slightly moist
4					As above, saturated, shell fragments
					As above
5					As above
6					
7					

WL tagged at 2.4' bgs
Set temp screen 0-5' bgs
Water - Foamy

ERM

Drilling Log

Project UAL OMC Owner UAL

Location Oakland Project Number 5266.00

Boring Number ERM-B-6 Total Depth of Auger 8' Auger Diameter 2"

Surface Elevation ______ Water Level: Initial 2.4' 24-hrs ______

Total Depth of Soil Sampler 8' Total Depth of Ground Water Sampler 8'

Ground Water Sample Interval(s) 0-8' bgs

Drilling Company Vironex Drilling Method Hand Auger/Direct Push

Driller Brian Log By DEM Date Drilled 4/15/03

Sketch Map

Notes - Hand Auger to 5' bgs

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter) start: 1505
0					
					Concrete surface - 1'
1	Pea Gravel				Pea GRavel
2			205	1705	SAND, olive green, fine grained, loose, gravelly, damp
			194		As above, hydrocarbon-like odor
3			102		As above (ERM-B-6-2.5 & 3.0')
					As above
4					As above
	SP				As above
5			0		As above
					SAND, olive green, loose, fine grained, saturated
6			0		As above
					As above
7			0		As above
					As above
8			0		As above
9					WL tagged at 2.4' bgs
					set temporary screen 0-8' bgs
10					

ERM

Drilling Log

Project: UAL OMC — Owner: UAL

Location: Oakland — Project Number: 5266-00

Boring Number: ERM-B-7 — Total Depth of Auger: 5' — Auger Diameter: 3"

Surface Elevation: ____ — Water Level: Initial 2.4' — 24-hrs: ____

Total Depth of Soil Sampler: 5' — Total Depth of Ground Water Sampler: 5'

Ground Water Sample Interval(s): 0-5' bgs

Drilling Company: Vironex — Drilling Method: Hand Auger

Driller: Brian — Log By: DEM — Date Drilled: 4/15/03

Sketch Map

Notes

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter) start: 1720
0					Concrete surface - 1'
1	Pea gravel				Pea Gravel
2			0	1725	SAND, fine grained, olive green, trace pea gravel, very moist
			0		As above, saturated (ERM-B-7-2.5 & 3.0') Hold
3	SP		0		As above
					As above
4					SAND, fine to medium grained, dark gray, shell fragments, saturated
5					As above, gravel at bottom.
					WL tagged at 2.4' bgs
					Set temporary screen 0-5' bgs

ERM

Drilling Log

Project: UAL OMC — Owner: UAL

Location: Oakland — Project Number: 5266.00

Boring Number: ERM-B-8 — Total Depth of Auger: 12' — Auger Diameter: 2"

Surface Elevation: ______ Water Level: Initial 6.5' 24-hrs ______

Total Depth of Soil Sampler: 12' — Total Depth of Ground Water Sampler: 12'

Ground Water Sample Interval(s): 2-12' bgs

Drilling Company: Gregg / Vironex — Drilling Method: Air Vac / Direct Push

Driller: Angel / Brian — Log By: AEP / DEM — Date Drilled: 4/16/03

Sketch Map

Notes – Air Vac to 5' bgs

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter) Air Vac Start: 1350 Direct Push start: 1510
0					Surface: Concrete 29"
1					
2					
3	Fill				Gravelly Fill to ~3.5' bgs
			0	1410	SAND, tan to olive, loose, slightly damp,
4	SP		0		fine grained, minor gravels and Clay (ERM-B-8-4.0 & 4.5') Hand auger
			0		
5			0		SAND, silty, olive green, loose, moist
6			0	1525	As above, very moist
			0		As above, saturated (ERM-B-8-6.5 & 7.0') Hold
7			0		As above
			0	NO Rec	
8	SM		0		As above ↓
9			0		
10			0		
11			0		
12			0		

1540 – WL tagged at 6.5' bgs
Set temporary screen 2-12' bgs

ERM

Drilling Log

Project: UAL OMC Owner: UAL
Location: Oakland Project Number: 5266.00
Boring Number: ERM-B-9 Total Depth of Auger: 12' Auger Diameter: 2"
Surface Elevation: ____ Water Level: Initial 10.4' 24-hrs ____
Total Depth of Soil Sampler: 12' Total Depth of Ground Water Sampler: 10.9'
Ground Water Sample Interval(s): 5.9-10.9' bgs
Drilling Company: Vironex Drilling Method: Direct Push
Driller: Brian Log By: DEM Date Drilled: 4/16/03

Sketch Map

Notes: Hand Auger to 5' bgs

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter) Start: 0830
0	(concrete, 0-2.5)				Surface: Concrete 2.5'
1					
2					
3	Fill				Base rock with silt, dry, tan ↓
4	SM		0	1005	SAND, silty, fine grained, tan, loose, dry
4.5			0		As above (ERM-B-9-4.5&5.0')
5			0		As above, olive green, damp
5.5	CL		0		
6		screen (5.9-10.9)	0	No Rec	Grades to CLAY, silty, olive green, soft, saturated
7					
8	CL		0	1030	As above (ERM-B-9-8.5&9.0') Hold ↓
8.5			0		
9			0		
10			0		
11			0	No Rec	
12					

1020 - WL tagged at 10.4' bgs
total Depth tagged at 10.9' bgs

set 5' of temporary screen
5.9-10.9' bgs

ERM

Drilling Log

Project: UAL OMC   Owner: UAL

Location: Oakland   Project Number: 5266.00

Boring Number: ERM-B-10   Total Depth of Auger: 12'   Auger Diameter: 2"

Surface Elevation: ______   Water Level: Initial 9'   24-hrs ______

Total Depth of Soil Sampler: 12'   Total Depth of Ground Water Sampler: 12

Ground Water Sample Interval(s): 2-12' bgs

Drilling Company: Vironex   Drilling Method: Direct Push

Driller: Brian   Log By: DEM   Date Drilled: 4/17/03

Sketch Map

Notes - Hand auger to 5' bgs

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
					Start: 1240
0	(concrete)				Surface: Concrete 6"
0.5–1.5	Pea gravel				Pea Gravel
2	SM		0	1245	SAND, silty, tan, loose, fine grained, dry
2.5			0		As above (ERM-B-10-2.5 & 3.0')
3			0		↓
5	ML		0		SILT, Clayey, Olive green, soft, damp
5.5					As above
6	SM		0	1305	SAND, silty, Olive green, loose, fine grained, shell fragments, dry (ERM-B-10-6.5 & 7.0') Hold
7			0		As above, damp
7.5					As above, moist
8			0		As above
8.5					As above, very moist
9			0	1320	As above, saturated (ERM-B-10-9.5 & 10.0') Hold
10			0		↓
11			0	NO Rec	
12		(screen 2–12')			

WL tagged at 9' bgs
Set temporary screen 2-12' bgs

ERM

Drilling Log

Project: UAL OMC Owner: UAL

Location: Oakland Project Number: 5266-00

Boring Number: ERM-B-11 Total Depth of Auger: 12' Auger Diameter: 2"

Surface Elevation: ____ Water Level: Initial 9.4' 24-hrs ____

Total Depth of Soil Sampler: 12' Total Depth of Ground Water Sampler: 12'

Ground Water Sample Interval(s): 2-12' bgs

Drilling Company: Vironex Drilling Method: Direct Push

Driller: Brian Log By: DEM Date Drilled: 4/17/03

Sketch Map

Notes – Hand auger to 5' bgs

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter) Start: 1145
0	(concrete)				Surface: Concrete 7"
1	Pea gravel				Pea Gravel
2	SM	screen	0	1205	SAND, silty, tan, fine grained, loose, dry
			0		As above (ERM-B-11-2.5 & 3.0')
3			0		↓
4					
5	SM		0		As above, olive green
6			0	1220	(ERM-B-11-6.5 & 7.0') Hold
7			0 0	NO REC	↓
8			0		As above
9			0	1235	As above, very moist As above, saturated (ERM-B-11-9.5&10.0') Hold
10	CL SM		0		As above, Grades to CLAY, silty, olive green, soft, saturated Grades to SAND, silty, olive green, fine grained, saturated
11			0	NO REC	
12					

WL tagged at 9.4' bgs
Set temporary screen 2-12' bgs

ERM

Drilling Log

Project UAL OMC Owner UAL

Location Oakland Project Number 5266.00

Boring Number ERM-B-12 Total Depth of Auger 6' Auger Diameter 3"

Surface Elevation ______ Water Level: Initial 2.5' 24-hrs ______

Total Depth of Soil Sampler 6' Total Depth of Ground Water Sampler 6'

Ground Water Sample Interval(s) 1-5' bgs

Drilling Company Vironex Drilling Method Hand Auger

Driller Brian Log By DEM Date Drilled 4/17/03

Sketch Map

Notes

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter) Start: 0940
0	(concrete)				Surface: Concrete 1'
1					
			0	0950	SAND, fine grained, silty, tan, loose, damp
2			0		As above,
			0		As above
3	SM				As above, dark gray, very moist
					As above, saturated
4					↓
5					
6					

WL tagged at 2.5' bgs
Screened 1-5' bgs

ERM

Drilling Log

Project: UAL OMC Owner: UAL

Location: Oakland Project Number: 5266.00

Boring Number: ERM-B-13 Total Depth of Auger: 12' Auger Diameter: 2"

Surface Elevation: ______ Water Level: Initial 6.4' 24-hrs ______

Total Depth of Soil Sampler: 12' Total Depth of Ground Water Sampler: 12'

Ground Water Sample Interval(s): 2-12' bgs

Drilling Company: Gregg / Vironex Drilling Method: Air Vac / Direct Push

Driller: Angel / Brian Log By: AEP/DEM Date Drilled: 4/16/03

Sketch Map

Notes - Air Vac to 4' bgs

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter) — Air Vac Start: 1249 Direct Push Start: 1440
0					Surface: Asphalt 6" - Jack hammered
1	Fill				Gravelly Fill to 2.5'
2					
3	SP			1300	SAND, fine grained, tan to olive, loose, damp, some gravels (ERM-B-13-3.5&4.0') Hand Auger
4					As above
					As above
5			0		As above
	SM				SAND, fine grained, silty, olive green, loose, moist
6			0	1455	As above, very moist
					As above, saturated (ERM-B-13-6.5&7.0') Hold
7			0		As above
					As above
8			0 0	No Rec	As above ↓
9			0		
10			0		
11			0		
12			0	No Rec	

1505 - WL tagged at 6.4' bgs
set temporary screen 2-12' bgs

Page 1 of 1

ERM

Drilling Log

Project: UAL OMC
Owner: UAL
Location: Oakland
Project Number: 5266.00
Boring Number: ERM-B-14
Total Depth of Auger: 12'
Auger Diameter: 2"
Surface Elevation:
Water Level: Initial: 8'
24-hrs:
Total Depth of Soil Sampler: 12'
Total Depth of Ground Water Sampler: 11'
Ground Water Sample Interval(s): 1-11' bgs
Drilling Company: Gregg/Vironex
Drilling Method: Air Vac/Direct Push
Driller: Angel/Brian
Log By: AEP/DEM
Date Drilled: 4/17/03

Sketch Map

Notes - Air Vac to 4' bgs

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter) Air Vac Start: 0822 Direct Push start: 0845
0					Surface: Concrete 28"
3	Fill				Gravelly Fill
4	SP			0830	SAND, tan to light olive, loose, damp, some gravels (ERM-B-14-4.5&5.0') Hand augered
5	SM		0		SAND, silty, tan, trace gravel, fine grained, loose, moist
6			0		As above
			0		As above, Grades to dark gray with shell fragments, very moist
7				NO REC	
8			0	0915	As above, saturated (ERM-B-14-8.5&9.0) Hold
9			0		As above
			0		As above, Grades to olive green
10				NO REC	
11					
12					0950 - WL tagged at 8' bgs TD tagged at 11' bgs

set temporary well 1-11' bgs

ERM

Drilling Log

Project: UAL MoC Owner: UAL

Location: Oakland Project Number: 5266.00

Boring Number: ERM-B-15 Total Depth of Auger: 1.5' Auger Diameter: 3"

Surface Elevation: ____ Water Level: Initial ____ 24-hrs ____

Total Depth of Soil Sampler: 1.5' Total Depth of Ground Water Sampler: ____

Ground Water Sample Interval(s): ____

Drilling Company: ERM Drilling Method: Hand Auger

Driller: DEM Log By: AEP Date Drilled: 4/17/03

Sketch Map

Notes

Depth (Feet)	Graphic Log and USCS Designation	FID (ppm)	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
					start: 1612
0					Surface: Concrete 5"
	PG			1620	Pea Gravel ~3"
1	SM				SAND, silty, tan, loose, fine grained, dry
2					
3					
4					
5					

ERM

Drilling Log

Project: UAL MOC | Owner: UAL

Location: Oakland | Project Number: 5266.00

Boring Number: ERM-B-16 | Total Depth of Auger: 12' | Auger Diameter: 2"

Surface Elevation: ___ | Water Level: Initial 6.4' | 24-hrs ___

Total Depth of Soil Sampler: 12' | Total Depth of Ground Water Sampler: 12'

Ground Water Sample Interval(s): 2-12' bgs

Drilling Company: Gregg/Vironex | Drilling Method: Air Vac/Direct Push

Driller: Angel/Brian | Log By: AEP/DEM | Date Drilled: 4/16/03

Sketch Map

Notes - Air Vac to 4' bgs

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter) — Start Air Vac: 1049 Start Direct Push: 1410
0					Surface: Asphalt ~ 3.5-4" Air Vac to 4' bgs Gravelly Fill
1					
2	Fill				
3					
4	SP			1107	Hand Auger sample 4-5' bgs SAND, Olive green, fine grained, loose, few gravels, damp (ERM-B-16-4.5 & 5.0')
5	SM		0		SAND, silty, fine grained, Olive green, loose, damp
6			0	1420	As above, moist As above, saturated (ERM-B-16-6.5 & 7.0') Hold
7			0		As above As above
8	SM		0 0	NO REC	As above
9			0		
10			0		
11			0		
12			0		1425 - WL tagged at 6.4' bgs Set temporary screen 2-12' bgs

ERM

Drilling Log

Project: UAL OMC Owner: UAL

Location: Oakland Project Number: 5266.00

Boring Number: ERM-B-17 Total Depth of Auger: 8' Auger Diameter: 2"

Surface Elevation: ____ Water Level: Initial 6.8' 24-hrs ____

Total Depth of Soil Sampler: 8' Total Depth of Ground Water Sampler: 8'

Ground Water Sample Interval(s): 3-8' bgs

Drilling Company: Gregg/Vironex Drilling Method: Air Vac/Direct Push

Driller: Angel/Brian Log By: AEP/DEM Date Drilled: 4/16/03

Sketch Map

Notes - Air Vac to 3' bgs. Hand Auger 3-5' bgs

Air Vac Start: 1010 Direct Push start: 1250

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
0					Surface: Asphalt 5"
1	Fill				Air Vac to 3' bgs Gravelly Fill
2					
3	SP	3-8'		1035	Hand Auger sample 3-4' bgs SAND, fine to medium grained, gravelly, trace clay, tan to olive green, damp (ERM-B-17-3.5 & 4.0')
4					As above
5	SM		0		SAND, fine to medium grained, olive green, loose, moist SAND, silty, fine grained, olive green, loose, moist
6	ML		0		As above, very moist, Grades to SILT, clayey, gray, stiff, moist
7	SM		0	1300	As above SAND, fine grained, silty, olive green, loose, saturated (ERM-B-17-7.75') Hold
8			0	NO REC	
9					WL tagged at 6.8' bgs
10					Set temporary screen 3-8' bgs
11					
12					

ERM

Drilling Log

Project: UAL OMC   Owner: UAL

Location: Oakland   Project Number: 5266.00

Boring Number: ERM-B-18   Total Depth of Auger: 12'   Auger Diameter: 2"

Surface Elevation: ______   Water Level: Initial 8.4'   24-hrs: ______

Total Depth of Soil Sampler: 12'   Total Depth of Ground Water Sampler: 12'

Ground Water Sample Interval(s): 2-12' bgs

Drilling Company: Gregg/Vironex   Drilling Method: Air Vac/Direct Push

Driller: Angel/Brian   Log By: AED/DEM   Date Drilled: 4/16/03

Sketch Map

Notes - Air Vac to 3.5' bgs. Hand Auger to 5' bgs

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter) Air Vac Start: 0937 Direct Push start: 1125
0					Surface: Asphalt 5"
1					Air Vac to 3.5' bgs
2	Fill				Gravelly Fill ↓
3					
4	SP			1000	SAND, fine to medium grained, gravelly, trace clay, tan to olive, damp (ERM-B-18-4.0 & 4.5')
5			0		As above SAND, silty, fine grained, olive green, moist
6	SM		0	1140	As above, saturated As above (ERM-B-18-6.5 & 7.0') Hold
7	CL		0 0		As above, Grades to CLAY, silty, olive green, soft, saturated
8			0	No Rec.	SAND, olive green, silty, fine grained, saturated ↓
9	SM		0		
10			0		
11			0 0		
12				No Rec.	1130 - WL tagged at 8.4', set temporary screen 2-12' bgs

ERM

Drilling Log

Project: UAL OMC   Owner: UAL
Location: Oakland   Project Number: 5266.00
Boring Number: ERM-B-19   Total Depth of Auger: 12'   Auger Diameter: 2"
Surface Elevation: ____   Water Level: Initial 7.9'   24-hrs ____
Total Depth of Soil Sampler: 12'   Total Depth of Ground Water Sampler: 12'
Ground Water Sample Interval(s): 2-12' bgs
Drilling Company: Gregg/Vironex   Drilling Method: Air Vac/Direct Push
Driller: Angel/Brian   Log By: AEP/DEM   Date Drilled: 4/16/03

Sketch Map

Notes - Air Vac to 4' bgs

Soil Description and Observations
(Color, Texture, Structures, Odor, Foreign Matter)
Air Vac Start: 0900   Direct Push start: 1045

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations
0	Asphalt				Surface: Asphalt ~5"
1	Fill				Gravelly Fill Air Vac to 4' bgs
2	Fill	Screen top (2')			↓
3	Fill				↓
4	SP			0920	SAND, fine to medium grained, gravelly, trace clay, tan to olive, damp (ERM-B-19-4.5&5.0') Hand Auger
5	SP / SM		0		As above SAND, fine grained, silty, olive green, micaceous, moist
6	SM		0	1055	As above, very moist As above, saturated
7	SM		0 0	NO Rec	As above
8	SM		0 0		As above
9	SM		0		↓
10	SM		0		↓
11	SM		0 0		↓
12		Screen bottom (12')		NO Rec	1059 - WL tagged at 7.9' bgs Set temporary screen 2-12' bgs

ERM

Drilling Log

Project: UAL OMC | Owner: UAL

Location: Oakland | Project Number: 5266.00

Boring Number: ERM-B-20 | Total Depth of Auger: 10' | Auger Diameter: ____

Surface Elevation: ____ | Water Level: Initial 8.39' | 24-hrs ____

Total Depth of Soil Sampler: 8.5' | Total Depth of Ground Water Sampler: 10'

Ground Water Sample Interval(s): 5-10' bgs

Drilling Company: Gregg | Drilling Method: Air Vac

Driller: Angel | Log By: AEP | Date Drilled: 04/16/03

Sketch Map

Notes

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
					Start: 1455
0					Concrete core to ~3-4" bgs (8 in diameter) Air Vac to 10' bgs Gravelly fill to ~2.5' bgs
1	Fill				
2					
3				1459	Sand; tan; loose; slightly damp; fine grained; minor gravels. (Hand Augered Sample) (ERM-B-20-3.5&4.0')
4					
5				1505	As above; (Hand Augered Sample)-HOLD) (ERM-B-20-5.5&6.0')
6	SP				
7					
8				1507	Sand; olive green; loose; wet; fine grained; gravels + shell fragments. (Hand Augered, Saturated Sample - HOLD) (ERM-B-20-8.0&8.5')
9					
10					As above.
					WL tagged at 8.39' bgs set temporary screen 5-10' bgs

ERM

Drilling Log

Project: UAL OMC
Owner: UAL
Location: Oakland
Project Number: 5266.00
Boring Number: ERM-B-21
Total Depth of Auger: 10'
Auger Diameter:
Surface Elevation:
Water Level: Initial 8.65'
24-hrs:
Total Depth of Soil Sampler: 9'
Total Depth of Ground Water Sampler: 10'
Ground Water Sample Interval(s): 5-10' bgs
Drilling Company: Gregg
Drilling Method: Air Vac
Driller: Angel
Log By: AEP
Date Drilled: 4/17/03

Sketch Map

Notes

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
					Start: 0920
0					Concrete core to 14" bgs Hand augered to 10" bgs
1–2				0920	Sand; brown to olive green; small shell fragments; loose; fine grained; slightly damp; few gravels. (Hand Augered sample) (ERM-B-21-2.0&2.5')
5	SP			0920	As above. (Hand Augered sample - HOLD) (ERM-B-21-5.5&6.0')
7–8				0930	Sand; olive green; wet; shell fragments, gravels; fine grained; some clay, slightly silty.
9					Gravelly w/ fine Sand; olive green; wet; 9-10' section kept caving in. (Hand Augered Saturated Sample - HOLD) (ERM-B-21-8.5&9.0')
10					Total depth to 10' WL tagged at 8.65' set temporary screen 5-10' bgs

ERM

Drilling Log

Project UAL OMC Owner UAL

Location Oakland Project Number 5266-00

Boring Number ERM-B-22 Total Depth of Auger 2' Auger Diameter 3"

Surface Elevation ____ Water Level: Initial ____ 24-hrs ____

Total Depth of Soil Sampler 2' Total Depth of Ground Water Sampler ____

Ground Water Sample Interval(s) ____

Drilling Company ERM Drilling Method Hand Auger/slide Hammer

Driller Doug Moberg Log By DEM Date Drilled 4/17/03

Sketch Map

Notes

Depth (Feet)	Graphic Log and USCS Designation	FID (ppm)	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter) Start: 1340
0					Surface: Concrete 6"
1	PG			1548	Pea Gravel: 0.5' - 1.0'
	SM				Sand; tan; loose; fine grained; silty; dry. (ERM-B-22-1.5 & 2.0')
2					
3					
4					
5					

ERM

Drilling Log

Project: UAL OMC
Owner: UAL
Location: Oakland
Project Number: 5266-00
Boring Number: ERM-B-23
Total Depth of Auger: 12'
Auger Diameter: 2"
Surface Elevation: ____
Water Level: Initial 7.2'
24-hrs: ____
Total Depth of Soil Sampler: 12'
Total Depth of Ground Water Sampler: 8'
Ground Water Sample Interval(s): 3-8' bgs
Drilling Company: Gregg/Vironex
Drilling Method: Air Vac/Direct Push
Driller: Angel/Brian
Log By: AEP/DEM
Date Drilled: 4/17/03

Sketch Map

Notes - Air Vac to 4' bgs

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter) Air Vac Start: 0848 Direct Push Start: 1035
0					Surface: 6" Asphalt
1					Gravelly Fill Air Vac to 4' bgs
2	Fill				
3					
4	SP			0845	SAND, fine grained, gravelly, tan to light olive, loose, shell fragments, damp (ERM-B-23-4.5&5.0') Hand Augered
5			0		As above
			0		SAND, fine grained, silty, tan, loose, trace gravel, very moist, grades to dark gray
6			0		
7	SM			No Rec	
8			0		SAND, fine grained, silty, tan, loose, saturated
9			0		As above CLAY, silty, olive green, soft, very moist
10			0		As above, gray As above
11	CL		0		
12			0		Pushed to 12' bgs. Hole collapsed to 8' bgs set temporary screen 3-8' bgs

WL tagged at 7.2' bgs

ERM

Drilling Log

Project: UAL OMC
Owner: UAL
Location: Oakland
Project Number: 5266.00
Boring Number: ERM-B-24
Total Depth of Auger: 12'
Auger Diameter: 2"
Surface Elevation:
Water Level: Initial 8'
24-hrs:
Total Depth of Soil Sampler: 12'
Total Depth of Ground Water Sampler: 12'
Ground Water Sample Interval(s): 2 - 12' bgs
Drilling Company: Vironex
Drilling Method: Direct Push
Driller: Brian
Log By: DEM
Date Drilled: 4/15/03

Sketch Map

Notes – Hand Auger to 5' bgs

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter) Start: 1220
0	(concrete)				Surface: Concrete 1'
1	SM		0		SAND, silty, fine grained, tan, dry
					As above
2		screen	0	1225	(ERM-B-24-2.5 & 3.0') Slide Hammer
3		screen	0		↓
		screen			As above, olive green
4	CL	screen			As above
		screen			CLAY, Olive green, very soft, moist
5		screen	0		As above, Light brown
	SM	screen	0		As above, olive green, very moist
6		screen	0	1245	SAND, silty, olive green, fine grained, saturated
		screen	0		As above
7		screen	0	NO rec	As above
8	SM	screen	0		As above
9		screen	0		↓
10		screen	0		↓
11	SP	screen	0	NO rec	SAND, fine to medium grained, shell fragments, dark gray, saturated
12					

WL tagged at 8' bgs
Set temporary screen 2-12' bgs

ERM

Drilling Log

Project UAL OMC Owner UAL

Location Oakland Project Number 5266.00

Boring Number ERM-B-25 Total Depth of Auger 12' Auger Diameter 2"

Surface Elevation ____ Water Level: Initial 6.9' 24-hrs ____

Total Depth of Soil Sampler 12' Total Depth of Ground Water Sampler 10.5'

Ground Water Sample Interval(s) 0.5-10.5' bgs

Drilling Company Vironex Drilling Method Direct Push

Driller Brian Log By DEM Date Drilled 4/15/03

Sketch Map

Notes - Hand Auger to 5' bgs

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
					Start: 1050
0	(concrete)				Surface: Concrete 1'
1			0		SAND, silty, tan, loose, fine grained, dry
2			0		
3			0	1100	(ERM-B-25-3.5 & 4.0')
4			0		
5	SM		0		SAND, silty, olive green, fine grained, saturated
6			0, 0, 0	1120	(ERM-B-25-6.0 & 6.5') Hold
7				NO Rec	
8					As above
9					
10					SAND, fine to medium grained, gray, micaceous, shell fragments, saturated, loose
11	SP				As above
12	CL				CLAY, slightly silty, olive green, very soft, very moist
					Set temporary screen 0.5-10.5' bgs
					WL tagged at 6.9' bgs

ERM

Drilling Log

Project: UAL OMC Owner: UAL
Location: Oakland Project Number: 5266.00
Boring Number: ERM-B-26 Total Depth of Auger: 8' Auger Diameter: 2"
Surface Elevation: ____ Water Level: Initial 5' 24-hrs ____
Total Depth of Soil Sampler: 8' Total Depth of Ground Water Sampler: 8'
Ground Water Sample Interval(s): 0 - 8' bgs
Drilling Company: Vironex Drilling Method: Direct Push
Driller: Brian Log By: DEM Date Drilled: 4/16/03

Sketch Map

Notes – Hand Auger to 5' bgs

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter) Start: 1200
0	(concrete)	screen			Surface: Concrete 1'
1					SAND, silty, fine grained, gray, damp
2				1205	(ERM-B-26-2.0 & 2.5')
3					
4	SM				
5			0		As above, very moist
6			0	1225	As above, saturated As above (ERM-B-26-6.5 & 7.0') Hold
7			0 0	NO REC	As above
8					
9					1220 - WL tagged at 5' bgs set temporary screen 0-8' bgs
10					

Page 1 of 1

ERM

Drilling Log

Project: UAL OMC   Owner: UAL

Location: Oakland   Project Number: 5266.00

Boring Number: ERM-B-27   Total Depth of Auger: 5.5'   Auger Diameter: 3"

Surface Elevation: ____   Water Level: Initial ~3' bgs   24-hrs: ____

Total Depth of Soil Sampler: 5.5'   Total Depth of Ground Water Sampler: 5.5'

Ground Water Sample Interval(s): 0-5.5' bgs

Drilling Company: Gregg   Drilling Method: Hand Auger

Driller: Angel   Log By: AEP   Date Drilled: 4/17/03

Sketch Map

Notes

Depth (Feet)	Graphic Log and USCS Designation	Screen Interval	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
					Start: 0950
0					Hand Auger to 5.5' bgs
1					
2	SM			0950	Sand; fine grained; loose; damp; silty; some gravels; tan to brown. (Hand Augered Sample)
3					
4	SP			0950	Sand; fine grained; loose; wet; olive green; shell fragments. (Hand Augered Saturated Sample - HOLD)
5					
6					Total Depth to 5.5' bgs.
					set temporary screen 0.5-5.5' bgs WL at ~3' bgs

ERM

Drilling Log

Project: UAL OMC — Owner: Port of Oakland

Location: OAK Airport / 1100 Airport Dr — Project Number: 5266.00

Boring Number: W-B-2 — Total Depth of Auger: 15' — Auger Diameter:

Surface Elevation: — Water Level: Initial 8.5' — 24-hrs: —

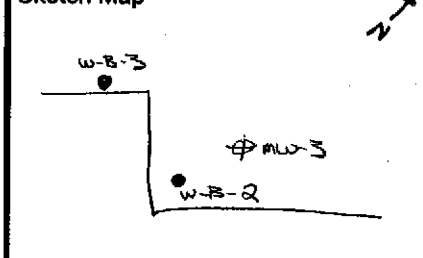
Total Depth of Soil Sampler: 15' — Total Depth of Ground Water Sampler: 15'

Ground Water Sample Interval(s): PVC riser 0-5' screen 5'-15'

Drilling Company: Gregg — Drilling Method: Geoprobe

Driller: Paul Rodgers — Log By: C. Waters — Date Drilled: 4/14/03

Sketch Map



Notes

Depth (Feet)	Graphic Log and USCS Designation	FID (ppm)	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
					ASPHALT
1			ND		
2			↓		Light brown fine to coarse SAND and GRAVEL; trace silt (DRY)
3				3.5'	
4				to 4.5'	Grey fine to med SAND; trace silt (DRY)
5					
6					
7					
8					WL @ 8.5' ▽
9					
10					Grey fine SAND; trace silt
11					
12					
13			↓		

Bottom @ 15'

Page 1 of 1

ERM

Drilling Log

Project: VALOMC Owner: PORT OF OAKLAND

Location: OAK. AIRPORT / AIRPORT DRIVE Project Number: 5266.00

Boring Number: W-B-3 Total Depth of Auger: 15' Auger Diameter:

Surface Elevation: Water Level: Initial 6' 24-hrs —

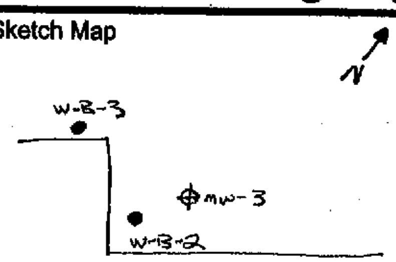
Total Depth of Soil Sampler: 15' Total Depth of Ground Water Sampler: 15'

Ground Water Sample Interval(s): PVC RISER 0'-5' SCREEN 5'-15'

Drilling Company: GREGG Drilling Method: GEOPROBE

Driller: PAUL ROGERS Log By: C WATROUS Date Drilled: 4/14/03

Sketch Map



Notes

Depth (Feet)	Graphic Log and USCS Designation	FID (ppm)	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
0–1			ND		ASPHALT
2					BROWN fine to med SAND and GRAVEL; trace silt (DRY)
3–4				3.0' to 4.0'	GREY fine to med SAND; trace silt (DRY)
6					WET @ 6' ▼
7					LIGHT BROWN fine to med SAND (WET)
10					DARK gray fine SAND; trace silt
13			↓		

BOTTOM @ 15'

Page 1 of 1

ERM

Drilling Log

Project: VALOMC Owner: Port of Oakland

Location: Oakland Airport/1100 Airport Dr. Project Number: 5266.00

Boring Number: W-B-4 Total Depth of Auger: 14' Auger Diameter:

Surface Elevation: Water Level: Initial 8' 24-hrs —

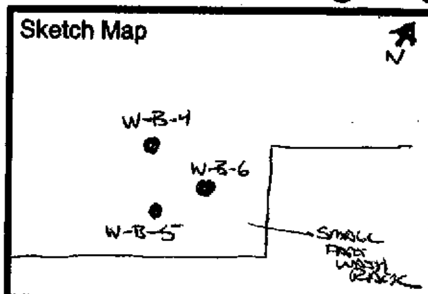
Total Depth of Soil Sampler: 14' Total Depth of Ground Water Sampler: 14'

Ground Water Sample Interval(s): PVC riser 0'-9' screen 9'-14'

Drilling Company: Gregg Drilling Method: Geoprobe

Driller: Paul Rodgers Log By: C. Watrous Date Drilled: 4/14/03

Sketch Map



Notes

Depth (Feet)	Graphic Log and USCS Designation	FID (ppm)	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
0					ASPHALT
1			ND		
2			↓		Brown fine to coarse SAND and GRAVEL (DRY)
3			↓	3.0' to 4.0'	
4			↓		Light Brown / Grey fine to med SAND; trace silt (DRY)
5			↓		
6			↓		
7			↓		Brown med to coarse SAND and GRAVEL (DRY)
8			↓		Dark grey fine SAND; trace silt (WET) — ▼ WET @ 8'
9			↓		
10			↓		
11			↓		
12			↓		
13			↓		

Bottom @ 14'

ERM **Drilling Log**

Project: UAL OMC Owner: Port of Oakland

Location: Oakland Airport / 1100 Airport Dr. Project Number: 5266.00

Boring Number: W-B-5 Total Depth of Auger: 14' Auger Diameter:

Surface Elevation: Water Level: Initial 8' 24-hrs —

Total Depth of Soil Sampler: 14' Total Depth of Ground Water Sampler: 14'

Ground Water Sample Interval(s): PVC riser 0-9' screen 9-14'

Drilling Company: Gregg Drilling Method: Geoprobe

Driller: Paul Rodgers Log By: C Watrous Date Drilled: 4/14/03

Sketch Map

SEE W-B-4

Notes

Depth (Feet)	Graphic Log and USCS Designation	FID (ppm)	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
					ASPHALT
1			ND		
2			↓		Brown fine to coarse SAND and GRAVEL (DRY)
3				3.0' to 4.0'	
4					Grey fine to med. SAND; trace silt (DRY)
5					
6					
7				7.0' to 8.0'	
8					Dark grey fine SAND; trace silt (WET) — ▼ wet @ 8'
9					
10					
11					
12					
13			↓		

BOTTOM @ 14'

ERM

Drilling Log

Project UAL OMC Owner PORT OF OAKLAND

Location OAKLAND AIRPORT / 1100 AIRPORT DR. Project Number 5266.00

Boring Number W-B-6 Total Depth of Auger 15' Auger Diameter ____

Surface Elevation ____ Water Level: Initial 9.5' 24-hrs —

Total Depth of Soil Sampler 15' Total Depth of Ground Water Sampler 15'

Ground Water Sample Interval(s) 10' PVC RISER ; 5' SCREEN

Drilling Company GREGG Drilling Method GEOPROBE

Driller PAUL RODGERS Log By C. WOODROWS Date Drilled 4/14/03

Sketch Map

SEE W-B-4

Notes

Depth (Feet)	Graphic Log and USCS Designation	FID (ppm)	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
1			ND		7" CONCRETE
2			↓		Brown fine to coarse SAND and GRAVEL (DRY)
3			↓	3.0' to 4.0'	
4			↓		Light brown fine to med SAND (DRY)
5			↓		
6			↓		
7			↓	7.0' to 8.0'	
8			↓		
9			↓		Grey fine SAND ; trace silt; trace shell fragments (moist)
10			↓		Grey fine SAND (wet) — wet @ 9.5'
11			↓		
12			↓		
13			↓		

BOTTOM @ 15'

Page 1 of 1

ERM

Drilling Log

Project: UAL OMC Owner: Port of Oakland

Location: OAK Airport / 1100 Airport Drive Project Number: 5266.00

Boring Number: W-B-7 Total Depth of Auger: 8' Auger Diameter:

Surface Elevation: Water Level: Initial 3' 24-hrs —

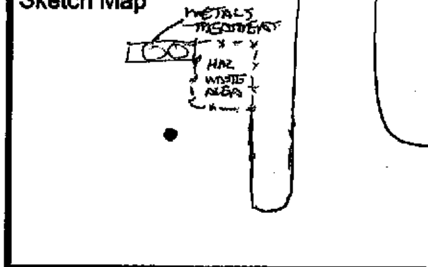
Total Depth of Soil Sampler: 8' Total Depth of Ground Water Sampler: 8'

Ground Water Sample Interval(s): PVC riser 0-3' screen 3'-8'

Drilling Company: Gregg Drilling Drilling Method: Geoprobe

Driller: Vince Log By: C. Watrous Date Drilled: 4/17/03

Sketch Map



Notes

Depth (Feet)	Graphic Log and USCS Designation	FID (ppm)	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
			ND	1.0 to 2.0	8" CONCRETE
1			↓		Brown fine to med SAND; trace silt (DRY)
2					
3					wet @ 3.0'
4					Grey fine SAND (wet)
5					
6					
7					Olive Green/Grey fine SAND; trace silt (wet)
8			ND		Bottom @ 8'
9					
10					

ERM

Drilling Log

Project: VAL OMC Owner: PORT OF OAKLAND

Location: OAKLAND AIRPORT (1100 Airport Dr) Project Number: 5266.00

Boring Number: W-B-8 Total Depth of Auger: 9' Auger Diameter:

Surface Elevation: Water Level: Initial 3' 24-hrs —

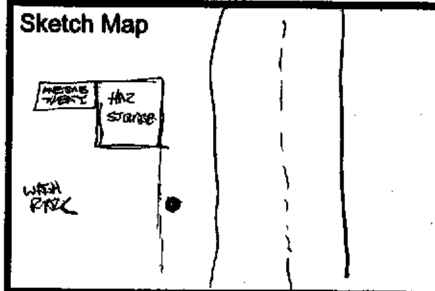
Total Depth of Soil Sampler: 9' Total Depth of Ground Water Sampler: 9'

Ground Water Sample Interval(s): PVC 0'-4', screen 4'-9'

Drilling Company: GREGG DRILLING Drilling Method: GEOPROBE

Driller: PAUL RODGERS Log By: C. WATROUS Date Drilled: 4/14/03

Sketch Map



Notes

Depth (Feet)	Graphic Log and USCS Designation	FID (ppm)	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
1			ND		BROWN FINE SAND AND GRAVEL; SOME SILT; ORGANICS (TOPSOIL)
2			↓	1.5-2.5	Brown fine to coarse SAND and GRAVEL (DRY)
3			↓		WET @ 3' ▼
4			↓		GREY COARSE SAND and GRAVEL (WET)
5			↓		
6			↓		
7			↓		
8			↓		
9			↓		Grey fine to coarse SAND and GRAVEL (WET)
10					Bottom @ 9'

ERM

Drilling Log

Project: UAL OMC Owner: Port of Oakland

Location: OAK Airport / 1100 Airport Drive Project Number: 5266.00

Boring Number: WB-9 Total Depth of Auger: 8' Auger Diameter: ______

Surface Elevation: ______ Water Level: Initial 4.0' 24-hrs ______

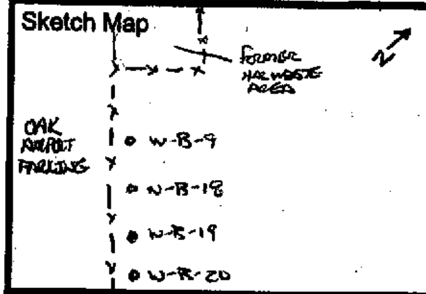
Total Depth of Soil Sampler: 8' Total Depth of Ground Water Sampler: 8'

Ground Water Sample Interval(s): PVC screen 0-8'

Drilling Company: Gregg Drilling Drilling Method: Geoprobe

Driller: Vince Log By: C. Watrous Date Drilled: 4/17/03

Sketch Map



Notes

Depth (Feet)	Graphic Log and USCS Designation	FID (ppm)	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
1			ND		8" concrete
			↓		Brown fine to med SAND (dry)
2					
3				3.0 to 3.5	
4					▼ WST @ 4.0'
5					
6					Gray fine SAND; trace silt (wet)
7					
8			↓		Bottom @ 8'
9					
10					

ERM

Drilling Log

Project: UAL OMC Owner: PORT OF OAKLAND

Location: OAK AIRPORT / 1100 AIRPORT DRIVE Project Number: 5260.00

Boring Number: W-B-10 Total Depth of Auger: 8' Auger Diameter: ______

Surface Elevation: ______ Water Level: Initial 4.5' 24-hrs ______

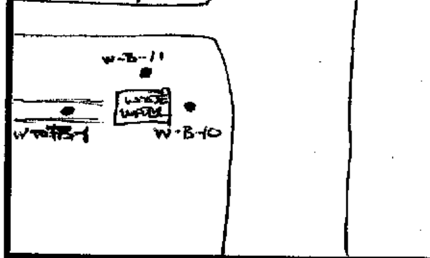
Total Depth of Soil Sampler: 8' Total Depth of Ground Water Sampler: 8'

Ground Water Sample Interval(s): PVC RISER 0-3', SCREEN 3-8'

Drilling Company: GREGG Drilling Method: GEOPROBE

Driller: VINCE Log By: C. WATROUS Date Drilled: 4/15/03

Sketch Map



Notes

Depth (Feet)	Graphic Log and USCS Designation	FID (ppm)	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
0–1			ND (to 8')		TOPSOIL (ORGANICS)
1–6			↓	3.0 to 4.0	BROWN fine to med SAND, trace silt (DRY) ▽ WET @ 4.5
6–8			↓		GREY fine SAND; trace silt (WET)
8					BOTTOM @ 8'
9					
10					

ERM

Drilling Log

Project: UAL OMC Owner: Port of Oakland

Location: OAK Airport / 1100 Airport Drive Project Number: 5266.00

Boring Number: W-B-11 Total Depth of Auger: 8' Auger Diameter:

Surface Elevation: Water Level: Initial 3.5' 24-hrs:

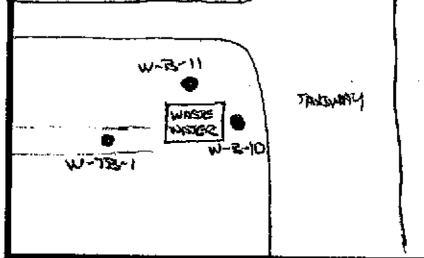
Total Depth of Soil Sampler: 8' Total Depth of Ground Water Sampler: 8'

Ground Water Sample Interval(s): PVC riser 0'-3'; Screen 3'-8'

Drilling Company: Gregg Drilling Method: Geoprobe

Driller: Vince Log By: C. Watrous Date Drilled: 4/15/03

Sketch Map



Notes

Depth (Feet)	Graphic Log and USCS Designation	FID (ppm)	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
					Topsoil (organics)
1			ND	1.0 to 2.0	Brown fine to med SAND; trace silt (dry)
2			↓		
3			↓		▼ wet @ 3.5'
4			↓		
5			↓		Grey fine SAND; trace silt (wet)
6			↓		
7			↓		
8			↓		Grey fine SAND; trace silt; trace shell fragments
					Bottom @ 8'
9					
10					

ERM

Drilling Log

Project: VAL OMC Owner: Port of Oakland

Location: Oak Airport / 1100 Airport Drive Project Number: 5266.00

Boring Number: W-B-14 Total Depth of Auger: 8' Auger Diameter: ______

Surface Elevation: ______ Water Level: Initial 4.5' 24-hrs ______

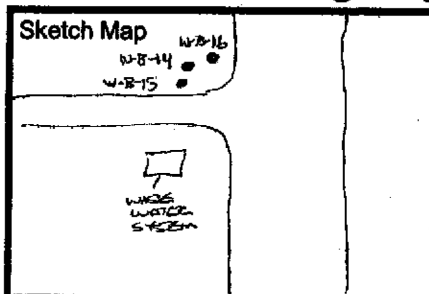
Total Depth of Soil Sampler: 8' Total Depth of Ground Water Sampler: 8'

Ground Water Sample Interval(s): PVC riser 0'-3'; Screen 3'-8'

Drilling Company: Gregg Drilling Method: Geoprobe

Driller: Vince Log By: C. Watrous Date Drilled: 4/15/03

Sketch Map



Notes

Depth (Feet)	Graphic Log and USCS Designation	FID (ppm)	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
					TOPSOIL (ORGANICS)
1			ND		Brown fine to med SAND
2				20 to 3.0	
3					
4					wet @ 4.5'
5					
6					Grey fine SAND; trace silt
7					
8			↓		Grey fine SAND and SILT; shell fragments
					Bottom @ 8'
9					
10					

ERM

Drilling Log

Project: UAL OMC

Owner: Port of Oakland

Location: OAK Airport / 1100 Airport Drive

Project Number: 5266.00

Boring Number: W-B-16

Total Depth of Auger: 8'

Auger Diameter:

Surface Elevation:

Water Level: Initial 2.5' 24-hrs

Total Depth of Soil Sampler: 8'

Total Depth of Ground Water Sampler: 8'

Ground Water Sample Interval(s): PVC screen 0'-8'

Drilling Company: Gregg Drilling

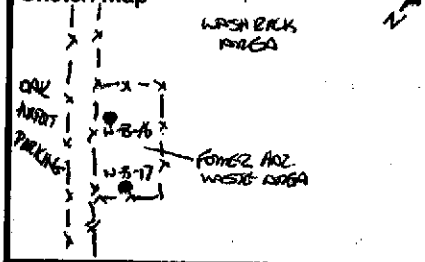
Drilling Method: Geoprobe

Driller: Vince

Log By: C. Watrous

Date Drilled: 4/17/03

Sketch Map



Notes

Depth (Feet)	Graphic Log and USCS Designation	FID (ppm)	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
					CONCRETE
1			ND	1.0 to 2.0	Brown fine to med SAND; trace silt (DRY)
2			↓		▼ WET @ 2.5'
3			↓		
4			↓		
5			↓		
6			↓		Olive green/grey fine SAND (WET)
7			↓		
8			↓		Bottom @ 8'
9					
10					

ERM

Drilling Log

Project: UALOMC
Owner: Port of Oakland
Location: OAK Airport / 1100 Airport Drive
Project Number: 5266.00
Boring Number: W-B-17
Total Depth of Auger: 8'
Auger Diameter:
Surface Elevation:
Water Level: Initial: 2.5'
24-hrs: —
Total Depth of Soil Sampler: 8'
Total Depth of Ground Water Sampler: 8'
Ground Water Sample Interval(s): PVC screen 0'-8'
Drilling Company: Gregg Drilling
Drilling Method: Geoprobe
Driller: Vince
Log By: C. Watrous
Date Drilled: 4/17/03

Sketch Map

SEE W-B-16 SKETCH

Notes

Depth (Feet)	Graphic Log and USCS Designation	FID (ppm)	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
1			ND	1.0 to 2.0	CONCRETE
			↓		Brown fine to med SAND; trace silt (DRY)
2					▼ WET @ 2.5'
3					
4					
5					
6					
7					Grey fine SAND (WET)
8			↓		Bottom @ 8'
9					
10					

ERM

Drilling Log

Project: UAL OMC
Owner: Port of Oakland
Location: OAK Airport / 1100 Airport Drive
Project Number: 5266.00
Boring Number: W-B-19
Total Depth of Auger: 8'
Auger Diameter:
Surface Elevation:
Water Level: Initial 4.0'
24-hrs:
Total Depth of Soil Sampler: 8'
Total Depth of Ground Water Sampler: 8'
Ground Water Sample Interval(s): PVC screen
Drilling Company: Gregg Drilling
Drilling Method: Geoprobe
Driller: Vince
Log By: C. Watrous
Date Drilled:

Sketch Map: See W-B-9 sketch

Notes:

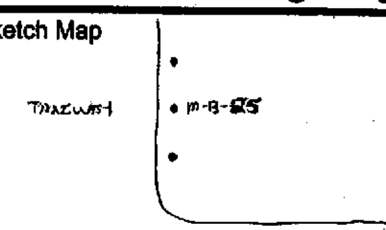
Depth (Feet)	Graphic Log and USCS Designation	FID (ppm)	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
1			ND		8" CONCRETE
2			↓		Brown fine to med SAND; trace silt (Dry)
3				3.0 to 3.5	
4					Wet @ 4.0'
5					
6					Grey fine SAND (wet)
7					
8			↓		Bottom @ 8'
9					
10					

ERM

Drilling Log

Project: UAL OMC
Owner: Port of Oakland
Location: Oak Airport / 1100 Airport Drive
Project Number: 526600
Boring Number: W-B-25
Total Depth of Auger: 10'
Auger Diameter:
Surface Elevation:
Water Level: Initial 4.5'
24-hrs:
Total Depth of Soil Sampler: 10'
Total Depth of Ground Water Sampler: 10'
Ground Water Sample Interval(s): PVC 0'-5'; screen 5'-10'
Drilling Company: Gregg
Drilling Method: Geoprobe
Driller: Vince
Log By: C. Watrous
Date Drilled: 9/16/03

Sketch Map



Notes

Depth (Feet)	Graphic Log and USCS Designation	FID (ppm)	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
					6" TOPSOIL (ORGANICS)
1			ND	1.0 to 2.0	Brown fine SAND and SILT. (DRY)
2					
3					
4					Blue grey SILT; trace fine sand (DRY) wet @ 4.5' ▽
5					
6					Brown fine to med SAND; trace silt (WET)
7					GREY SILT AND CLAY
8					Olive green fine SAND; trace silt (WET)
9					
10			↓		Bottom of Boring @ 10'

ERM

Drilling Log

Project: VAL OMC   Owner: PORT OF OAKLAND

Location: OAK AIRPORT / 1100 AIRPORT DRIVE   Project Number: 5266.00

Boring Number: W-B-29   Total Depth of Auger: 10'   Auger Diameter:

Surface Elevation: Water Level: Initial 3.0'   24-hrs:

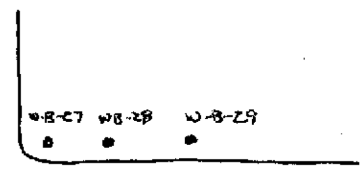
Total Depth of Soil Sampler: 10'   Total Depth of Ground Water Sampler: 10'

Ground Water Sample Interval(s): PVC RISER 0-5' SCREEN 5'-10'

Drilling Company: GREGG   Drilling Method: GEOPROBE

Driller: VINCE   Log By: C. WATROUS   Date Drilled: 4/16/03

Sketch Map



Notes

Depth (Feet)	Graphic Log and USCS Designation	FID (ppm)	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
					TOPSOIL (ORGANICS)
1			ND	1.0 to 2.0	Brown fine to med SAND; trace silt and clay (DRY)
2					
3					▼
4					Grey fine to med SAND; trace silt
5					
6					
7					Grey fine SAND and SILT;
8					
9					
10					Bottom @ 10'

ERM

Drilling Log

Project: UAL OMC Owner: Port of Oakland

Location: OAK Airport / 1100 Airport Drive Project Number: 5266.00

Boring Number: W-B-32 Total Depth of Auger: 10' Auger Diameter: ____

Surface Elevation: ____ Water Level: Initial 3.0' 24-hrs ____

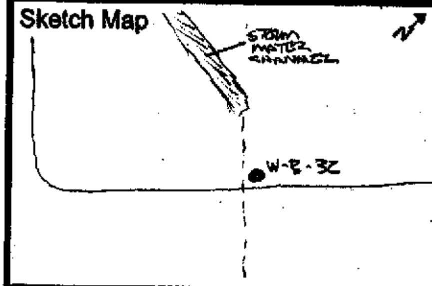
Total Depth of Soil Sampler: 10' Total Depth of Ground Water Sampler: 10'

Ground Water Sample Interval(s): Pre screen 0'-10'

Drilling Company: Gregg Drilling Drilling Method: Geoprobe

Driller: Vince Log By: C. Watrous Date Drilled: 4/10/03

Sketch Map



Notes

Depth (Feet)	Graphic Log and USCS Designation	FID (ppm)	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
1			ND	1.0 to 2.0	Brown fine to coarse SAND + GRAVEL; trace organics
					Brown fine to med SAND; trace silt (DRY)
2					
3					▽ wet @ 3.0'
					Grey fine to med SAND (wet)
4					Blue grey CLAY
5					Olive green/grey fine SAND (wet)
6					
7					
8					Grey fine SAND (wet)
9					
10			↓		Bottom @ 10'

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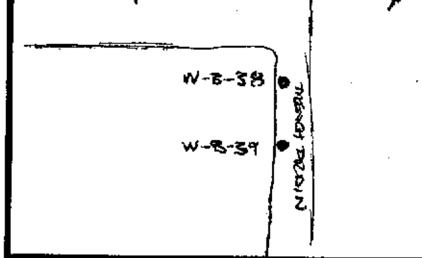
ERM

Drilling Log

Project: VAL OMC
Owner: Port of Oakland
Location: Oak Airport / 1100 Airport Dr.
Project Number: 5266.00
Boring Number: W-B-38
Total Depth of Auger: 10'
Auger Diameter: ______
Surface Elevation: ______
Water Level: Initial: 4'
24-hrs: ______
Total Depth of Soil Sampler: 8'
Total Depth of Ground Water Sampler: 8'
Ground Water Sample Interval(s): PVC 0-3' screen 3-8'
Drilling Company: Gregg
Drilling Method: Geoprobe
Driller: Vince
Log By: C. Watrous
Date Drilled: 4/15/03

Sketch Map



Notes

Depth (Feet)	Graphic Log and USCS Designation	FID (ppm)	PID (ppm)	Sample Interval	Soil Description and Observations (Color, Texture, Structures, Odor, Foreign Matter)
					6" CONCRETE
1			ND		Brown fine to med SAND; some silt (dry)
2			↓	2.0 to 3.0	
3			↓		Olive grey fine to med SAND ▼ noted @ 4'
4			↓		
5			↓		
6			↓		
7			↓		Grey fine SAND (wet)
8			↓		Bottom @ 8'
9			↓		
10			↓		

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Environmental Resources Management

Drilling Log

Project: UAL OMC — Owner: UAL

Location: Oakland — W.O. Number: 5266.00

Well Number: ERM-MW-01 — Total Depth: 16' — Diameter: 7"

Surface Elevation: ____ — Water Level: Initial 7.5' — 24-hrs. ____

Screen: Dia. 1" — Length: 10' — Slot Size: 0.020"

Casing: Dia. 1" — Length: 5.75' — Type: sch 40 PVC

Drilling Company: Gregg — Drilling Method: HSA

Driller: Bobby Deason — Log By: DEM/CBW — Date Drilled: 5/8/03

Sketch Map

Notes

PID	Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures) Start: 1520 Hand Auger to 5' bgs
	0				Surface: Concrete 7" Baserock
	1	Fill			
	2		Grout	Hold 1525	
	3				SAND, silty, tan, fine grained, loose, dry
	4				
0	5				
0					
0	6	SM		Hold 1535	
0				No Rec	
0	7				
0					
0	8			No Rec	SAND, silty, fine grained, gray, loose, wet ▽
	9			No Rec	
0	10		#3 SAND		SAND, silty, gray, fine grained, loose, saturated
0					As above
0	11				As above, Grades to CLAY, silty, tan, soft, moist
0					
0	12	CL			
0					

GWLOG

Environmental Resources Management

Drilling Log

Project UAL OMC Owner UAL

Location Oakland W.O. Number 5266.00

Well Number ERM-MW-01 Total Depth 16' Diameter 7"

Surface Elevation ______ Water Level: Initial 7.5' 24-hrs. ______

Screen: Dia. 1" Length 10' Slot Size 0.020"

Casing: Dia. 1" Length 5.75' Type Sch 40 PVC

Drilling Company Gregg Drilling Method HSA

Driller Bobby Deason Log By DEM/CBW Date Drilled 5/8/03

Sketch Map

Notes

PID	Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
0					CLAY, Olive green, soft, moist
0	14	CL			As above
0					As above
0 0	15		#3 SAND	NO REC	CLAY, dark gray, silty, soft (Bay Mud)
0		OH			As above
0	16				As above
0 0		SM			SAND, silty, dark gray, clayey, shell fragments, saturated
	17			NO REC	
	18				
	19				
	20				

Environmental Resources Management

Drilling Log

Project: UAL OMC   Owner: UAL

Location: Oakland   W.O. Number: 5266.00

Well Number: ERM-MW-02   Total Depth: 17'   Diameter: 7"

Surface Elevation: ____   Water Level: Initial 8'   24-hrs. ____

Screen: Dia. 1"   Length 10'   Slot Size 0.020"

Casing: Dia. 1"   Length 6.75'   Type SCh 40 PVC

Drilling Company: Gregg   Drilling Method: HSA

Driller: Bobby Deason   Log By: DEM   Date Drilled: 5/8/03

Sketch Map

Notes

PID	Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
					Start: 1330 Hand Auger to 5' bgs
	0				Surface: Asphalt 8.5"
	1	Fill			Base rock with SILT, sandy, tan, dry
	2				
0	3		Grout	Hold 1350	SAND, silty, fine grained, gravelly, tan, loose, dry
	3.5				As above with no gravel ↓
	4				
0	5	SM			
0					
0	6				
0				NO Rec	
0	7				
0					As above, slightly moist
0	8				As above, gray, saturated ▽
0					As above, dark gray, Grades to CLAY, silty, Olive green, soft, saturated. As above and sandy 8.5-9.0' bgs
0	9	CL	#3 SAND		
				NO Rec	
0	10	SM			SAND, silty, Fine grained, Olive green, loose, saturated
0					As above
0	11				
0					As above, Grades to CLAY, silty, Olive green to brown, soft, very moist
	12	CL			
0					As above
0		OH			As above, Grades to CLAY, silty, dark gray, soft, very moist (Bay Mud)

Page 1 of 2

GWLOG

Environmental Resources Management

Drilling Log

Project: UAL OMC — Owner: UAL

Location: Oakland — W.O. Number: 5266.00

Well Number: ERM-MW-2 — Total Depth: 17' — Diameter: 7"

Surface Elevation: — Water Level: Initial 8' — 24-hrs.

Screen: Dia. 1" — Length 10' — Slot Size 0.020"

Casing: Dia. 1" — Length 6.75' — Type

Drilling Company: Gregg — Drilling Method: HSA

Driller: Bobby Deason — Log By: DEM — Date Drilled: 5/8/03

Sketch Map

Notes

PID	Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
0					As above
	14			No Rec	
0	15	OH	#3 SAND		As above
0					
0	16				
0		ML		No Rec	↓, Grades to SILT, sandy, clayey, dark gray, very soft, saturated
	17				
	18				
	19				
	20				

GWLOG

Environmental Resources Management

Drilling Log

Project UAL OMC Owner UAL

Location Oakland W.O. Number 5266.00

Well Number ERM-MW-3 Total Depth 15' Diameter 7"

Surface Elevation ______ Water Level: Initial 7.5' 24-hrs. ______

Screen: Dia. 1" Length 10' Slot Size 0.020"

Casing: Dia. 1" Length 4.75' Type sch 40 PVC

Drilling Company Gregg Drilling Method HSA

Driller Bobby Deason Log By CBW Date Drilled 5/9/03

Sketch Map

Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures) start: 0810
0				Surface: 8" Asphalt/Concrete Base Rock
2	Fill	Grout		
3			Hold 0815	SAND, silty, fine grained, tan, loose, dry
5	SM			↓
8		#3 SAND	NO REC	SAND, silty, gray, loose, shell fragments, saturated
9				As above
				As above
10	CL			CLAY, olive green, soft
11			NO REC	
12	OH			CLAY, dark gray, shells
				As above
				As above

GWLOG

Environmental Resources Management

Drilling Log

Project: UAL OMC — Owner: UAL

Location: Oakland — W.O. Number: 5266.00

Well Number: ERM-MW-3 — Total Depth: 15′ — Diameter: 7″

Surface Elevation: ______ — Water Level: Initial 7.5′ — 24-hrs. ______

Screen: Dia. 1″ — Length 10′ — Slot Size 0.020″

Casing: Dia. 1″ — Length 4.75′ — Type Sch 40 PVC

Drilling Company: Gregg — Drilling Method: HSA

Driller: Bobby Deason — Log By: CBW — Date Drilled: 5/9/03

Sketch Map

Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
	OH			As above
14	SM			SAND, silty, fine grained, tan, loose, saturated
				As above
15		#3 SAND		SAND, dark black, fine grained, saturated
	SP			As above
16				As above
				As above
17				
18				
19				
20				

GWLOG

Environmental Resources Management

Drilling Log

Project: UAL OMC Owner: UAL

Location: Oakland W.O. Number: 5266.00

Well Number: ERM-MW-4 Total Depth: 16' Diameter: 7"

Surface Elevation: ____ Water Level: Initial 7.5' 24-hrs. ____

Screen: Dia. 1" Length 10' Slot Size 0.020"

Casing: Dia. 1" Length 5.75' Type Sch 40 PVC

Drilling Company: Gregg Drilling Method: HSA

Driller: Bobby Deason Log By: CBW Date Drilled: 5/9/03

Sketch Map

Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures) Start: 0940
0				Surface: Concrete 6"
				Pea Gravel
2		Grout	Hold 0945	SAND, silty, tan, dry
5	SM			SAND, silty, Olive green, damp
7			NO Rec	
8		#3 SAND	NO Rec	SAND, silty, gray, fine grained, saturated ∇
9				As above
				As above
10	ML			SILT, sandy, clayey, gray, saturated
	SM			SAND, silty, fine grained, tan, loose, saturated
11				As above
				CLAY, dark green, soft
12	CL			As above
				As above
				CLAY, dark gray, soft

GWLOG

Environmental Resources Management

Drilling Log

Project: OMC UAL   Owner: UAL

Location: Oakland   W.O. Number: 5266.00

Well Number: ERM-MW-4   Total Depth: 16'   Diameter: 7"

Surface Elevation: ____   Water Level: Initial 7.5'   24-hrs. ____

Screen: Dia. 1"   Length 10'   Slot Size 0.020"

Casing: Dia. 1"   Length 5.75'   Type sch 40 PVC

Drilling Company: GREGG   Drilling Method: HSA

Driller: Bobby Deason   Log By: CBW   Date Drilled: 5/9/03

Sketch Map

Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
				As above
14	CL			As above
		#3 SAND	NO REC	
15				CLAY, dark gray, stiff, shell fragments
16	OH			As above
				As above
17				
18				
19				
20				

Environmental Resources Management

Drilling Log

Project: UAL OMC | Owner: UAL
Location: Oakland | W.O. Number: 5266.00
Well Number: ERM-MW-05 | Total Depth: 14' | Diameter: 7"
Surface Elevation: | Water Level: Initial ~8' | 24-hrs.
Screen: Dia. 1" | Length 10' | Slot Size 0.020"
Casing: Dia. 1" | Length 3.75' | Type Sch 40 PVC
Drilling Company: Gregg | Drilling Method: HSA
Driller: Bobby Deason | Log By: DEM | Date Drilled: 5/8/03

Sketch Map

Notes

PID	Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
					Start: 1100 Hand Auger to 5' bgs
	0				Surface: Concrete 14"
0	1.5		Grout	Hold 1105	SAND, silty, fine grained, tan, damp
0	2				↓
0	5	SM			As above, Olive gray
0	5.5				
0	6			Hold 1115	
0	6.5				
0	7		#3 sand	NO Rec	
0	7.5				As above, very moist
0	8				As above, saturated
0	8.5				As above
0	9				As above
0	9.5				↓
0	10				
0	10.5				
0	11	CL			As above, Grades to CLAY, silty, soft, olive gray, saturated,
8?	11.5				As above, Grades to SAND, silty, fine grained, Olive gray, saturated
	12	SM			As above
0	13				As above, Grades to CLAY, silty, Olive gray, very moist, soft
0	13.5	CL			As above

Environmental Resources Management

Drilling Log

Project UAL OMC Owner UAL

Location Oakland W.O. Number 5266.00

Well Number ERM-MW-05 Total Depth 14' Diameter 7"

Surface Elevation Water Level: Initial ~8' 24-hrs.

Screen: Dia. 1" Length 10' Slot Size 0.020"

Casing: Dia. 1" Length 3.75' Type Sch 40 PVC

Drilling Company Gregg Drilling Method HSA

Driller Bobby Deason Log By DEM Date Drilled 5/8/03

Sketch Map

Notes

PID	Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
0			#3		As above, gray
0	14	CL			As above
0			Bentonite		As above, dark gray, shell fragments
0	15	SC			As above, Grades to SAND, clayey, shell fragments, dark gray, fine grained, saturated, rotten egg odor
	16				
	17				
	18				
	19				
	20				

GWLOG

Environmental Resources Management

Drilling Log

Project: UAL - OMC
Owner: UAL
Location: Oakland
W.O. Number: 5266.00
Well Number: ERM-MW-06
Total Depth: 12.5'
Diameter: 5 3/4"
Surface Elevation:
Water Level: Initial ~3'
24-hrs.:
Screen: Dia. 1"
Length: 10'
Slot Size: 0.020"
Casing: Dia. 1"
Length: 2.25'
Type: Sch 40 PVC
Drilling Company: Gregg
Drilling Method: HSA
Driller: Bobby Deason
Log By: DEM
Date Drilled: 5/7/03

Sketch Map

Notes - Stove pipe Completion

PID	Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures) Start: 0910 Hand Auger to 3' bgs
	0				
0.5	0.5			Hold 0912	SILT, gravelly, clayey, brown, damp
0.7	1		Grout		As above
	1.5				As above
0	2	ML			As above, moist
	2.5				As above, very moist
0	3				As above, increasing clay, saturated. Begin HSA
	3.5				As above, Grades to Pea Gravel, saturated
0	4	Pea Gravel			As above ↓
0	5				
	6				As above, Grades to SAND, silty, fine grained, brown, saturated
0	6.5			NO REC	
	7		#3 Sand	NO REC	
	8	SM			
0	8.5				
0	9				SAND, silty, fine grained, loose, gray, saturated, Grades to CLAY, olive gray,
0	9.5				soft, saturated, Grades to SAND, silty, olive gray, saturated
0	10				As above
	10.5				As above
0	11	CL			As above, Grades to CLAY, olive green, soft, very moist
0	11.5				As above, Grades to SAND, fine grained, slightly silty,
	12	SP		NO REC	gray, saturated
	12.5				As above, increasing silt
0	13	CL			CLAY, silty, dark gray and olive green, very moist

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GWLOG

Environmental Resources Management

Drilling Log

Project: UAL OMC   Owner: UAC

Location: Oakland   W.O. Number: 5266.00

Well Number: ERM-MW-06   Total Depth: 12.5'   Diameter: 5 3/4"

Surface Elevation: ____   Water Level: Initial ~3'   24-hrs. ____

Screen: Dia. 1"   Length: 10'   Slot Size: 0.020"

Casing: Dia. 1"   Length: 2.25'   Type: Sch 40 PVC

Drilling Company: Gregg   Drilling Method: HSA

Driller: Bobby Deason   Log By: DEM   Date Drilled: 5/7/03

Sketch Map

Notes

PID	Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
0		CL			As above
0	14				As above
	15				
	16				
	17				
	18				
	19				
	20				

GWLOG

Environmental Resources Management

Drilling Log

Project: UAL OMC Owner: UAL

Location: Oakland W.O. Number: 5266.00

Well Number: ERM-MW-07 Total Depth: 14' Diameter: 5 3/4"

Surface Elevation: ____ Water Level: Initial ~3.5' 24-hrs. ____

Screen: Dia. 1" Length 10' Slot Size 0.020"

Casing: Dia. 1" Length 3.75' Type Sch 40 PVC

Drilling Company: Gregg Drilling Method: HSA

Driller: Bobby Deason Log By: DEM Date Drilled: 5/7/03

Sketch Map

Notes

PID	Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures) Start: 1220 Hand Auger to 5' bgs
	0				Surface: Concrete ~14"
	1		Grout		
0					SAND, silty, Fine grained, tan, damp
0	2				As above
					As above, Olive green
	3	SM			As above
					As above, very moist
	4				As above, saturated
		ML			SILT, trace sand and clay, Olive green, saturated
					As above
0	5				
0		SM			SAND, silty, fine grained, Olive gray, shell fragments, saturated
0	6	CL			CLAY, slightly silty, olive green, soft, very moist
0		ML			SILT, olive green, damp, Grades to SAND, Fine to medium
0	7	SP		NO REC	grained, Olive gray, trace silt, micaceous, shell fragments, saturated
0					As above
0	8	ML	#3 sand		SILT, sandy, Olive green, very moist
0					SAND, Fine to medium grained, olive gray, shell fragments, saturated
0	9	SP			As above
0					As above
0	10			NO REC	
0		SM			SAND, silty, Fine grained, gray, saturated
0	11	CL			CLAY, Olive green, soft, very moist
0					SAND, fine to medium grained, gray, shell fragments, saturated
0	12	SP			As above
0					As above
0					As above

Environmental Resources Management

Drilling Log

Project UAL OMC Owner UAL

Location Oakland W.O. Number 5266.00

Well Number ERM-MW-07 Total Depth 14' Diameter 5 3/4"

Surface Elevation ______ Water Level: Initial ~3.5' 24-hrs. ______

Screen: Dia. 1" Length 10 Slot Size 0.020"

Casing: Dia. 1" Length 3.75' Type Sch 40 PVC

Drilling Company ______ Drilling Method HSA

Driller Bobby Deason Log By DEM Date Drilled 5/7/03

Sketch Map

Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
0	SP			As above
14	OH			Bay Mud, CLAY, silty, dark gray, soft, saturated
15			No Rec	
16				
17				
18				
19				
20				

Environmental Resources Management

Drilling Log

Project: UAL OMC **Owner:** UAL
Location: Oakland **W.O. Number:** 5266.00
Well Number: ELM-MW-08 **Total Depth:**   **Diameter:** 5 3/4"
Surface Elevation: **Water Level: Initial** ~3.5' **24-hrs.**
Screen: Dia. 1" **Length** 10' **Slot Size** 0.020"
Casing: Dia. 1" **Length** 3.25' **Type** Sch 40 PVC
Drilling Company: Gregg **Drilling Method:** HSA
Driller: Bobby Deeson **Log By:** DEM **Date Drilled:** 5/7/03

Sketch Map

Notes

Start: 1355 Hand Auger to 5' bgs

PID	Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
	0				
	0.5				Surface: Concrete 1'
	1			Hold 1400	
1	1.5		Grout		SAND, Fine grained, gray, loose, silty, moist
1.5	2				As above
0	2.5				As above
	3				As above, very moist
	3.5				As above, saturated
0	4				↓
0	5				
0	5.5				SAND, Fine grained, gray, silty, shell fragments, saturated
0	6	SM			↓
0	6.5				
0	7				
	7.5		#3 sand	NO Rec	
	8				
	9			NO Rec	
0	10				
0	10.5				SAND, Fine grained, silty, shell fragments, saturated
0	11				↓
0	11.5				
	12				
0	12.5	OH			CLAY, silty, dark gray, soft, saturated (Bay Mud)
0	13				As above

Environmental Resources Management

Drilling Log

Project UAL OMC Owner UAL

Location Oakland W.O. Number 5266.00

Well Number ERM-MW-08 Total Depth 13.5 Diameter 5 3/4"

Surface Elevation ____ Water Level: Initial ~3.5' 24-hrs. ____

Screen: Dia. 1" Length 10' Slot Size 0.020"

Casing: Dia. 1" Length 3.25' Type Sch 40 PVC

Drilling Company Gregg Drilling Method HSA

Driller Bobby Deason Log By DEM Date Drilled 5/7/03

Sketch Map

Notes

PID	Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
0		OH	#3 M		As above
	14				
	15				

Environmental Resources Management — **Drilling Log**

Project: UAL OMC | Owner: UAL
Location: Oakland | W.O. Number: 5266.00
Well Number: ERM-MW-09 | Total Depth: 13.5' | Diameter: 5 3/4"/8"
Surface Elevation: | Water Level: Initial ~3.5 | 24-hrs.
Screen: Dia. 1" | Length: 10' | Slot Size: 0.020"
Casing: Dia. 1" | Length: 3.25' | Type: Sch 40 PVC
Drilling Company: Gregg | Drilling Method: HSA
Driller: Bobby Dexson | Log By: DEM | Date Drilled: 5/7/03

Sketch Map

Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures) start: 1510 Hand Auger to 5' bgs
0				Surface: Concrete 1'
1		Grout	Hold 1515	SAND, Fine to medium grained, slightly silty, gray, damp, hydrocarbon-like odor
2				As above, very moist
3				As above
				As above, saturated
4				As above
				As above, slight hydrocarbon-like odor
5	SM			As above
				As above, shell fragments ↓
6		#3 sand		
7				As above, olive gray
				As above ↓
8				
9			No Rec	
10				Sampler sand locked on 10-12' run
11				Soils - As above ↓
12				
				Used 8" augers to set well to 13.5' bgs

Environmental Resources Management

Drilling Log

Project UAL OMC Owner UAL

Location Oakland W.O. Number 5266.00

Well Number ERM-MW-09 Total Depth 13.5' Diameter 5 3/4"/8"

Surface Elevation ____ Water Level: Initial ~3.5' 24-hrs. ____

Screen: Dia. 1" Length 10' Slot Size 0.020"

Casing: Dia. 1" Length 3.25' Type Sch 40 PVC

Drilling Company Gregg Drilling Method HSA

Driller Bobby Deason Log By DEM Date Drilled 5/7/03

Sketch Map

Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
		#Um		
14				
15				

GWLOG

Environmental Resources Management

Drilling Log

Project	UAL OMC	Owner	UAL
Location	Oakland	W.O. Number	5266.00
Well Number	ERM-MW-10	Total Depth	10'
Diameter	7"	Surface Elevation	
Water Level: Initial	~2.5'	24-hrs.	
Screen: Dia.	1"	Length	7'
Slot Size	0.020"	Casing: Dia.	1"
Length	2.75	Type	Sch 40 PVC
Drilling Company	Gregg	Drilling Method	HSA
Driller	Bobby Deason	Log By	DEM
Date Drilled	5/8/03		

Sketch Map

Notes

Description/Soil Classification (Color, Texture, Structures)

start: 0850 Hand Auger to 5' bgs

PID	Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification
	0				
0		SM	Grout		SAND, silty, tan, finegrained, damp, loose
0	1				As above, moist
		CL			CLAY, silty, Olive green, medium plasticity, moist
0	2				As above, very moist
					SAND, silty, finegrained, loose, olivegreen, saturated
	3				As above
					As above
0	4				As above, trace silt and clay
					As above
0	5	SM			As above
0			#3 Sand		SAND, Silty, Olive green, loose, saturated
0	6				↓
0					
0	7				
0					
0	8				
0					As above, Grades to CLAY, silty, dark gray, soft, moist
0	9				As above (BAYMUD)
0					As above, very moist
0	10	OH			↓
0					
0	11				
0					As above, brown to rusty orange
0	12	SM			SAND, silty, dark gray, saturated, rotten egg odor

GWLOG

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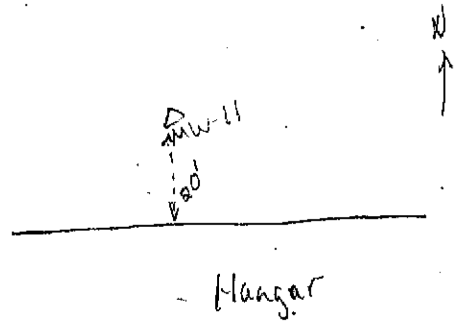
BOREHOLE / WELL CONSTRUCTION LOG

EHOLE LOCATION



Approximate Scale:

Notes:

Project: (facility, address, city, state)	former UAL OMC Oakland Airport Oakland, CA
Borehole/Well No:	FRM MW-11
Job No:	321-1677-1
Logged By:	JEM / MHW
Edited By:	—
Project Manager:	JEA
Drill Rig:	M 2.5 (Geoprobe)
Drilling Contractor: (name, city, state)	Gregg Drilling
Driller:	Don & Fausto
License # : C57-	485165
Drilling Method:	HSA
Sample Method:	Direct Push
Well Head Completion:	Flush
Ground Surface Elevation:	—
Hammer Weight/Drop:	—
Borehole Diameter:	8"
Started, Time:	1030 11:15
Date:	12/19/03
Completed, Time:	12:28 p.m
Date:	12-22-03

Water Depth	12.5'				
Boring/Casing Depth	15'				
Time	12:24				
Date	12-22-03				

Total Boring Depth: 15' | Total Well Depth: 15'

Screened Interval: 5'-15' | Well Diameter: 2"

Sand Pack (Type and Interval):

Well Development Method:

Time: | Date: | Flow Rate:

Geophysical Logs, Type:

By: | Date:

e ID	PID / PID (ppm)	Sampler Type / depth	Blows per 6 Inches	Inches Driven	Inches Recovered	Sample Condition	Boring Diameter	Conductor Casing(s) Interval and Diameter	Sand / Grout	Well Casing / Screen	Depth in Feet	Recovery / Sample Loc.	Contact / Hyd. Conduct.	LITHOLOGIC DESCRIPTIONS
			NA	NA	NA		8"		Bentonite Grout (0–4')	PVC Blank Casing (0–5')	0			Asphalt/concrete 14.5 inch
											1			
	ND										2			Sand (SP), light br, soft, damp, 100% fine to med grain sand w/ some sea shells - mollusks, NP, MEK to HEK
											3			Water in the hole ~ 3.5 ft.
											4			
									RMC #2/12 sand (4'–)	0.01" slotted screen (5'–)	5			
		Direct Push									6			Sand SP, light gray, soft, damp to moist, 100% fine to med grain sand, NP, MEK to HEK
											7			
	ND										8			
	ND										9			Sand, SP, light gray, soft, wet, 100% fine to med grain sand, NP, HEK
	ND													

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BOREHOLE / WELL CONSTRUCTION LOG (cont.)

Project / Job No.: 321-1677-1

Borehole/Well No.: ERM-MW-11

Sample ID	PID/FID	Sampler Type	Blows / 6 Inches	Inches Driven	Inches Recov'd	Sample Cond.	Boring Diameter	Conduct. Casing	Sand / Grout	Well Casing	Depth (ft)	Recovery	Contact	Notes
	ND	Direct Push	NA	NA	NA	Good	8"		↑	↑				Same as above
	ND	↓	↓	↓	↓		↓			0.01" slotted screen	1			
	ND								RMC #2/12 Sand		2			
	ND										3			
	ND	↓	↓	↓	↓		↓		↓	↓	4			
											5			
											6			
											7			
											8			
											9			
											0			
											1			
											2			
											3			
											4			
											5			
											6			
											7			
											8			
											9			

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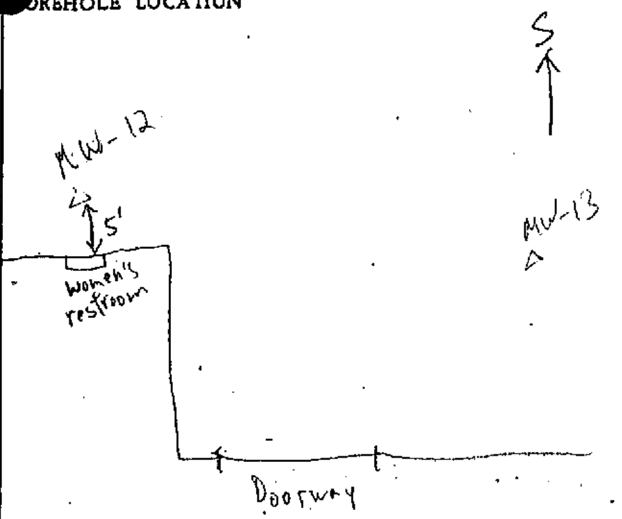
BOREHOLE / WELL CONSTRUCTION LOG

BOREHOLE LOCATION



Approximate Scale:

Notes:

Field	Value	Field	Value
Project: (facility, address, city, state)	former UAL OMC Oakland Airport Oakland, CA	Borehole/Well No:	ERM-MW-12
		Job No:	321-1677-1
Logged By:	JEA/MMW	Edited By:	—
Project Manager:	JEA	Drill Rig:	Geoprobe M.2.5
Drilling Contractor: (name, city, state)	Gregg Drilling		
Driller:	Don & Fausto	License #: C57-	485165
Drilling Method:	HSA	Sample Method:	Direct Push
Well Head Completion:	Flush	Ground Surface Elevation:	—
Hammer Weight/Drop:	—	Borehole Diameter:	8"
Started, Time:	1322 8:50	Date:	12/19/03 12/23/03
Completed, Time:	10:03	Date:	12/23/03

Water Depth	7.32'				
Boring/Casing Depth	15				
Time	10:01				
Date	12/23/03				

Total Boring Depth: 15' | Total Well Depth: 15'

Screened Interval: 5'-15' | Well Diameter: 2"

Sand Pack (Type and Interval): RMC #2/12 sand, 4'-15'

Well Development Method:

Time: Date: — Flow Rate: —

Geophysical Logs, Type:

By: Date: —

Sample ID	PID / FID (ppm)	Sampler Type / depth	Blows per 6 Inches	Inches Driven	Inches Recovered	Sample Condition	Boring Diameter	Conductor Casing(s) Interval and Diameter	Sand / Grout	Well Casing / Screen	Depth in Feet	Recovery / Sample Loc.	Contact / Hyd. Conduct.	LITHOLOGIC DESCRIPTIONS
			NA	NA	NA		8"		Grout (0–3')	blank PVC casing (0–5')	0			Concrete
											1			Sand (SP)
											2			Clay Sand (SC) Brown, dry, soft, 40% clay 60% fine med sand, HP, LEK
									bentonite (3–4')		3			Sand SP Brown, soft, dry, 100% fine grain, NP, MEK to LEK
									RMC #2/12 sand (4'–)	1" slotted screen (5'–)	4			
											5			
											6			
											7			Sand (SP) gray brown, stiff, moist, 100% fine to med grain sand, NP, MEK to HEK
											8			water @ 7ft
											9			

WEISS ASSOCIATES — **BOREHOLE / WELL CONSTRUCTION LOG (cont.)**

Project / Job No.: 321-1677-1
Borehole/Well No.: ERM-MW-12

Notes:

Sample ID	PID/FID	Sampler Type	Blows / 6 Inches	Inches Driven	Inches Recov'd	Sample Cond.	Boring Diameter	Conduct. Casing	Sand / Grout	Well Casing	Depth (ft)	Recovery	Contact	Notes
	ND	Direct Push	NA	NA	NA	Good	8"		#2/12 sand	0.01" slotted / screen	10–11			Same as above
	ND										11–12			Clay (CH), Light brown gray, wet, med. dense, 100% clay, HP, LEK
	ND										12–13			Sand (SP) gray brown, stiff, wet, 100% fine-med. sand, NP, MEK to HEK
	ND								PVC		13–14			
	ND										14–15			
											16			
											17			
											18			
											19			
											20			
											21			
											22			
											23			
											24			
											25			
											26			
											27			
											28			
											29			

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BOREHOLE / WELL CONSTRUCTION LOG

BOREHOLE LOCATION

S ↑

MW-13

Doorway

Approximate Scale:

Notes:

Project: (facility, address, city, state)	former UAL OMC Oakland Airport Oakland, CA
Borehole/Well No:	ERM-MW-13
Job No:	321-1697-1
Logged By:	JEA/MMW
Edited By:	—
Project Manager:	JEA
Drill Rig:	Geoprobe M.2.5
Drilling Contractor: (name, city, state)	Gregg Drilling
Driller:	Don & Fausto
License #: C57-	485165
Drilling Method:	HSA
Sample Method:	Direct Push
Well Head Completion:	Flush mounted
Ground Surface Elevation:	—
Hammer Weight/Drop:	—
Borehole Diameter:	8"
Started, Time:	14/15 14:41
Date:	12/19/03 12/22/03
Completed, Time:	15:34
Date:	12/22/03

Water Depth	8.85'				
Boring/Casing Depth	15'				
Time	15:30				
Date	12/22/03				

Total Boring Depth: 15' **Total Well Depth:** 15'

Screened Interval: 5'-15' **Well Diameter:** 2"

Sand Pack (Type and Interval): 4'-15'

Well Development Method:

Time: — **Date:** — **Flow Rate:** —

Geophysical Logs, Type:

By: — **Date:** —

Sample ID	PID / FID (ppm)	Sampler Type / depth	Blows per 6 Inches	Inches Driven	Inches Recovered	Sample Condition	Boring Diameter	Conductor Casing(s) Interval and Diameter	Sand / Grout	Well Casing / Screen	Depth in Feet	Recovery / Sample Loc.	Contact / Hyd. Conduct.	LITHOLOGIC DESCRIPTIONS
			NA	NA	NA		8"		Grout (0–~3.5'); Bentonite (~3.5–4')	Blank PVC Casing (0–5')	0			Concrete
											1		—	Sand (SP), Brown, Soft, damp, 100% fine to med sand, NP, MEK to HEK
											2			
											3			
											4			
					RMC #2/12 Sand	0.01" slotted Screen	5			
											6		←	color change to gray brown
											7			
											8			water coming into borehole ~8 ft
											9			

WEISS ASSOCIATES — BOREHOLE / WELL CONSTRUCTION LOG (cont.)

Project / Job No.: 321-1677-1

Borehole/Well No.: ERM-MW-13

Notes:

Same as above

Depth (ft)	Sample ID	PID/FID	Sampler Type	Blows / 6 Inches	Inches Driven	Inches Recov'd	Sample Cond.	Boring Diameter	Conduct. Casing	Sand / Grout	Well Casing	Recovery	Contact
0–1		ND	Direct Push ↓	NA ↓	NA ↓	NA ↓		2" ↓		RMC #2/12 sand ↓	0.01" slotted screen ↓		
1–2		ND											
2–3		ND											
3–4		ND											
4–5		ND											

Depth (ft) scale: 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

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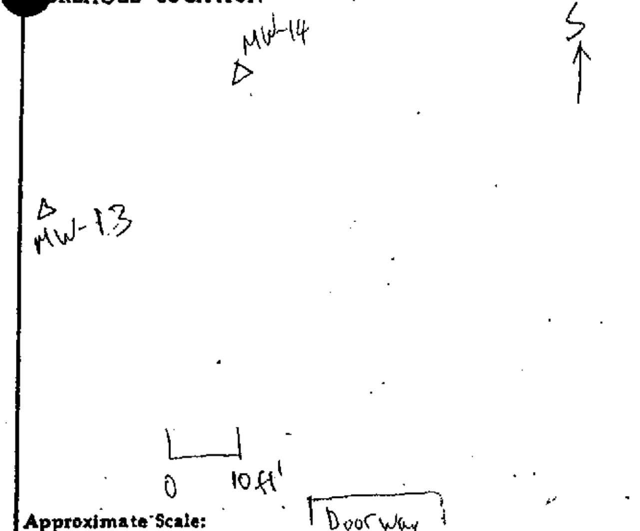
BOREHOLE / WELL CONSTRUCTION LOG

BOREHOLE LOCATION



Approximate Scale:

Notes:

Project: (facility, address, city, state)	former UAL OMC Oakland Airport Oakland, CA
Borehole/Well No:	ERM-MW-14
Job No:	321-1677-1
Logged By:	JEA/MMW
Edited By:	—
Project Manager:	JEA
Drill Rig:	Geoprobe M.2.5
Drilling Contractor: (name, city, state)	Gregg Drilling
Driller:	Don & Faudo
License #: C57-	485165
Drilling Method:	HSA
Sample Method:	Direct Push
Well Head Completion:	Flushmount
Ground Surface Elevation:	—
Hammer Weight/Drop:	—
Borehole Diameter:	8"
Started, Time:	1340 10:05
Date:	12/19/03 12/23/0
Completed, Time:	11:00
Date:	12-23-03

Water Depth	9.88'				
Boring/Casing Depth	15'				
Time	11:07				
Date	12-23-03				

Total Boring Depth:	15'
Total Well Depth:	15"
Screened Interval:	5' - 15'
Well Diameter:	2"
Sand Pack (Type and Interval):	RMC #2/12 sand, 5' to 15'
Well Development Method:	
Time:	—
Date:	—
Flow Rate:	—
Geophysical Logs, Type:	
By:	—
Date:	—

Sample ID	PID / FID (ppm)	Sampler Type / depth	Blows per 6 Inches	Inches Driven	Inches Recovered	Sample Condition	Boring Diameter	Conductor Casing(s) Interval and Diameter	Sand / Grout	Well Casing / Screen	Depth in Feet	Recovery / Sample Loc.	Contact / Hyd. Conduct.	LITHOLOGIC DESCRIPTIONS
			NA	NA	NA		8"				0			concrete
									Grout (0–3)	PVC casing Blank (0–5)	1			Sand (SP) light brown, soft, damp, 100% fine to med sand, NP, MEK to HEK
											2			
									Bentonite (3–4)		3			
									RMC #2/12 sand (4–)		4			
										0.01" slotted screen (5–)	5			
											6			
											7		Z	Sand (SP) gray brown, stiff, moist 100% fine to med sand, NP, MEK to HEK
											8			water @ 8 ft
											9			

WEISS ASSOCIATES

BOREHOLE / WELL CONSTRUCTION LOG (cont.)

Project / Job No.: 321-1677-1

Borehole/Well No.: ERM-MW-14

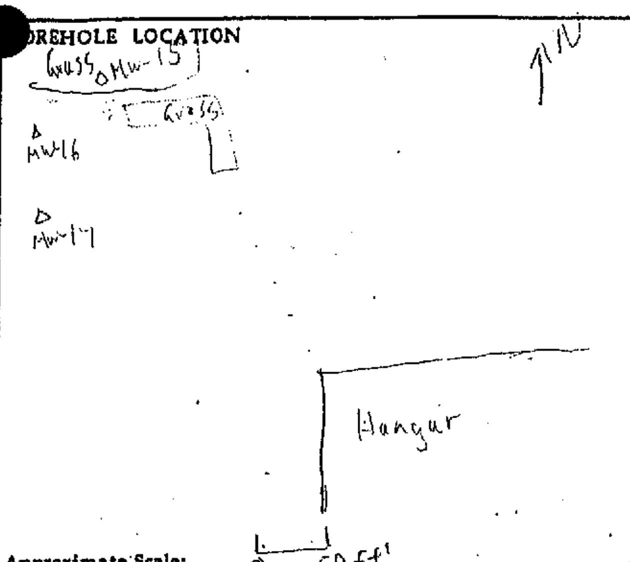
Notes:

Sample ID	PID/FID	Sampler Type	Blows / 6 Inches	Inches Driven	Inches Recov'd	Sample Cond.	Boring Diameter	Conduct. Casing	Sand / Grout	Well Casing	Depth (ft)	Recovery	Contact	
			NA	NA	NA		↑		↑	↑				
	ND										1			Clay (CH) Light brown gray, Wet, Med. dense, 100% clay, HP, LEK
	ND								RMC #2/12 sand	0.01" slotted screen	2			Sand (SP), Gray Brown, stiff, wet, 100% fine-med sand, NP, MEK to HEK
	ND						8"				3			Clay (CH), dk gray, wet, med. dense, 100% clay, HP, LEK
	ND										4			
	ND		↓	↓	↓		↓		↓	↓	5			
											6			
											7			
											8			
											9			
											0			
											1			
											2			
											3			
											4			
											5			
											6			
											7			
											8			
											9			

WEISS ASSOCIATES

BOREHOLE / WELL CONSTRUCTION LOG

BOREHOLE LOCATION



Approximate Scale: 0 — 50 ft'

Notes: Hand Auger 0 - 7 ft.

Project: (facility, address, city, state)	Former UAL OMC Oakland Airport Oakland, CA
Borehole/Well No:	ERM-MW-15
Job No:	321-1677-1
Logged By:	JEA / MMW
Edited By:	—
Project Manager:	JEA
Drill Rig:	M. 2.5 Geoprobe
Drilling Contractor: (name, city, state)	Gregg Drilling
Driller:	Don & Fausto
License #: C57-	485165
Drilling Method:	HSA
Sample Method:	Direct Push
Well Head Completion:	Stovepipe
Ground Surface Elevation:	—
Hammer Weight/Drop:	—
Borehole Diameter:	8"
Started, Time:	~~12/19/03~~ ~~945~~ 1325
Date:	~~1000~~ ~~945~~ 12/22/03 12/19/03
Completed, Time:	1415
Date:	12/22/03

Water Depth	3.5	2.8'				
Boring/Casing Depth	7	12.5'				
Time	1000	14:03				
Date	12/19/03	12/22/03				

Total Boring Depth: 12.5' | Total Well Depth: 12.5'

Screened Interval: 2.5' - 12.5' | Well Diameter: 2"

Sand Pack (Type and Interval): RMC #2/12 sand 1.5' to 12.5

Well Development Method: —

Time: | Date: — | Flow Rate: —

Geophysical Logs, Type:

By: — | Date: —

Sample ID	PID / FID (ppm)	Sampler Type / depth	Blows per 6 Inches	Inches Driven	Inches Recovered	Sample Condition	Boring Diameter	Conductor Casing(s) Interval and Diameter	Sand / Grout	Well Casing / Screen	Depth in Feet	Recovery / Sample Loc.	Contact / Hyd. Conduct.	LITHOLOGIC DESCRIPTIONS
		Direct Push	N/A	N/A	N/A		8"		bentonite (0–1.5)	Blank PVC casing (0–2.5)	0			Sand (SP), light brown, soft, damp, 100% fine to med grain sand.
											1			
											2			
									RMC #2/12 sand	0.01 slotted screen	3		—	Water in hole.
											4			Clay (CL), dk gray. (Bay Mud), wet.
											5			
											6			
											7			Sand (SP), light brown, soft, damp, 100% fine-med. sand, NP, MEK
	ND										8			
	ND										9			Silty sand (SM), light brown, soft,

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BOREHOLE / WELL CONSTRUCTION LOG (cont.)

Project / Job No.: 321-1697-1

Borehole/Well No.: ERM-MW-15

Notes:

Sample ID	PID/FID	Sampler Type	Blows / 6 Inches	Inches Driven	Inches Recov'd	Sample Cond.	Boring Diameter	Conduct. Casing	Sand / Grout	Well Casing	Depth (ft)	Recovery	Contact	Notes
	ND	Continuously	NA	N/A	N/A									sand, NP, MEK
									RMC #2/12 sand	0.01" slotted screen	1			
	ND					good	8"				2			
											3			
											4			
											5			
											6			
											7			
											8			
											9			
											0			
											1			
											2			
											3			
											4			
											5			
											6			
											7			
											8			
											9			

Equipco 925-609-1085

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BOREHOLE / WELL CONSTRUCTION LOG

BOREHOLE LOCATION

DMW-16
100'
DMW-17
N

Approximate Scale:

Notes:

Project: (facility, address, city, state)	former UAL OMC Oakland Airport Oakland, CA
Borehole/Well No:	ERM-MW-16
Job No:	321-1677-1
Logged By:	JEA / MMW
Edited By:	—
Project Manager:	JEA
Drill Rig:	Geoprobe M2.5
Drilling Contractor: (name, city, state)	Gregg Drilling
Driller:	Jeremy Fri, Don & Faustino Mon.
License # : C57-	485165
Drilling Method:	HSA
Sample Method:	Direct Push
Well Head Completion:	Flush
Ground Surface Elevation:	
Hammer Weight/Drop:	N/A
Borehole Diameter:	8"
Started, Time:	1200 0930 12/22
Date:	1200 12/19/03
Completed, Time:	0945 12/22
Date:	

Water Depth	2.54'				
Boring/Casing Depth	12.5				
Time	9:42				
Date	12-22-03				

Total Boring Depth: 12.5
Total Well Depth: 12.5
Screened Interval: 2.5-12.5
Well Diameter: 2"
Sand Pack (Type and Interval): RMC #2/12 sand, 1.5'-12.5'
Well Development Method:
Time: — Date: Flow Rate: —
Geophysical Logs, Type:
By: — Date: —

Sample ID	PID / FID (ppm)	Sampler Type / depth	Blows per 6 Inches	Inches Driven	Inches Recovered	Sample Condition	Boring Diameter	Conductor Casing(s) Interval and Diameter	Sand / Grout	Well Casing / Screen	Depth in Feet	Recovery / Sample Loc.	Contact / Hyd. Conduct.	LITHOLOGIC DESCRIPTIONS
			NA	NA			8"		Bentonite	Blank casing	0			concrete
											1			Sand (SP), Light Brown, soft, damp, 100% fine to med grain sand, NP, MEK to LEK. Thin layer of Clay @ 2 ft then sand again
											3			Sand (SP) Bluegreen, soft, moist to wet, 100% fine to med grain sand,
									#2/12 RMC sand	0.01 slotted screen	5–9			
			NA		NA	Good					7			Same as above
	0.2	Direct Push									9			
	29													

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BOREHOLE / WELL CONSTRUCTION LOG (cont.)

Project / Job No.: 321-1677-1

Borehole/Well No.: ERM-MW-16

Notes:

Sample ID	PID/FID	Sampler Type	Blows / 6 Inches	Inches Driven	Inches Recov'd	Sample Cond.	Boring Diameter	Conduct. Casing	Sand / Grout	Well Casing	Depth (ft)	Recovery	Contact	Notes
	0.2	Direct Push	NA	NA			8"							Same as above
	0					Good			RMC #2/12 sand	0.01 slotted screen	1			
											2			
											3			
											4			
											5			
											6			4 bags of sand
											7			
											8			
											9			
											0			
											1			
											2			
											3			
											4			
											5			
											6			
											7			
											8			
											9			

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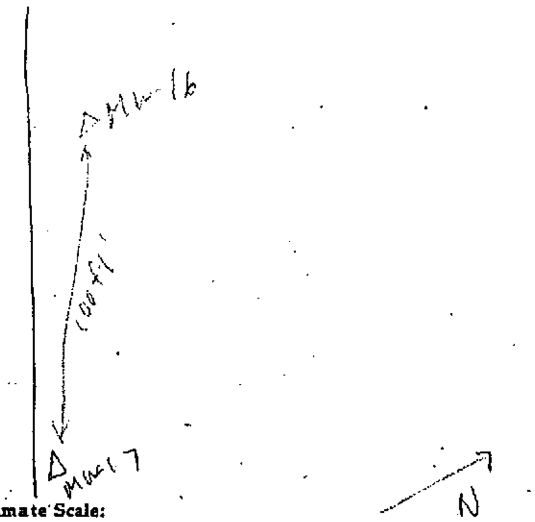
BOREHOLE / WELL CONSTRUCTION LOG

BOREHOLE LOCATION



Approximate Scale:

Notes:

Project: (facility, address, city, state)	former VALOMC Oakland Airport Oakland, CA
Borehole/Well No:	ERM-MW-17
Job No:	321-1677-1
Logged By:	JEA / MMW
Edited By:	—
Project Manager:	JEA
Drill Rig:	Geoprobe M 2.5
Drilling Contractor: (name, city, state)	Gregg Drilling
Driller:	Don & Fausto, 12/22
License # : C57-	485165
Drilling Method:	HSA
Sample Method:	Direct Push
Well Head Completion:	Flush
Ground Surface Elevation:	—
Hammer Weight/Drop:	
Borehole Diameter:	8"
Started, Time:	1220 9:47
Date:	12/19/03
Completed, Time:	10:45
Date:	12/22/03

Water Depth	3.2						
Boring/Casing Depth	12.5'						
Time	10:40						
Date	12/22/03						

Total Boring Depth:	12.5'	Total Well Depth:	12.5'
Screened Interval:	2.5'-12.5'	Well Diameter:	2"
Sand Pack (Type and Interval):	RMC #2/12 sand, 1.5' to 12.5'		
Well Development Method:			
Time: —	Date: —	Flow Rate:	—
Geophysical Logs, Type:			
By: —		Date:	—

Sample ID	PID / FID (ppm)	Sampler Type / depth	Blows per 6 Inches	Inches Driven	Inches Recovered	Sample Condition	Boring Diameter	Conductor Casing(s) Interval and Diameter	Sand / Grout	Well Casing / Screen	Depth in Feet	Recovery / Sample Loc.	Contact / Hyd. Conduct.	LITHOLOGIC DESCRIPTIONS
		Direct Push	NA	NA	NA		8"		Bentonite	Blank PVC casing	0			Concrete
											1		—	Sand (SP) brown, soft, damp to moist, 100% fine to med grain sand, NP, MEK
											2			
											3			
											4			
											5			
											6		—	water started coming in the hole
									RMC #2/12 sand	0.01" slotted screen	7			Same as above
	ND					Good					8			
	ND										9			
	ND													

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BOREHOLE / WELL CONSTRUCTION LOG (cont.)

Project / Job No.: 321-1677-1

Borehole/Well No.: ERM MW-17

Notes:

Sample ID	PID/FID	Sampler Type	Blows / 6 Inches	Inches Driven	Inches Recov'd	Sample Cond.	Boring Diameter	Conduct. Casing	Sand / Grout	Well Casing	Depth (ft)	Recovery	Contact	
	ND	Direct Push	NA	NA	NA									Same as above
	ND					Good	8"		RMC #2/12 sand	0.01 slotted screen	1			
											2			
											3			
											4			
											5			
											6			
											7			
											8			
											9			
											0			
											1			
											2			
											3			
											4			
											5			
											6			
											7			
											8			
											9			

Appendix E
Laboratory Data and QA/QC Review

Analytical data are the basis for evaluating the environmental conditions at the former United Airlines Oakland Maintenance Center (OMC) in Oakland, California. It is essential that the data are accurate and reflect actual conditions.

To ensure data quality was acceptable for decision-making purposes, Environmental Resources Management (ERM) reviewed laboratory analytical results for the OMC investigation. This review identifies limitations on the use of the data, and identifies results that should not be used for decision-making purposes. The quality of the data was assessed and qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (October 1999) and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (July 2002).

ERM reviewed data for compliance with the following quality assurance/quality control (QA/QC) project and/or method-prescribed criteria:

- **Holding Time and Sample Preservation:** The period of time between collection of the sample and preparation/analysis of the sample. Analyses performed for this project have method-prescribed holding times as well as temperature and chemical preservation requirements.
- **Blank Samples:** The preparation and analysis of reagent (contaminant-free) water. Blank samples for this investigation included method and trip blanks. Detections in a blank sample indicate laboratory and/or transportation or field contamination.
- **Spike Samples:** The preparation and analysis of an environmental sample or a sample of reagent water spiked with a subset of target compounds at known concentrations. The results of the spike analysis measure laboratory accuracy in the reagent sample, and results from the environmental sample spike measure potential interference from the matrix.
- **Surrogate Spikes:** The addition of compounds similar to target compounds of interest that are added to sample aliquots for organic analysis. Surrogate spikes measure possible interference from the sample matrix for the analysis of target compounds.
- **Duplicate Samples:** The preparation and analysis of an additional aliquot of the sample. The results from duplicate analysis measure potential heterogeneity of contaminants in the sample.
- **Total Petroleum Hydrocarbons Evaluation:** Qualification of any poorly identified total petroleum hydrocarbon (TPH) detections. The chromatograms of samples with positive detections are compared to the chromatograms of standards for pattern agreement.

Potential U.S. Environmental Protection Agency qualifiers that may have been applied during the review process are as follows:

"U" (Not detected, [ND]): The analyte was reported as detected by the laboratory, but the reported concentrations should be considered ND above the laboratory reporting limit.

"J" (Estimated): The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

"N" (Tentative identification): The analysis indicated the presence of an analyte for which there was presumptive evidence to make only a "tentative identification."

"NJ" (Tentative identification, estimated): The analysis indicated the presence of an analyte that had been "tentatively identified" and the associated numerical value represents its approximate concentration.

"UJ" (ND, estimated): The analyte was not detected above the reported sample quantitation limit; however, the reported quantitation limit was approximate and may or may not have represented the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

"R" (Rejected): The sample results were rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte could not be verified.

Only the acid fraction in the semivolatile organic compound (SVOC) analysis of two samples was rejected based on the data review. All data that were not rejected, including data flagged as having estimated values, are acceptable and can be used for decision-making purposes. The following discussion addresses each of the QA/QC components listed above and the results for each of the components.

HOLDING TIME AND PRESERVATION

The USEPA has established a maximum sample holding time for each analysis. The USEPA has also established chemical and temperature preservation requirements for those analyses that may be subject to chemical degradation. Holding times and sample temperatures extending beyond the USEPA maximum or samples that are not properly preserved can negatively affect sample integrity (e.g., loss of volatile compounds, biodegradation) and are qualified depending on the severity of the exceedence and compounds of concern.

ERM has reviewed the analytical results of the investigation for compliance with the method-prescribed preparation and analysis holding times. One water sample analyzed for SVOCs was estimated (UJ) because it was extracted 1 day out of holding time. This sample is listed in Table A-1.

BLANK SAMPLES

A blank sample that is theoretically contaminant-free is prepared in the laboratory and carried through the analytical process. The purpose of a blank sample is to determine the presence and magnitude of contamination resulting from laboratory, shipping, or other sample-handling activities. Blank samples are analyzed and evaluated for detections of target compounds. If target compounds are detected in a blank sample that was initially intended to be contaminant-free, these detections indicate that some element of the sample collection, transportation, or analysis activities has introduced contaminants not present in the original environmental sample aliquot. If target compounds are detected in a blank sample, then all associated data must be carefully evaluated to determine whether:

1. Those results have been similarly impacted, or
2. The blank problem is an isolated occurrence not representative of other data.

The two types of blank samples routinely analyzed and reported with the Phase II investigation samples were method blank and trip blank samples. Preparation, handling, and analysis of these blank samples are as follows:

- Method blank samples were prepared by the laboratory by taking an aliquot of reagent water through all preparation and analysis steps. A method blank was prepared and analyzed with each batch of environmental samples. Method blank samples monitor for potential contamination of samples from the laboratory.
- Trip blank samples were prepared by the laboratory by filling a volatile organic analysis vial with an aliquot of reagent water and sealing it with a Teflon-lined lid. Trip blank samples monitor for potential contamination of samples during collection and transportation to the laboratory. The trip blank samples travel with the empty aqueous containers to the field and return to the laboratory with the filled aqueous containers. These samples are opened by laboratory personnel only.

Common Laboratory Contamination

In the laboratory, methylene chloride (also known as dichloromethane; DCM) and acetone can be commonly detected at low levels in both blanks and samples in the volatile organic compound (VOC) analysis. Similarly, phthalate compounds are often detected at low levels in the SVOC analysis. These detections are considered common laboratory contamination when found at levels less than ten times (10x) the quantitation limit. When detected at these low levels, the quantitation limit is elevated to the concentration found in the sample, and the compound is considered ND at that level. Evaluation for common laboratory contamination is performed before reviewing method and trip blanks for other contaminants. If these common laboratory contaminants are found at low levels in the method and trip blanks, they are considered ND and not used to qualify other samples. Similarly, all other samples are first assessed for common laboratory contamination prior to method and trip blank evaluation. Table A-2 contains samples and blanks qualified for common laboratory contamination; they are qualified as estimated (UJb). Other blank contamination is qualified as estimated (UJ).

The common laboratory contaminants found at low levels in the samples were DCM and bis(2-ethylhexyl)phthalate. Detections were qualified as estimated (UJb) as shown on Table A-2.

Method Blank Samples

The majority of the method blank detections for the OMC data results were common laboratory contaminants; qualified data are listed on Table A-2. The non-common laboratory contaminants beryllium and zinc were detected in method blank samples.

Samples were qualified based on the USEPA functional guidelines 5-times rule. Inorganic sample results that were less than five times the concentration detected in the associated blank were qualified as estimated (UJ).

The common laboratory contaminant reported in method blank samples was DCM and was qualified as estimated (UJb) as described above.

Trip Blank Samples

Trip blanks are typically analyzed only for VOCs and may occasionally be contaminated during preparation and/or analysis from ambient conditions at the laboratory. In general, the trip blank sample results were ND, with the exceptions of chloroform, methyl tert-butyl ether, and the common laboratory contaminant DCM. Samples that were directly associated with a contaminated trip blank sample that had not been previously qualified as estimated (UJ) based on a method blank detection or common laboratory contamination were qualified as estimated (UJ). Sample detections that were qualified as estimated (UJ) based on trip blank detections were qualified using the 5-times and 10-times rule based on the concentration reported in the associated trip blank.

Trip blank and associated sample results with applied qualifiers are listed on Table A-2. The trip blank data indicate sample handling and transportation procedures were acceptable.

SPIKE SAMPLES

A spike sample is a QC sample that is prepared and analyzed by the laboratory. The laboratory prepares, analyzes, and reports spike sample results to demonstrate proper analysis, detection, and quantification of target compounds. A spike sample result is typically reported as the amount of compound detected divided by the amount spiked into the sample and is commonly referred to as percent recovery. The percent recovery is then compared to an established limit range. The two types of spike samples analyzed with the project samples were matrix spikes (MS) and blank spikes.

MS samples consist of an aliquot of an environmental sample that is spiked with known concentrations of a subset of target compounds. A matrix spike duplicate (MSD) sample is a second sample prepared and analyzed with the MS sample. MS samples are used to monitor potential interference from the sample matrix for target compounds. A low MS recovery may indicate low-biased sample results; a high MS recovery may indicate high-biased sample results.

Blank spike samples, which are commonly referred to as laboratory control samples (LCS), are an aliquot of reagent water that is spiked with known concentrations of a subset of target compounds. The LCS sample monitors laboratory accuracy without the bias of a sample matrix. LCS recoveries outside of acceptable limits may indicate poor laboratory accuracy.

Most MS and LCS recoveries were within acceptable limits. Exceptions, listed on Table A-2, represent a small fraction of the data compared to the total amount of MS and LCS data reported.

Other than the exceptions noted, the MS recoveries indicate minimal matrix interference and the LCS recoveries indicate acceptable laboratory accuracy. Samples were qualified based on MS, MSD, and/or LCS results as follows:

- Sample detections associated with MS/MSD recoveries outside of the control limits were qualified as estimated (J) for detected compounds. The majority of the qualified data was for MS/MSD recoveries in the soil results. These results are listed on Table A-3.
- ND results associated with an MS or MSD recovery above the upper control limit did not require qualification because high-biased results would not affect a non-detection (i.e., ND results would not become detections). However, MS/MSD recoveries below the lower control limit indicate the potential for false negative results. ND sample results associated with MS

or MSD recoveries below the lower control limit were qualified as estimated (UJ) at the detection limit.

- If an LCS was out of control limits but its duplicate was acceptable, no qualifications were made to the data.
- In the case where an MS/MSD recovery was out of control limits, but the spiked sample's concentration was more than four times the amount of analyte spiked, no qualifications were made to the data. Similarly, when a spiked sample required a large dilution in order to bring it to within the instrument's analytical limits, and as a result the spike was diluted out, no qualifications were made to the data.

SURROGATE SPIKES

A surrogate spike is used to assess interference from the sample matrix during the analysis. Surrogate spike results are typically reported in terms of percent recovery, based on the concentration of surrogate detected divided by the known amount of surrogate added to the sample aliquot.

Surrogate recoveries were compared to the laboratory-generated or method-prescribed limits of acceptance. In general, surrogate recoveries were within acceptable limits. The exceptions represent a small fraction of the data compared to the total amount of surrogate data reported. The acid fraction in the SVOC analysis of two samples was rejected based on poor acid surrogate recoveries. A portion of detected VOCs was qualified as estimated (J) due to elevated surrogate recoveries. Detected and nondetected compounds in one sample analyzed for total petroleum hydrocarbons were qualified as estimated (UJ/J) due to a low surrogate recovery. These qualifications are summarized in Table A-4.

The laboratory performed the VOC analysis with four surrogates. One surrogate (bromofluorobenzene) was consistently above control limits in the samples as well as in the blanks and QC samples. This indicates a system-wide laboratory problem with bromofluorobenzene rather than a matrix problem; nevertheless, the detected compounds associated with the poor surrogate recoveries were qualified as estimated (J) in the samples affected by high surrogate recoveries. These results are summarized in Table A-4.

Sample results with surrogate recoveries outside acceptable criteria were qualified (similar to data associated with MS recovery exceedence) as follows:

- Data with detections associated with a surrogate recovery outside of a control limit were qualified as estimated (J).
- ND results associated with a surrogate recovery below the lower control limit were qualified as estimated at the detection limit (UJ). ND results

associated with a surrogate recovery above the upper control limit did not require qualification because high-biased results would not affect ND results (i.e., ND results would not become detections).

- ND results associated with surrogate recoveries below 10 percent were qualified as rejected (R). Data were only rejected when severe matrix interference was observed in the surrogate recovery. The ND acid portion of the SVOC sample results for W-B-12 and ERM-B-5 required "R" qualification (Table A-4).

DUPLICATE SAMPLES

A duplicate sample is a second aliquot of a sample that is treated the same as the original sample. A duplicate sample analysis is performed to measure the precision of the method and possible matrix heterogeneity. Duplicate field samples are collected to measure matrix heterogeneity.

A portion of the field samples were collected in duplicate and submitted for analysis. The relative percent difference (RPD) was calculated for each of the reported detections in the sample pairs. The calculated RPDs were then compared to method-prescribed, laboratory-generated, or project-acceptable limits.

RPDs calculated using values less than five times the practical quantitation limit (PQL) do not accurately represent precision and are not used for that purpose. In accordance with the *Functional Guidelines,* Samples were not qualified on the basis of field duplicates that did not meet control criteria. The RPDs are shown on Table A-5.

TOTAL PETROLEUM HYDROCARBONS EVALUATION

To properly identify a specific multi-component TPH fraction in a sample, the chromatogram produced from the gas chromatographic analysis is compared to the multi-component chromatogram of appropriate standards. The sample chromatogram should contain a distinguishable pattern of peaks that is similar to the pattern present in the standard chromatogram. The laboratory compared sample chromatograms against the appropriate standard chromatogram. The relative retention times and relative peak heights observed in the multi-component TPH standard were compared to sample chromatograms with positive detections. The majority of the diesel chromatograms had peaks that were located in the quantitation range, but did not resemble the diesel standard. Subsequently, ERM qualified the diesel detections as tentatively identified (NJ) as shown on Table A-6.

Silica gel cleanup can be useful to remove naturally occurring compounds in the sample, which may contribute to the total diesel measured in the sample. Silica gel cleanup was performed on all samples with detectable TPH concentrations. The results of the original analyses and the silica gel reanalyses that did not match the standard chromatograms are found in Table A-6.

OVERALL ASSESSMENT

Only a small amount of the data generated was qualified as rejected (R). Data were only rejected when severe interference from the sample matrix was observed in the surrogate recoveries. Those data that did require rejection were not used for decision-making purposes, as the results are not considered reliable. The specific number of samples or sample points that required rejection is detailed as follows:

- SVOCs: phenol, 2-methylphenol, 4-methylphenol, 2-nitrophenol, 2,4-dimethylphenol, 4-chloro-3-methylphenol, 2,4,6-trichlorophenol, 2,4,5-trichlorophenol, 2,4-dinitrophenol, 4-nitrophenol, 4,6-dinitro-2-methylphenol, and pentachlorophenol for sample W-B-12
- SVOCs: phenol, 2-chlorophenol, 2-methylphenol, 2-nitrophenol, 2,4-dimethylphenol, 2,4-dichlorophenol, 4-chloro-3-methylphenol, 2,4,6-trichlorophenol, 2,4,5-trichlorophenol, 2,4-dinitrophenol, 4-nitrophenol, 4,6-dinitro-2-methylphenol, and pentachlorophenol for sample ERM-B-5.

Thallium was detected in many of the samples run by inductively coupled plasma (ICP) methods. One water and one soil sample was reanalyzed for thallium using graphite furnace atomic absorption and both were ND. This indicates that the detections of thallium during the investigation were most likely false-positives. It is known that ICP can produce false positive results for thallium in the presence of iron in the samples. Iron was not reported as a target analyte for this project; however, the laboratory verified that iron was present in the samples. Based on this information, all thallium detections are qualified as estimated (J) and are summarized in Table A-7.

All qualified data, excluding rejected data, can be used for decision-making purposes; however, the limitation identified by the applied qualifier should be considered when using the data. The quality of the data generated is acceptable for the preparation of technically defensible documents.

Table E-1
Samples with Exceeded Holding Times
Oakland Maintenance Center
United Airlines

Lab Package	Sample ID	Method	# of Days Exceeded	ERM Qualifier
S304368	W-B-2	8270C	1	UJ

Key:
UJ = Estimated detection limit

Table E-2
Blank and Associated Suspect Sample Detections
Oakland Maintenance Center
United Airlines

Lab Package	Blank IDs	Associated Samples	Detected Compound	Reported Concentration	Units	ERM Qualifier
S304337	TB	TB	Methylene chloride	1.8	µg/l	UJb
S304367	MB	MB	Methylene chloride	4.04	µg/l	UJb
S304369	MB	MB	Methylene chloride	4.04	µg/l	UJb
S304388	MB	MB	Methylene chloride	4.04	µg/l	UJb
S304405	MB	MB	Methylene chloride	1.23	µg/l	UJb
S304406	MB	MB	Methylene chloride	1.23	µg/l	UJb
S304434	MB	MB	Methylene chloride	1.23	µg/l	UJb
S304434	TB	TB	MTBE	0.87	µg/l	None
		W-B-7	MTBE	1.9	µg/l	UJ
S304435	TB	TB	Methylene chloride	3.1	µg/l	UJb
	MB	MB	Methylene chloride	1.23	µg/l	UJb
S304368	NA	ERM-B-2	Methylene chloride	1.5	µg/l	UJb
S304475	TB	TB	Methylene chloride	3.7	µg/l	UJb
			MTBE	0.94	µg/l	None
S304387	NA	ERM-B-13-3.5	Methylene chloride	0.047	mg/kg	UJb
S304388	NA	W-B-12 (0.5')	Methylene chloride	0.054	mg/kg	UJb
S304488	NA	W-B-12	bis(2-ethylhexyl)phthalate	5.7	µg/l	UJb
S304364	MB	MB	Beryllium	0.0065	mg/l	
		W-B-6	Beryllium	0.0055	mg/l	UJ
S304368		W-B-3	Beryllium	0.0061	mg/l	UJ
S304369	MB	MB	Zinc	2.3	mg/kg	
		ERM-B-3-2.5	Zinc	14	mg/kg	UJ
		ERM-B-4-2.5	Zinc	14	mg/kg	UJ
		ERM-B-5-2.5	Zinc	21	mg/kg	UJ
		ERM-B-6-2.5	Zinc	14	mg/kg	UJ
S305273	TB	TB	Methylene chloride	2.3	µg/l	UJb
37257	TB	NA	Chloroform	0.7	µg/l	None

Key:
MB = Method blank
TB = Trip blank
mg/kg = Milligrams per kilogram
µg/l = Micrograms per liter
NA = not applicable
UJ = Due to blank contamination, the reported concentrations should be considered not detected at the reported sample value
UJb = Methylene chloride and bis(2-ethylhexyl)phthalate are considered common laboratory contaminants when found at levels less than ten times the report limit and are qualified as not detected at the reported sample value

Table E-3
Spike Recoveries Outside of Acceptable Limits
Oakland Maintenance Center
United Airlines

Lab Package	Sample ID	Associated Sample	Method	Compound	Recovery (%)	Limit (%)	RPD	Limit	Result	ERM Qualifier
S304369	3040246-ms1	MS/MSD	6010B	Zinc	52/53	80-120	1	20	mg/kg	
		ERM-B-4-2.5	6010B	Zinc					14	J
		ERM-B-5-2.5	6010B	Zinc					21	J
		ERM-B-6-2.5	6010B	Zinc					14	J
S304365		ERM-B-1-3.5	6010B	Zinc					40	J
		ERM-B-2-3.5	6010B	Zinc					19	J
S304434	3040302-ms	MS/MSD	6010B	Zinc	58/64	80-120	2	20	mg/kg	
		W-B-7 (1-2)	6010B	Zinc					15	J
		W-B-17 (1-2)	6010B	Zinc					18	J
		W-B-16 (1-2)	6010B	Zinc					18	J
S304435		ERM-B-12-2.0	6010B	Zinc					19	J
		ERM-B-11-2.5	6010B	Zinc					16	J
		ERM-B-10-2.5	6010B	Zinc					15	J
S304451		ERM-B-22-1.5	6010B	Zinc					15	J
		ERM-B-15-1.0	6010B	Zinc					18	J
		W-B-22 (2-3)	6010B	Zinc					20	J
S304368	3040608-ms1	MS/MSD	EPA 200	Thallium	28/31	80-120	12	20	<5.0 µg/l	UJ
S304434	3040487-ms	MS/MSD	7470	Mercury	64/65	80-120	1	20	µg/l	
		W-B-7	7470	Mercury					<0.20	UJ
		W-B-17	7470	Mercury					<0.20	UJ
		W-B-16	7470	Mercury					<0.20	UJ
		ERM-B-23	7470	Mercury					<0.20	UJ
S304451		ERM-B-10	7470	Mercury					<0.20	UJ
		ERM-B-11	7470	Mercury					<0.20	UJ
S304361	3040233-bs1	BS	DHS LUFT	Diesel	55	60-140	26	50	NA	
S304337	3040233-bs1	BS	DHS LUFT	Diesel	46	60-140	51	50	NA	
S304361	3040233-bs1	BS	DHS LUFT	Diesel	46	60-140	51	50	NA	
S304364	3040233-bs1	BS	DHS LUFT	Diesel	46	60-140	51	50	NA	

Key:

Table E-3
Spike Recoveries Outside of Acceptable Limits
Oakland Maintenance Center
United Airlines

Lab Package	Sample ID	Associated Sample	Method	Compound	Recovery (%)	Limit (%)	RPD	Limit	Result	ERM Qualifier

UJ = Estimated detection limit
J = Estimated value
µg/l = Micrograms per liter
NA = The duplicate blank spike was within control limits; therefore no samples were qualified.
RPD = Relative percent difference

Table E-4
Surrogate Recovery Results out of Acceptable Limits
Oakland Maintenance Center
United Airlines

Lab Package	Sample ID	Method	Surrogate	Recovery (%)	Limit (%)	ERM Qualifier
S304337	W-B-3 (3-4)	8260B	Bromofluorobenzene	153	60-140	
	W-B-4 (3-4)	8260B	Bromofluorobenzene	151	60-140	
	W-B-5 (3-4)	8260B	Bromofluorobenzene	147	60-140	
	W-B-8 (1.5-2.5)	8260B	Bromofluorobenzene	164	60-140	
	W-B-8	8260B	Bromofluorobenzene	306	70-130	J
	TB	8260B	Bromofluorobenzene	354	70-130	J
S304361	W-B-38	8260B	Bromofluorobenzene	338	70-130	
	W-B-38 DUP	8260B	Bromofluorobenzene	374	70-130	
	W-B-11	8260B	Bromofluorobenzene	334	70-130	
	W-B-10	8260B	Bromofluorobenzene	345	70-130	
	TB	8260B	Bromofluorobenzene	236	70-130	J
S304364	W-B-2	8260B	Bromofluorobenzene	244	70-130	J
	W-B-3	8260B	Bromofluorobenzene	254	70-130	J
	W-B-4	8260B	Bromofluorobenzene	328	70-130	J
	W-B-5	8260B	Bromofluorobenzene	290	70-130	J
	W-B-6	8260B	Bromofluorobenzene	250	70-130	J
S304365	ERM-B-2-3.5	8260B	Bromofluorobenzene	145	60-140	
S304366	W-B-11 (1-2)	8260B	Bromofluorobenzene	151	60-140	
	W-B-38 (2-3)	8260B	Bromofluorobenzene	185	60-140	
S304367	W-B-25 (1-2)	8260B	Bromofluorobenzene	179	60-140	
	ERM-B-3	8260B	Bromofluorobenzene	235	70-130	J
	ERM-B-5	8260B	Bromofluorobenzene	182	70-130	J
	ERM-B-6	8260B	Bromofluorobenzene	168	70-130	J
	TB	8260B	Bromofluorobenzene	266	70-130	J
	MB	8260B	Bromofluorobenzene	364	70-130	J
S304368	ERM-B-4	8260B	Bromofluorobenzene	192	70-130	
	ERM-B-1	8260B	Bromofluorobenzene	142	70-130	J
	ERM-B-2	8260B	Bromofluorobenzene	134	70-130	J
	TB	8260B	Bromofluorobenzene	205	70-130	J
S304369	ERM-B-3-2.5	8260B	Bromofluorobenzene	184	60-140	
	ERM-B-6-2.5	8260B	Bromofluorobenzene	177	60-140	J
	ERM-B-7	8260B	Bromofluorobenzene	195	70-130	
S304388	W-B-25	8260B	Bromofluorobenzene	211	70-130	
	W-B-29	8260B	Bromofluorobenzene	238	70-130	
	W-B-29 (1-2)	8260B	Bromofluorobenzene	182	60-140	
	TB	8260B	Bromofluorobenzene	288	70-130	J
S304404	ERM-B-13	8260B	Bromofluorobenzene	337	70-130	J
S304406	W-B-32 (1-2)	8260B	Bromofluorobenzene	197	60-140	
	W-B-32	8260B	Bromofluorobenzene	312	70-130	
	TB	8260B	Bromofluorobenzene	352	70-130	J

Lab Package	Sample ID	Method	Surrogate	Recovery (%)	Limit (%)	ERM Qualifier
S304432	ERM-B-14	8260B	Bromofluorobenzene	324	70-130	
	ERM-B-14 DUP	8260B	Bromofluorobenzene	384	70-130	
	ERM-B-12	8260B	Bromofluorobenzene	359	70-130	
S3304433	ERM-B-14-4.5	8260B	Bromofluorobenzene	182	60-140	
	ERM-B-23-4.5	8260B	Bromofluorobenzene	198	60-140	
	ERM-B-11	8260B	Bromofluorobenzene	301	70-130	J
	ERM-B-10	8260B	Bromofluorobenzene	270	70-130	J
S3304434	W-B-7	8260B	Bromofluorobenzene	204	70-130	
	TB	8260B	Bromofluorobenzene	360	70-130	J
	W-B-16	8260B	Bromofluorobenzene	342	70-130	J
	W-B-16 DUP	8260B	Bromofluorobenzene	388	70-130	J
	W-B-17	8260B	Bromofluorobenzene	400	70-130	J
	W-B-17 (1-2)	8260B	Bromofluorobenzene	162	60-140	
	W-B-16 (1-2)	8260B	Bromofluorobenzene	189	60-140	
S3304435	TB	8260B	Bromofluorobenzene	424	70-130	
	ERM-B-12-2.0	8260B	Bromofluorobenzene	159	60-140	
	ERM-B-11-2.5	8260B	Bromofluorobenzene	180	60-140	
	ERM-B-10-2.5	8260B	Bromofluorobenzene	191	60-140	
	ERM-B-23	8260B	Bromofluorobenzene	333	70-130	
S304451	ERM-B-22-1.5	8260B	Bromofluorobenzene	189	60-140	
	ERM-B-15-1.0	8260B	Bromofluorobenzene	188	60-140	
S304475	W-B-19 (3-3.5)	8260B	Bromofluorobenzene	183	60-140	
	W-B-9 (3-3.5)	8260B	Bromofluorobenzene	159	60-140	
	W-B-22 (2-3)	8260B	Bromofluorobenzene	218	60-140	
	W-B-22	8260B	Bromofluorobenzene	428	70-130	J
	W-B-22 DUP	8260B	Bromofluorobenzene	448	70-130	J
	W-B-19	8260B	Bromofluorobenzene	376	70-130	J
	W-B-9	8260B	Bromofluorobenzene	371	70-130	J
	TB	8260B	Bromofluorobenzene	444	70-130	J
	P-1	8260B	Bromofluorobenzene	408	70-130	J
S304476	UAL-MW-3	8260B	Bromofluorobenzene	440	70-130	J
	P-2	8260B	Bromofluorobenzene	464	70-130	J
	UAL-MW-1	8260B	Bromofluorobenzene	496	70-130	J
	UAL-MW-2	8260B	Bromofluorobenzene	416	70-130	J
S304368	W-B-2	8270C	Phenol-d6	16	18-115	
			Terphenyl-d14	55	56-139	
S304405	ERM-B-24	8270C	Phenol-d6	14	18-115	
			Terphenyl-d14	53	56-139	
S304406	W-B-32	8270C	Terphenyl-d14	44	56-139	
S304432	ERM-B-14	8270C	Phenol-d6	13	18-115	
			Terphenyl-d14	30	56-139	
	ERM-B-27	8270C	Terphenyl-d14	40	56-139	

Lab Package	Sample ID	Method	Surrogate	Recovery (%)	Limit (%)	ERM Qualifier
	ERM-B-21	8270C	Terphenyl-d14	49	56-139	
S304434	W-B-17	8270C	Terphenyl-d14	42	56-139	
S304476	UAL-MW-2	8270C	Terphenyl-d14	45	56-139	
S304489	ERM-B-5	8270C	2-Fluorophenol	7	15-103	R/J
		8270C	Phenol-d6	0	18-115	R/J
		8270C	Nitrobenzene-d5	30	39-103	UJ/J
		8270C	2-Fluorobiphenyl	38	40-124	UJ/J
		8270C	Terphenyl-d14	27	56-139	UJ/J
S304488	W-B-12	8270C	2-Fluorophenol	12	15-103	R/J
		8270C	Phenol-d6	7	18-115	R/J
		8270C	Nitrobenzene-d5	38	39-103	UJ/J
		8270C	2-Fluorobiphenyl	35	40-124	UJ/J
		8270C	Terphenyl-d14	24	56-139	UJ/J
S304337	W-B-8 (1.5-2.5)	DHS LUFT	Octacosane	6940	50-150	
S304361	W-B-38	DHS LUFT	Octacosane	173	50-150	J
	W-B-11	DHS LUFT	Octacosane	184	50-150	J
	W-B-12	DHS LUFT	Octacosane	910	50-150	J
	W-B-12 silica	DHS LUFT	Octacosane	306	50-150	J
	W-B-14	DHS LUFT	Octacosane	156	50-150	J
S304362	ERM-B-25	DHS LUFT	Octacosane	167	50-150	J
S304364	W-B-4	DHS LUFT	Octacosane	152	50-150	J
	W-B-5	DHS LUFT	Octacosane	262	50-150	
S304367	ERM-B-5	DHS LUFT	Octacosane	0	50-150	
	ERM-B-6 silica	DHS LUFT	Octacosane	39	50-150	J
S304368	ERM-B-4	DHS LUFT	Octacosane	0	50-150	
	ERM-B-4 silica	DHS LUFT	Octacosane	0	50-150	
	ERM-B-1	DHS LUFT	Octacosane	0	50-150	
	ERM-B-1 silica	DHS LUFT	Octacosane	0	50-150	
	ERM-B-2	DHS LUFT	Octacosane	0	50-150	
	ERM-B-2 silica	DHS LUFT	Octacosane	0	50-150	
	WB-3	DHS LUFT	Octacosane	0	50-150	
S304369	ERM-B-5-2.5	DHS LUFT	Octacosane	0	50-150	
	ERM-B-5-2.5 silic	DHS LUFT	Octacosane	0	50-150	
	ERM-B-6-2.5	DHS LUFT	Octacosane	0	50-150	
	ERM-B-6-2.5 silic	DHS LUFT	Octacosane	0	50-150	
	ERM-B-7	DHS LUFT	Octacosane	165	50-150	J
S304386	ERM-B-9-4.5	DHS LUFT	Octacosane	0	50-150	
	ERM-B-9-4.5 silic	DHS LUFT	Octacosane	0	50-150	
S304387	ERM-B-19-4.5	DHS LUFT	Octacosane	165	50-150	NA

Lab Package	Sample ID	Method	Surrogate	Recovery (%)	Limit (%)	ERM Qualifier
	ERM-B-18-4.0	DHS LUFT	Octacosane	169	50-150	NA
	ERM-B-17-3.5	DHS LUFT	Octacosane	160	50-150	J
S304388	W-B-25	DHS LUFT	Octacosane	211	50-150	
	W-B-29	DHS LUFT	Octacosane	202	50-150	
S304390	ERM-B-24	DHS LUFT	Octacosane	153	50-150	J
	ERM-B-19	DHS LUFT	Octacosane	164	50-150	J
	ERM-B-18	DHS LUFT	Octacosane	166	50-150	J
S304404	ERM-B-8-4.0	DHS LUFT	Octacosane	361	50-150	
	ERM-B-20-3.0	DHS LUFT	Octacosane	162	50-150	
	W-B-32	DHS LUFT	Octacosane	357	50-150	J
S304406	W-B-32 (1-2)	DHS LUFT	Octacosane	255	50-150	J
S304432	ERM-B-14	DHS LUFT	Octacosane	176	50-150	J
	ERM-B-27	DHS LUFT	Octacosane	182	50-150	J
	ERM-B-21	DHS LUFT	Octacosane	187	50-150	J
S304433	ERM-B-14-4.5	DHS LUFT	Octacosane	2890	50-150	
	ERM-B-23-4.5	DHS LUFT	Octacosane	1220	50-150	
	ERM-B-27-2.0	DHS LUFT	Octacosane	192	50-150	
S304434	W-B-7 (1-2)	DHS LUFT	Octacosane	204	50-150	J
	W-B-7	DHS LUFT	Octacosane	162	50-150	J
	W-B-17	DHS LUFT	Octacosane	170	50-150	J
S304435	ERM-B-10-3.0	DHS LUFT	Octacosane	159	50-150	
S304451	ERM-B-11	DHS LUFT	Octacosane	156	50-150	J
	ERM-B-22-1.5	DHS LUFT	Octacosane	154	50-150	
S304476	P-2	DHS LUFT	Octacosane	154	50-150	J
	UAL-MW-2	DHS LUFT	Octacosane	204	50-150	J
36455	ERM-MW-08	EPA 8015	o-Terphenyl	24	29-142	UJ/J

Key:
J = Estimated value. When the surrogate recovery is greater than the upper limit, only detected compounds are qualified
R/J = Compounds that are not detected in the acid fraction of the semivolatile analysis are rejected and detected compounds are qualified as estimated
UJ/J = Both detected and nondetected compounds are qualified as estimated

Table E-5
Field Duplicate Results and Calculated Relative Percent Differences
Oakland Maintenance Center
United Airlines

Lab Package	Sample ID	Compound	Units	Detection Limit	Sample Concentration Primary	Sample Concentration Secondary	RPD (%)
S304434	W-B-16	1,1-Dichloroethane	µg/l	0.5	0.75	0.75	0.0
		1,1-Dichloroethene	µg/l	0.5	0.55	0.59	7.0
S304475	W-B-22	Chloromethane	µg/l	0.5	0.51	ND	NC
		1,1-Dichloroethane	µg/l	0.5	0.8	0.8	0.0
S305273	ERM-MW-1	1,2-Dichlorobenzene	µg/l	0.5	0.82	0.76	7.6
		1,4-Dichlorobenzene	µg/l	0.5	1.3	ND	NC
		1,1-Dichloroethane	µg/l	0.5	23.0	22.0	4.4
		1,2-Dichloroethane	µg/l	0.5	1.83	0.78	80.5
		1,1-Dichlorethene	µg/l	0.5	2.0	1.9	5.1
		cis-1,2-Dichloroethene	µg/l	0.5	19.0	18.0	5.4
		Ethylbenzene	µg/l	0.5	0.90	0.83	8.1
		Isopropylbenzene	µg/l	0.5	0.54	0.50	7.7
		p-Isopropyltoluene	µg/l	0.5	1.1	3.6	106.4
		Naphthalene	µg/l	1.0	26.0	17.0	41.9
		n-Propylbenzene	µg/l	0.5	1.1	0.99	10.5
		Toluene	µg/l	0.5	0.72	0.75	4.1
		Trichloroethene	µg/l	0.5	1.3	1.2	8.0
		1,2,4-Trimethylbenzene	µg/l	0.5	6.9	6.1	12.3
		1,3,5-Trimethylbenzene	µg/l	0.5	4.1	3.4	18.7
		Xylenes (total)	µg/l	0.5	4.9	4.3	13.0
36454	ERM-MW-03	1,1-Dichloroethane	µg/l	5	16.0	16	0.0
37257	ERM-MW-17	1,1-Dichloroethane	µg/l	0.5	3.7	2.3	46.7
		1,1-Dichloroethene	µg/l	0.5	3.9	2.3	51.6
		Toluene	µg/l	0.5	0.7	0.5	33.3

Key:
NC = Not calculated; one result was detected and the other result was not detected
ND = Not detected above the method reporting limit
µg/l = Micrograms per liter
RPD = Relative percent difference

Table E-6
Suspect TPH Results
Oakland Maintenance Center
United Airlines

Lab Package	ERM Sample ID	Reported Concentration	Units	ERM Applied Qualifier
S304337	W-B-8 silica	100	µg/l	NJ
S304361	W-B-38	230	µg/l	NJ
	W-B-38 silica	120	µg/l	NJ
	W-B-11	140	µg/l	NJ
	W-B-11 silica	120	µg/l	NJ
	W-B-10	160	µg/l	NJ
	W-B-10 silica	93	µg/l	NJ
	W-B-12	4100	µg/l	NJ
	W-B-12 silica	5100	µg/l	NJ
	W-B-14	67	µg/l	NJ
	W-B-14 silica	69	µg/l	NJ
S304362	ERM-B-25	370	µg/l	NJ
	ERM-B-25 silica	140	µg/l	NJ
S304364	W-B-2	200	µg/l	NJ
	W-B-2 silica	88	µg/l	NJ
	W-B-4	140	µg/l	NJ
	W-B-4 silica	97	µg/l	NJ
	W-B-6	520	µg/l	NJ
	W-B-6 silica	260	µg/l	NJ
S304367	ERM-B-3	930	µg/l	NJ
	ERM-B-3 silica	200	µg/l	NJ
	ERM-B-5	12000	µg/l	NJ
	ERM-B-5 silica	4700	µg/l	NJ
	ERM-B-6	7700	µg/l	NJ
	ERM-B-6 silica	990	µg/l	NJ
S304368	ERM-B-4	4500	µg/l	NJ
	ERM-B-4 silica	840	µg/l	NJ
	ERM-B-1	2300	µg/l	NJ
	ERM-B-1 silica	340	µg/l	NJ
	ERM-B-2	5500	µg/l	NJ
	W-B-3	120	µg/l	NJ
	W-B-3 silica	77	µg/l	NJ
S304369	ERM-B-4-2.5	18	mg/kg	NJ
	ERM-B-4-2.5 silica	9.2	mg/kg	NJ
	ERM-B-5-2.5	43	mg/kg	NJ
	ERM-B-5-2.5 silica	<20	mg/kg	
	ERM-B-7	1900	µg/l	NJ

Lab Package	ERM Sample ID	Reported Concentration	Units	ERM Applied Qualifier
	ERM-B-7 silica	150	µg/l	NJ
S304386	ERM-B-9-4.5	200	mg/kg	NJ
	ERM-B-9-4.5 silica	<20	mg/kg	
S304387	ERM-B-17-3.5	5.1	mg/kg	NJ
	ERM-B-17-3.5 silica	<5.0	mg/kg	
S304388	W-B-12 (0.5)	18	mg/kg	NJ
	W-B-12 (0.5) silica	15	mg/kg	NJ
	ERM-B-26	360	µg/l	NJ
	ERM-B-26 silica	140	µg/l	NJ
S304390	ERM-B-24	620	µg/l	NJ
	ERM-B-24 silica	160	µg/l	NJ
	ERM-B-19	80	µg/l	NJ
	ERM-B-19 silica	100	µg/l	NJ
	ERM-B-18	96	µg/l	NJ
	ERM-B-18 silica	100	µg/l	NJ
S304405	ERM-B-17	51	µg/l	NJ
	ERM-B-17 silica	80	µg/l	NJ
	ERM-B-16	59	µg/l	NJ
	ERM-B-16 silica	82	µg/l	NJ
	ERM-B-13	86	µg/l	NJ
	ERM-B-13 silica	77	µg/l	NJ
	ERM-B-9	120	µg/l	NJ
	ERM-B-9 silica	150	µg/l	NJ
S304406	W-B-32 (1-2)	23	mg/kg	NJ

Table E-6
Suspect TPH Results
Oakland Maintenance Center
United Airlines

Lab Package	ERM Sample ID	Reported Concentration	Units	ERM Applied Qualifier
	W-B-32 (1-2) silica	22	mg/kg	NJ
	W-B-32	250	µg/l	NJ
	W-B-32 silica	160	µg/l	NJ
	ERM-B-8	52	µg/l	NJ
	ERM-B-8 silica	72	µg/l	NJ
S304432	ERM-B-20	61	µg/l	NJ
	ERM-B-20 silica	83	µg/l	NJ
	ERM-B-14	110	µg/l	NJ
	ERM-B-14 silica	170	µg/l	NJ
	ERM-B-27	550	µg/l	NJ
	ERM-B-27 silica	180	µg/l	NJ
	ERM-B-21	130	µg/l	NJ
	ERM-B-21 silica	130	µg/l	NJ
S304434	W-B-7 (1-2)	27	mg/kg	NJ
	W-B-7 (1-2) silica	13	mg/kg	NJ
	W-B-7	83	µg/l	NJ
	W-B-7 silica	79	µg/l	NJ
	W-B-16	57	µg/l	NJ
	W-B-16 silica	69	µg/l	NJ
	W-B-17	660	µg/l	NJ
	W-B-17 silica	220	µg/l	NJ
S304451	ERM-B-11	110	µg/l	NJ
	ERM-B-11 silica	66	µg/l	NJ
	ERM-B-10	96	µg/l	NJ
	ERM-B-10 silica	63	µg/l	NJ
S304475	P-1	82	µg/l	NJ
	P-1 silica	100	µg/l	NJ
S304476	UAL-MW-3	86	µg/l	NJ
	UAL-MW-3 silica	78	µg/l	NJ
	UAL-MW-2	280	µg/l	NJ
	UAL-MW-2 silica	120	µg/l	NJ
36455	ERM-MW-08	1100	µg/l	NJ
	ERM-MW-09	2600	µg/l	NJ
	ERM-MW-08, Si gel	250	µg/l	NJ
	ERM-MW-09, Si gel	760	µg/l	NJ

Key:

Table E-6
Suspect TPH Results
Oakland Maintenance Center
United Airlines

Lab Package	ERM Sample ID	Reported Concentration	Units	ERM Applied Qualifier

µg/l = Micrograms per liter
mg/kg = Milligrams per kilogram
NJ = Tentative value - chromatogram may be indicative of non-aromatic hydrocarbon
Note: Review of chromatograms indicated that the peaks did not resemble the diesel fuel pattern

Table E-7
Suspect ThalliumResults
Oakland Maintenance Center
United Airlines

Lab Package	ERM Sample ID	Reported Concentration	Units	ERM Applied Qualifier
S304337	W-B-2 (3.5-4.5)	50	mg/kg	J
	W-B-3 (3-4)	74	mg/kg	J
	W-B-4 (3-4)	63	mg/kg	J
	W-B-5 (3-4)	59	mg/kg	J
	W-B-6 (3-4)	140	mg/kg	J
	W-B-8 (1.5-2.5)	200	mg/kg	J
	W-B-8	0.15	mg/l	J
S304364	W-B-4	0.082	mg/l	J
S304365	ERM-B-1-3.5	70	mg/kg	J
	ERM-B-2-3.5	63	mg/kg	J
S304366	W-B-10 (3-4)	60	mg/kg	J
	W-B-11 (1-2)	93	mg/kg	J
	W-B-38 (2-3)	67	mg/kg	J
S304367	W-B-25 (1-2)	380	mg/kg	J
	W-B-25 (1-2) GFAA	<0.42	mg/kg	U
	ERM-B-5	0.074	mg/l	J
	ERM-B-6	0.081	mg/l	J
S304368	ERM-B-2	0.21	mg/l	J
	ERM-B-2 GFAA	<5.0	µg/l	U
S304369	ERM-B-3-2.5	72	mg/kg	J
	ERM-B-4-2.5	55	mg/kg	J
	ERM-B-5-2.5	67	mg/kg	J
	ERM-B-6-2.5	62	mg/kg	J
S304387	ERM-B-13-3.5	59	mg/kg	J
S304388	W-B-12 (0.5)	160	mg/kg	J
	W-B-29 (1-2)	280	mg/kg	J
S304406	W-B-32 (1-2)	78	mg/kg	J
S304432	ERM-B-14	0.065	mg/l	J
S3304433	ERM-B-14-4.5	150	mg/kg	J

Table E-7
Suspect ThalliumResults
Oakland Maintenance Center
United Airlines

Lab Package	ERM Sample ID	Reported Concentration	Units	ERM Applied Qualifier
	ERM-B-23-4.5	96	mg/kg	J
S3304434	W-B-7 (1-2)	75	mg/kg	J
	W-B-17 (1-2)	93	mg/kg	J
	W-B-16 (1-2)	80	mg/kg	J
S3304435	ERM-B-12-2.0	91	mg/kg	J
	ERM-B-11-2.5	75	mg/kg	J
	ERM-B-10-2.5	77	mg/kg	J
S304451	ERM-B-11	0.064	mg/l	J
	ERM-B-22-1.5	85	mg/kg	J
	ERM-B-15-1.0	83	mg/kg	J
S304475	W-B-22 (2-3)	76	mg/kg	J

Key:
mg/l = Milligram per liter
mg/kg = Milligrams per kilogram
J = estimated value
U = Not detected
GFAA = Analysis performed by graphite furnace atomic absorption

Appendix F
Survey Data

Notes:

1. The locations of Underground Storage Tanks (UST's) surveyed and shown on this map were determined on the ground by others.

2. The coordinates (North and East) shown on this map are California Coordinate System of 1983, Zone III, (CCS83) and are based upon the North American Datum of 1983 (NAD83), 1984 adjustment, published in 1986, and shown upon Record of Survey 990, filed for record in Book 25 of Record of Surveys, at Pages 50-60, Alameda County Official Records.

This map reflects the results of surveys conducted under my direction in February - April, 2003 at the request of the Port Land Surveyor of the Port of Oakland.

...ughan, LS 6122
...xpires 3/31/06

Date

SURVEYED LOCATIONS

DESCRIPTION	NORTH	EAST	DESCRIPTION	NORTH	EAST
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

PORT OF OAKLAND

530 Water Street
Oakland, California

GRAPHIC SCALE
0 150' 300' 600' 900'
IN FEET
1 INCH = 300' FT

OAKLAND INTERNATIONAL AIRPORT
LOCATIONS OF UNDERGROUND / ABOVE GROUND STORAGE TANKS AND MONITORING WELLS

DRAWN BY: JVB	FIELD BOOK:
CHECKED BY: JM	DATA FILE: MWELL1-12.CR5
SCALE: 1" = 300'	WORK ORDER NO. 120037
DATE: 2/24/03	REVISION: 2
SHEET 1 OF 1	REV. DATE: 4/28/03
ATTACHMENTS: HIGH_SOUTH_8_MOD2	
DWG LOCATION: 120037_MW1.dwg	

KAVANAGH ENGINEERING

0344ERM1.doc

708 CAROLAN AVENUE • BURLINGAME, CA 94010
TEL: (650) 579-1944 • FAX: (650) 579-1960

UNITED AIRLINES OAKLAND MAINTENANCE CENTER

MONITORING WELL COORDINATES AND ELEVATIONS

PREPARED FOR: ENVIRONMENTAL RESOURCES MANAGEMENT
1777 BOTELHO DRIVE, SUITE 260
WALNUT CREEK, CA. 94596.
925-946-0455

BY: C. L. Kavanagh
Charles L. Kavanagh
RCE 20858

REGISTERED PROFESSIONAL ENGINEER
CHARLES L. KAVANAGH
No. 20858
Exp. 9-30-05
CIVIL
STATE OF CALIFORNIA

Date: 5-30-03

Node ID	Northing	Easting	(PORT DATUM) Elevation Wellhead	Ground	Description
57	2088493.74	6067058.48	10.39	10.65	ERM-MW-1
58	2088478.28	6067028.58	9.85	10.14	ERM-MW-2
56	2088533.82	6067033.20	9.79	10.20	ERM-MW-3
59	2088529.42	6067099.23	10.50	10.71	ERM-MW-4
60	2088428.86	6067079.07	9.85	10.12	ERM-MW-5
69	2088659.58	6066590.90	8.91	6.91	ERM-MW-6
68	2088534.37	6066537.28	6.16	6.45	ERM-MW-7
67	2088588.30	6066463.99	5.46	5.96	ERM-MW-8
66	2088637.71	6066426.93	5.49	5.73	ERM-MW-9
70	2088726.06	6066492.23	7.54	5.27	ERM-MW-10
62	2088683.02	6067089.06	8.71	9.07	UAL-MW-1
64	2088595.34	6067117.53	10.10	10.39	UAL-MW-2
65	2088581.66	6067162.72	10.32	10.69	UAL-MW-3
63	2088614.66	6067157.14	10.05	10.15	UAL-MW-4
61	2088437.12	6066979.17	9.38	9.50	UAL-MW-5

NOTES

1. FIELD SURVEYING. Performed 5-29-03.

2. REFERENCE ELEVATION. Found nail "UNITED 1", located 200' north of the northwest corner of the maintenance hangar. Elevation 9.21 (Port of Oakland Datum).

3. DATUM CONVERSION. Port of Oakland datum (based on Mean Lower Low Water) is 3.20' below NGVD 1929 (mean sea level datum).
0.00 (NGVD 1929) = 3.20 (Port Datum). To convert Port Datum Elevations to NGVD 1929, subtract 3.20.

4. COORDINATE SYSTEM. California Coordinate System Zone 3, North American Datum 1983 (NAD 83), converted to US Feet. Ground distances were multiplied by a scale factor of 0.999929 to obtain grid distances.

5. SURVEY CONTROL. Coordinates provided by Port of Oakland Survey Dept. 510-627-1472

Control #	NAD 83 Coordinates	
UNITED 1	N 2,088,557.82	E 6,066,944.01
UNITED 2	N 2,089,066.03	E 6,067,328.84

SK-1

0344ERM2.doc

UNITED AIRLINES OAKLAND MAINTENANCE CENTER

MONITORING WELL COORDINATES AND ELEVATIONS

PROJECT #5310.10

PREPARED FOR: ENVIRONMENTAL RESOURCES MANAGEMENT
1777 BOTELHO DRIVE, SUITE 260
WALNUT CREEK, CA. 94596.
925-946-0455

BY:

Charles L. Kavanagh
RCE 20858

Date: ______________________

REGISTERED PROFESSIONAL ENGINEER
CHARLES L. KAVANAGH
No. 20858
Exp. 9-30-05
CIVIL
STATE OF CALIFORNIA

MONITORING WELLS

Node ID	Northing	Easting	Elevation Top Casing	Elevation Rim(Ground)	Description
75	2088558.14	6066998.83	9.31	9.69	ERM-MW-11
77	2088338.75	6067060.68	8.93	9.30	ERM-MW-12
80	2088432.31	6067166.10	10.36	10.67	ERM-MW-13
78	2088354.29	6067142.84	9.71	10.15	ERM-MW-14
72	2088720.49	6066389.83	7.99	6.06	ERM-MW-15
73	2088553.69	6066396.41	5.77	5.98	ERM-MW-16
74	2088442.17	6066483.89	5.96	6.41	ERM-MW-17

NOTES

1. FIELD SURVEYING. Performed 12-30-03.

2. REFERENCE ELEVATION. Found nail "UNITED 1", located 200' north of the northwest corner of the maintenance hanger. Elevation 9.21 (Port of Oakland Datum).

3. DATUM CONVERSION. Port of Oakland datum (based on Mean Lower Water) is 3.20' below NGVD 1929 (mean sea level datum).
0.00 (NGVD 1929) = 3.20 (Port Datum). To convert Port Datum Elevations to NGVD 1929, subtract 3.20.

4. COORDINATE SYSTEM. California Coordinate System Zone 3, North American Datum 1983 (NAD 83), converted to US Feet. Ground distances were multiplied by a scale factor of 0.999929 to obtain grid distances.

5. SURVEY CONTROL. Coordinates provided by Port of Oakland Survey Dept. 510-627-1472.

Control#	NAD 83 Coordinates	
UNITED 1	N 2,088,557.82	E 6,066,944.01
UNITED 2	N 2,089,066.03	E 6,067,328.84

SK-2

Appendix G
Slug Test Procedures and Results

APPENDIX G- SLUG TEST PROCEDURES AND RESULTS

This appendix describes the procedures for conducting the slug tests, the data collected, the evaluation of the data, and the results. A slug test is an in situ field test used on a single well to measure the hydraulic conductivity in the immediate vicinity of a well. The basic principle of a slug test involves quickly adding or removing a volume of water, or a mechanical equivalent (a "slug"), from a well and measuring the subsequent dissipation (falling head) or recovery (rising head) of the ground water level in the well with time. Slug tests can be applied to both confined and unconfined aquifers in fully or partially penetrating wells. The slug tests were performed at the former United Oakland Maintenance Center (OMC) to provide estimates on the hydraulic conductivity within fill interval above the Bay Mud. The results of the slug tests were used in the site specific health risk assessments presented in Section 5 and Appendix I.

FIELD PROCEDURES

The following section describes the monitoring well locations chosen for slug tests and the procedures used to conduct the slug tests.

Slug Test Locations

Slug tests were conducted on the following 6 monitoring wells at the OMC on December 2003 (Figure F-1):

- ERM-MW-3
- ERM-MW-7
- ERM-MW-9
- UAL-MW-1
- UAL-MW-3
- UAL-MW-5

Three of the monitoring wells (ERM-MW-3, ERM-MW-7, and ERM-MW-9) are 1-inch in diameter, two wells (UAL-MW-1 and UAL-MW-3) are 4-inch in diameter, and one well (P-2/UAL-MW-5) is 2-inch in diameter. Monitoring well UAL-MW-2, a 4-inch diameter well, was used as a background well to provide information on potential water table elevation fluctuations during the slug testing activities. A total of two slug tests were performed on each monitoring well.

Slug Test Protocol

Prior to commencement of the slug tests, a round of water level elevations was performed on all onsite monitoring wells. Tests were conducted using a mechanical slug (a sealed pipe) and pressure transducers/data loggers (In-situ, Inc. Mini-Trolls). The Mini-Trolls were programmed in the field using a laptop computer to collect readings at 1-second intervals. The Mini-Troll used in the background well was programmed to collect data at 5-minute intervals. Following programming, the Mini-trolls were lowered into the well and secured.

The slugs used for the tests were 5-foot long, solid stainless steel rods with diameters of 0.75, 1.5 or 3 inch depending on the size of the well to be evaluated (1, 2 or 4 inch, respectively). These slugs correspond to volumes of 0.44 liter (L), 1.76 L, and 7.03 L, respectively. Following emplacement of the Mini-Troll, the corresponding slug was lowered into the well. This procedure was followed at each monitoring well until all Mini-Trolls and slugs were emplaced.

Returning to the well where the initial Mini-Troll and slug were installed, the water level was measured and, once it had equilibrated to the pre-installation measurement (± 0.02 feet), the time and depth to water were recorded and the slug was removed. This sequence was repeated at each well in the order of installation. If a well had not equilibrated to the pre-installation water level measurement, it was bypassed until its water level equilibrated.

Once the slugs were removed from all of the wells, a minimum of ten minutes was allowed to elapse before water levels were checked using an electronic water level indicator. If the water level had equilibrated to the pre-slug removal measurement (± 0.02 feet), the time and depth to water were recorded and the slug was replaced to allow for a second test. Upon completion of the second test, the Mini-trolls were removed from the wells and the water level data was downloaded onto the laptop computer.

SLUG TEST RESULTS

The following sections describe the evaluation performed on the data collected during the slug tests.

Analysis Method

The method used to analyze the data was the Bouwer and Rice (1976) method, which is appropriate for fully and partially penetrating confined and unconfined aquifers. This method involves measuring the displacement of water within the well (H_t) after a slug has been removed. The value of H_t as a function of time is plotted on semi logarithmic paper. The data pairs will generally fall in a straight line. The slope of that line is used to determine the hydraulic conductivity of the surrounding formation.

In order to facilitate the need to manage and analyze large volumes of data collected during the slug test field activities, each test was analyzed with the assistance of *AquiferTest*, an aquifer testing analysis software produced by Waterloo Hydrogeologic, Inc. Water level data were input into the analysis software electronically. An ERM geologist manually completed the monitoring well geometry input, data reduction, and curve fitting efforts.

Slug Test Results

The results of the slug test analyses are enclosed in this appendix. For each test, the first page provides a semi-logarithmic plot of H/H_0 versus time and the resulting hydraulic conductivity value, which is based upon the best-fit straight line through the data set. The second page presents a hydrograph illustrating water level displacement versus time. Although both falling head and rising head tests were performed, only rising head tests were analyzed as they provide results that are more representative of aquifer conditions because only saturated pores are affected.

In several tests, two straight lines were observed within the data set. As described by Bouwer (1989), the first and steeper of these two straight lines is due to the high permeability zone around the well corresponding to the sand filter pack. Efforts were therefore made to calculate hydraulic conductivity values based upon the second, less steep straight line, which represents the aquifer.

Two of the data sets (ERM-MW-3 and ERM-MW-9) were not included in the analysis due to the lack of results consistent with a slug test. Both ERM-MW-3 and ERM-MW-9 are 1-inch diameter monitoring wells constructed with a proportionally large surrounding radius of filter pack (8-inch diameter borehole). Therefore, it is possible that the slug used to displace the water within these wells may have not displaced enough water to impact the surrounding formation and the data may only reflect the displacement of water from the filter pack. The other four wells produced characteristic data sets and the calculated values of K were consistent between the first and second test.

A summary of the well construction input parameters and the resulting hydraulic conductivity values are shown in Table F-1. These tests indicate that hydraulic conductivity (K) values range from 0.49 to 18 feet per day ($1.6x10^{-4}$ to $6x10^{-3}$ centimeters/second [cm/s]) in the fill aquifer, with an average K of 5.6 feet per day ($1.9x10^{-3}$ cm/s). These results are consistent with the expected K values for thin interbedded fine-grained silts and silty sands that are found in this zone (Freeze and Cherry, 1979).

REFERENCES

Bouwer, H., 1989. *The Bouwer and Rice Slug Test – An Update.* Ground Water, Number 3, Volume 27.

Bouwer, H. and R.C. Rice, 1976. *A Slug Test Method for Determining Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells.* Water Resources Research, vol. 12, no. 3, pp.423-428.

Freeze, R.A. and J.A. Cherry, 1979. Groundwater. Prentice-Hall, Inc. Englewood Cliffs, New Jersey 07632,

Waterloo Hydrogeologic, 1997. *Aquifer Test User's Manual.*

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G:\\5310\10\53101033.dwg	J. Estrada	11/12/03	5310.10

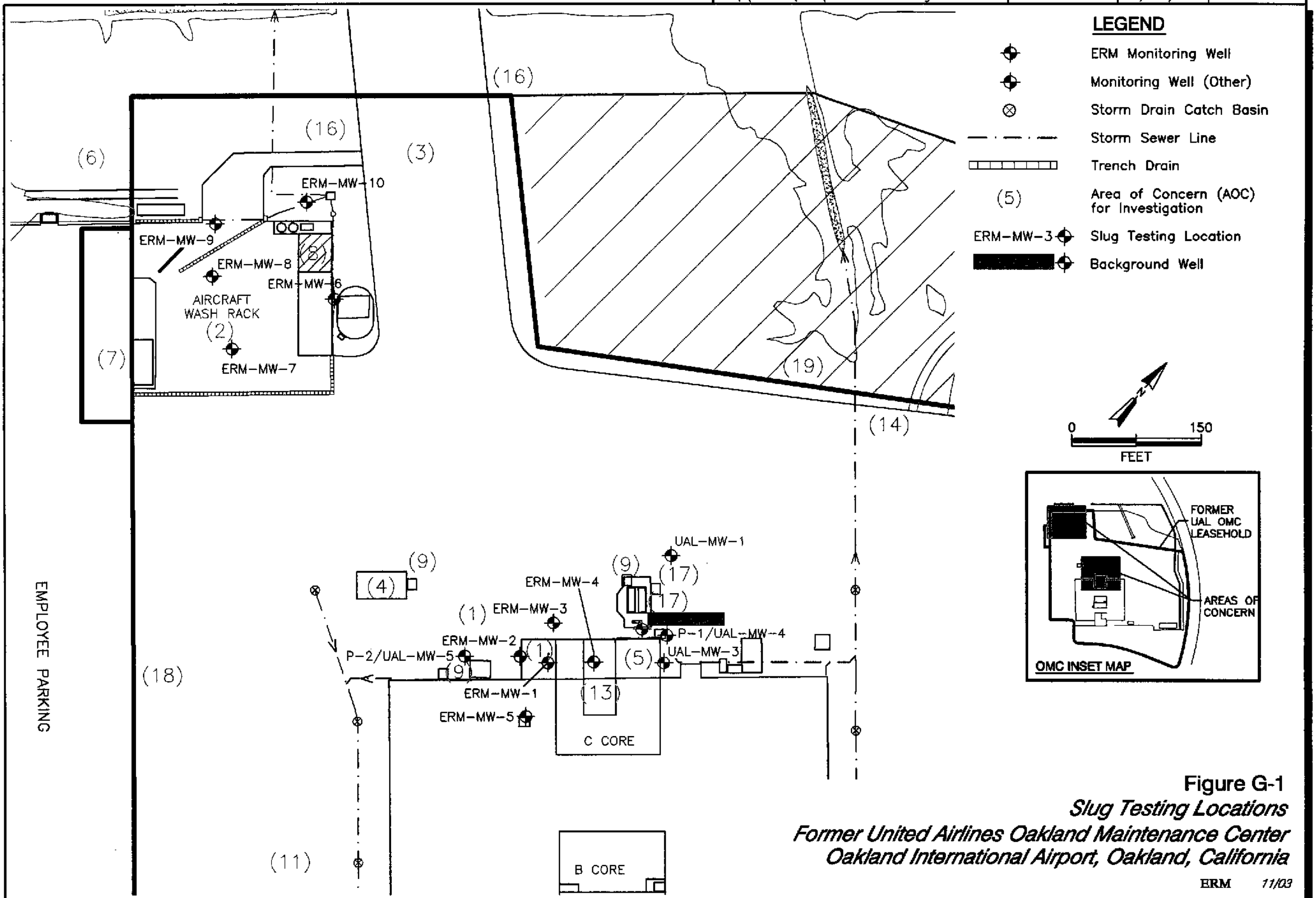


Figure G-1

Slug Testing Locations

Former United Airlines Oakland Maintenance Center

Oakland International Airport, Oakland, California

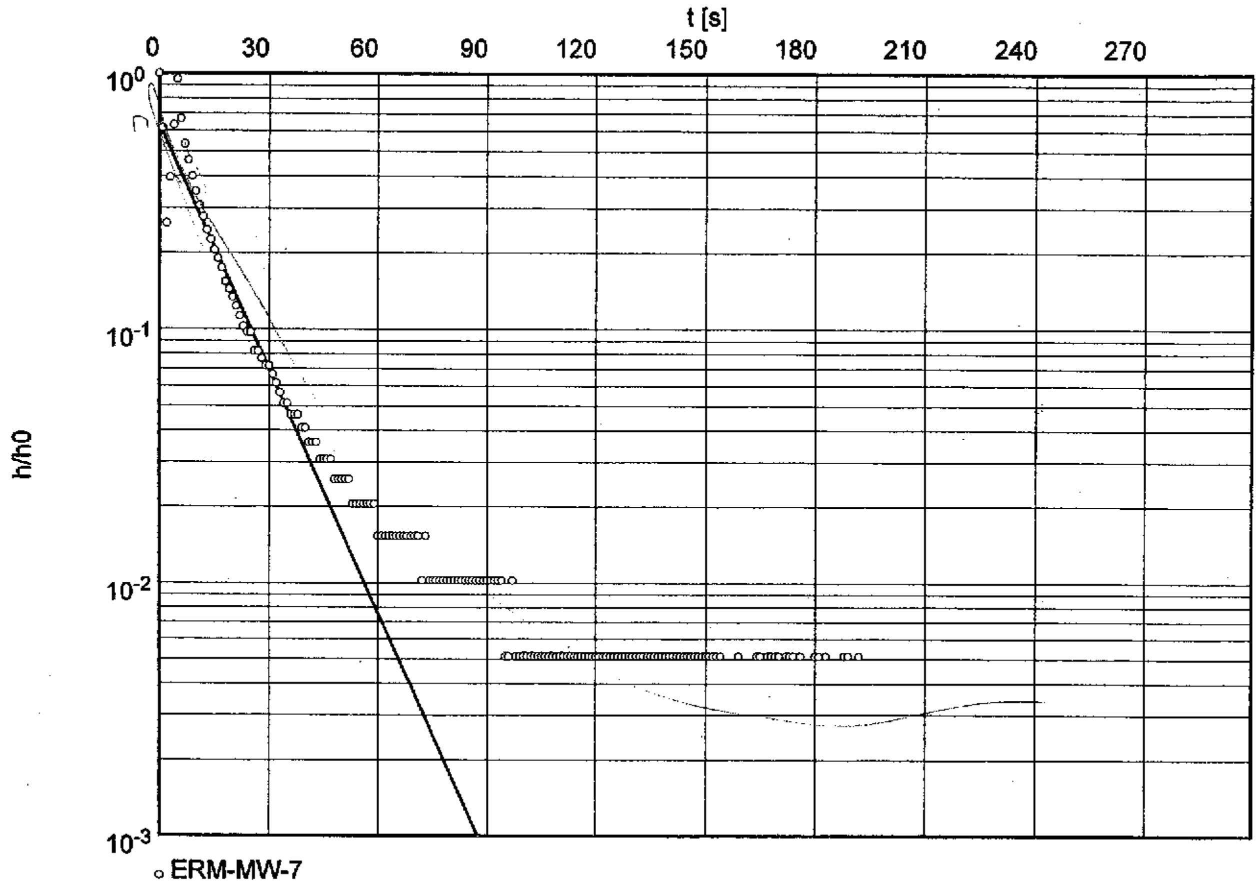
ERM 11/03

Table G-1
Slug Test Results
Oakland Maintenance Center
Oakland, California

	Input Parameters				Hydraulic Conductivity [ft/s]		Hydraulic Conductivity [ft/day]	
Well ID	**Casing Radius, ft**	**Borehole Radius, ft**	**Screen Length, ft**	**Aquifer Thickness, ft**	**Rising Head Test Trial 1**	**Rising Head Test Trial 2**	**Rising Head Test Trial 1**	**Rising Head Test Trial 2**
ERM-MW-7	0.042	0.24	10.0	10.5	1.99E-04	2.08E-04	1.72E+01	1.80E+01
UAL-MW-1	0.16	0.41	20.0	15.8	1.33E-05	1.31E-05	1.15E+00	1.13E+00
UAL-MW-3	0.16	0.41	20.0	13.4	5.70E-06	8.23E-06	4.92E-01	7.11E-01
UAL-MW-5	0.083	0.33	unknown	7.6	3.60E-05	3.80E-05	3.11E+00	3.28E+00
					A/B zone K min.	**5.70E-06**	**A/B zone K min.**	**4.92E-01**
					A/B zone K max.	**2.08E-04**	**A/B zone K max.**	**1.80E+01**
					A/B zone K avg.	**6.52E-05**	**A/B zone K avg.**	**5.63E+00**

ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS / Date: 12/9/03

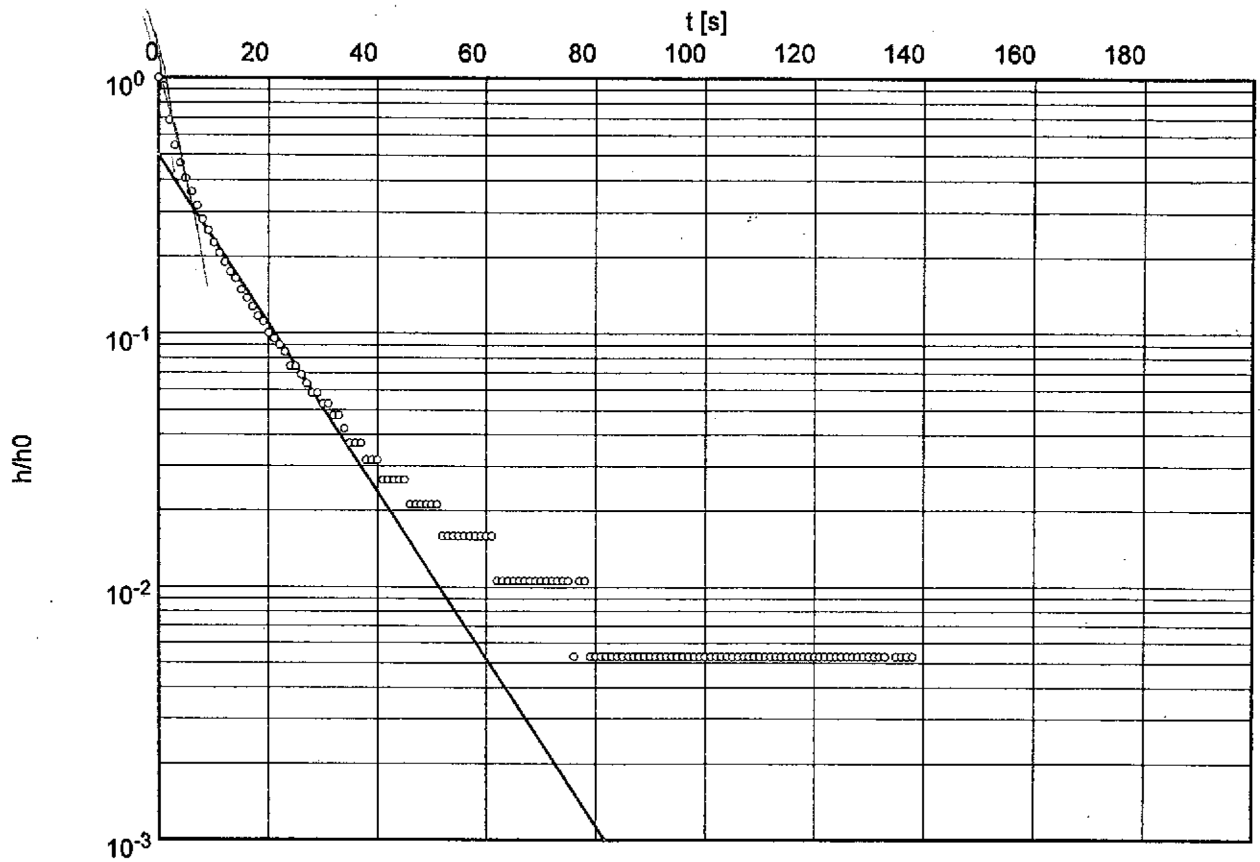
Slug Test No. 1	Test conducted on: 12/4/03
ERM-MW-7	



Hydraulic conductivity [ft/s]: 1.99×10^{-4}

ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1
		Project: OMC Slug Test
		Evaluated by: RLS — Date: 12/9/03

Slug Test No. 2	Test conducted on: 12/4/03
ERM-MW-7	

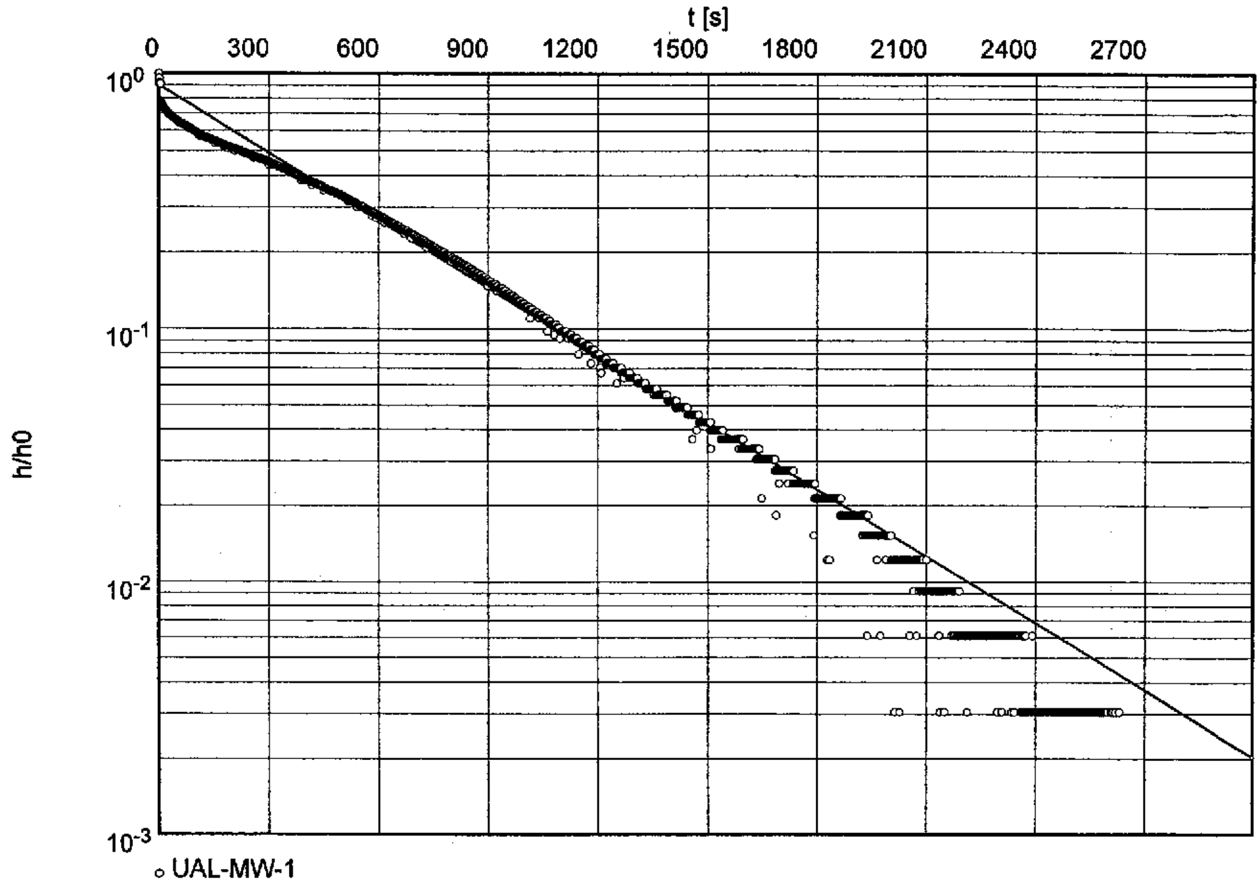


∘ ERM-MW-7

Hydraulic conductivity [ft/s]: 2.08×10^{-4}

ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS · Date: 12/9/03

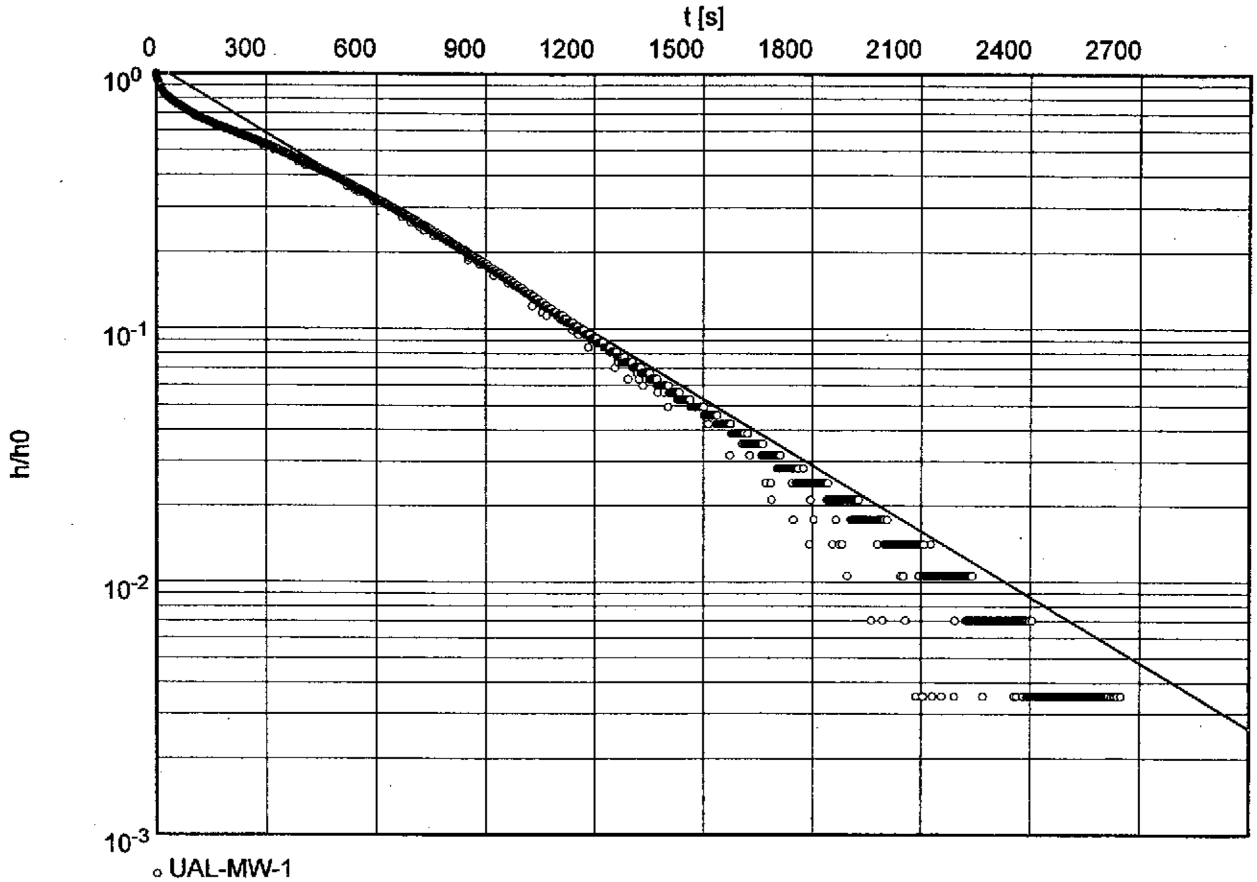
Slug Test No. 1	Test conducted on: 12/8/03
UAL-MW-1	



Hydraulic conductivity [ft/s]: 1.33×10^{-5}

ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1	
		Project: OMC Slug Test	
		Evaluated by: RLS	Date: 12/9/03

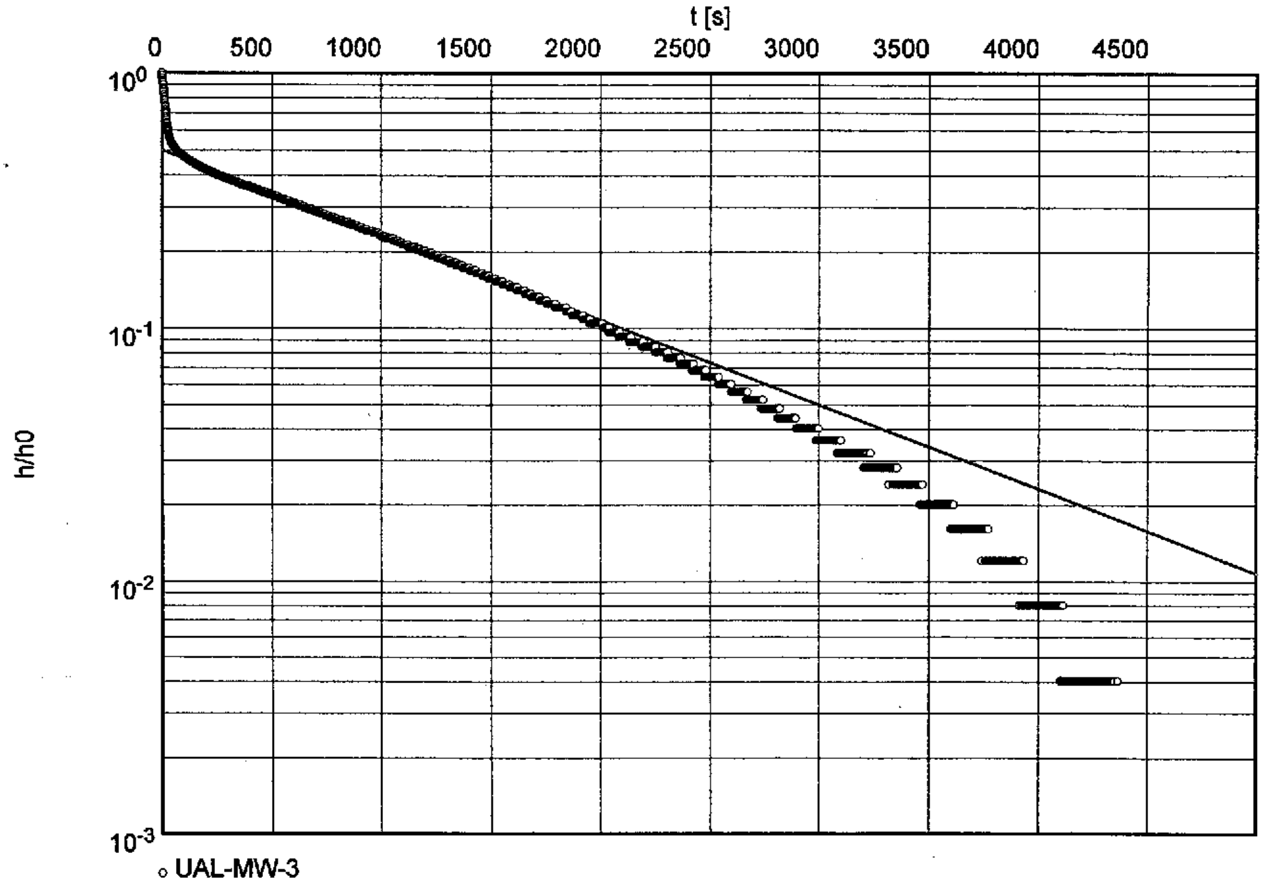
Slug Test No. 2	Test conducted on: 12/8/03
UAL-MW-1	



Hydraulic conductivity [ft/s]: 1.31×10^{-5}

ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS — Date: 12/9/03

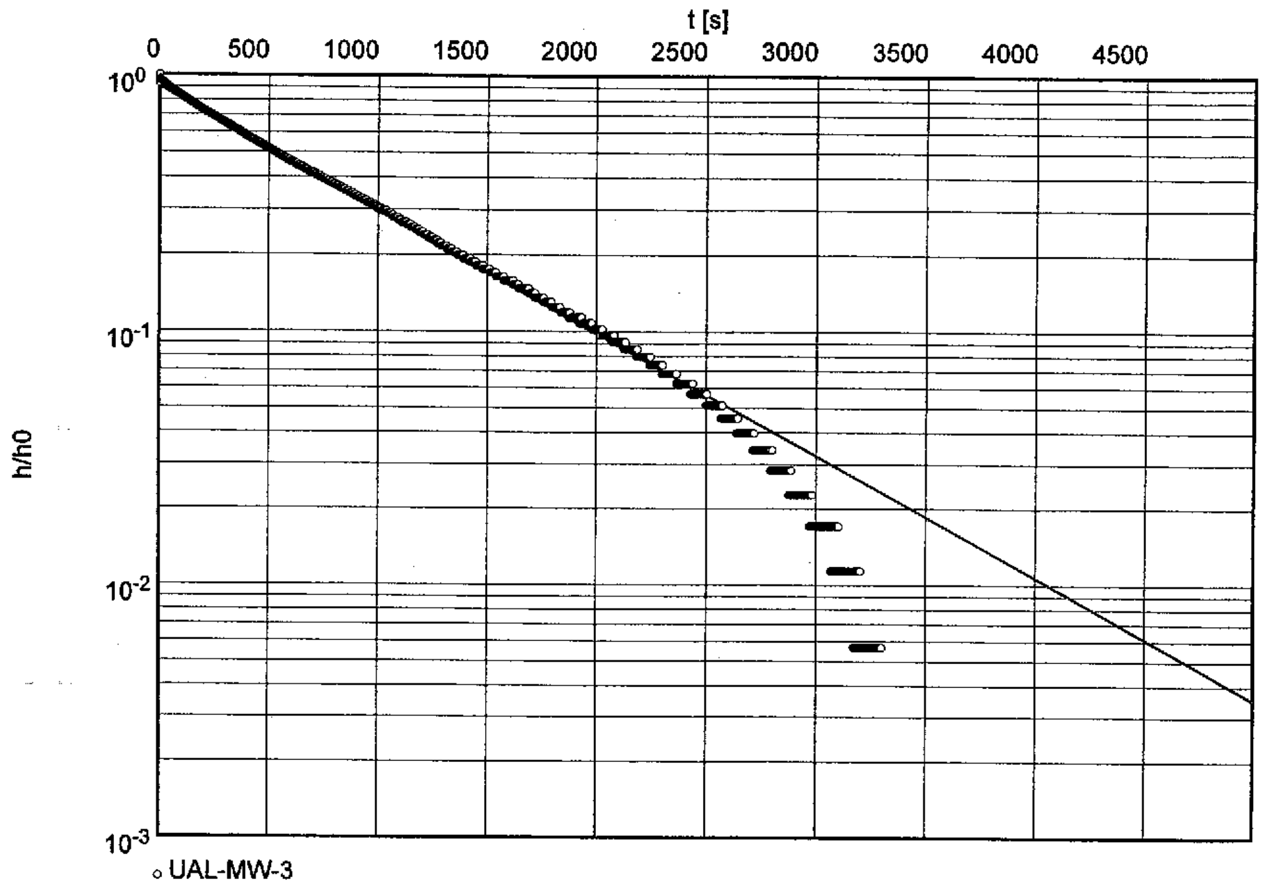
Slug Test No. 1	Test conducted on: 12/8/03
UAL-MW-3	



Hydraulic conductivity [ft/s]: 5.70×10^{-6}

ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1	
		Project: OMC Slug Test	
		Evaluated by: RLS	Date: 12/10/03

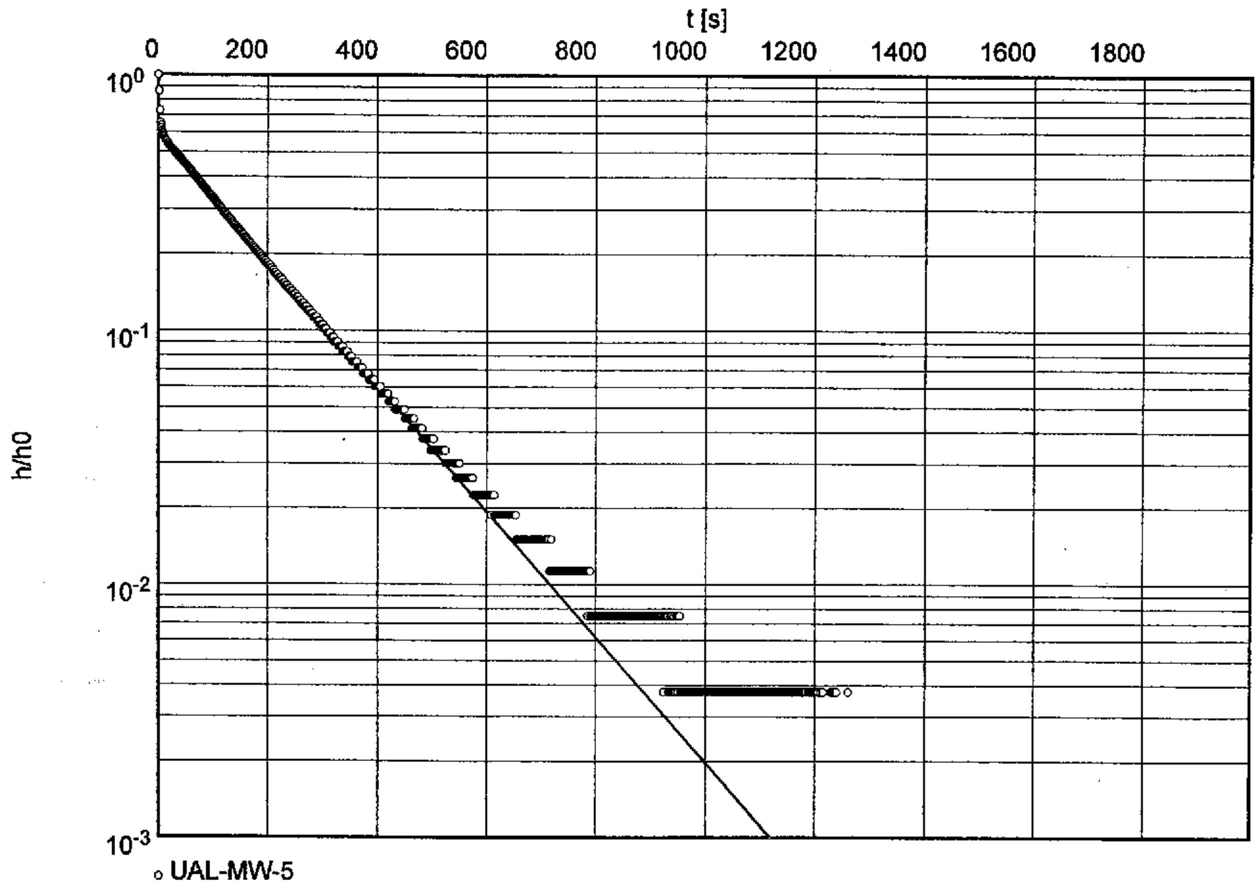
Slug Test No. 2	Test conducted on: 10/8/03
UAL-MW-3	



Hydraulic conductivity [ft/s]: 8.23×10^{-6}

ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS / Date: 12/9/03

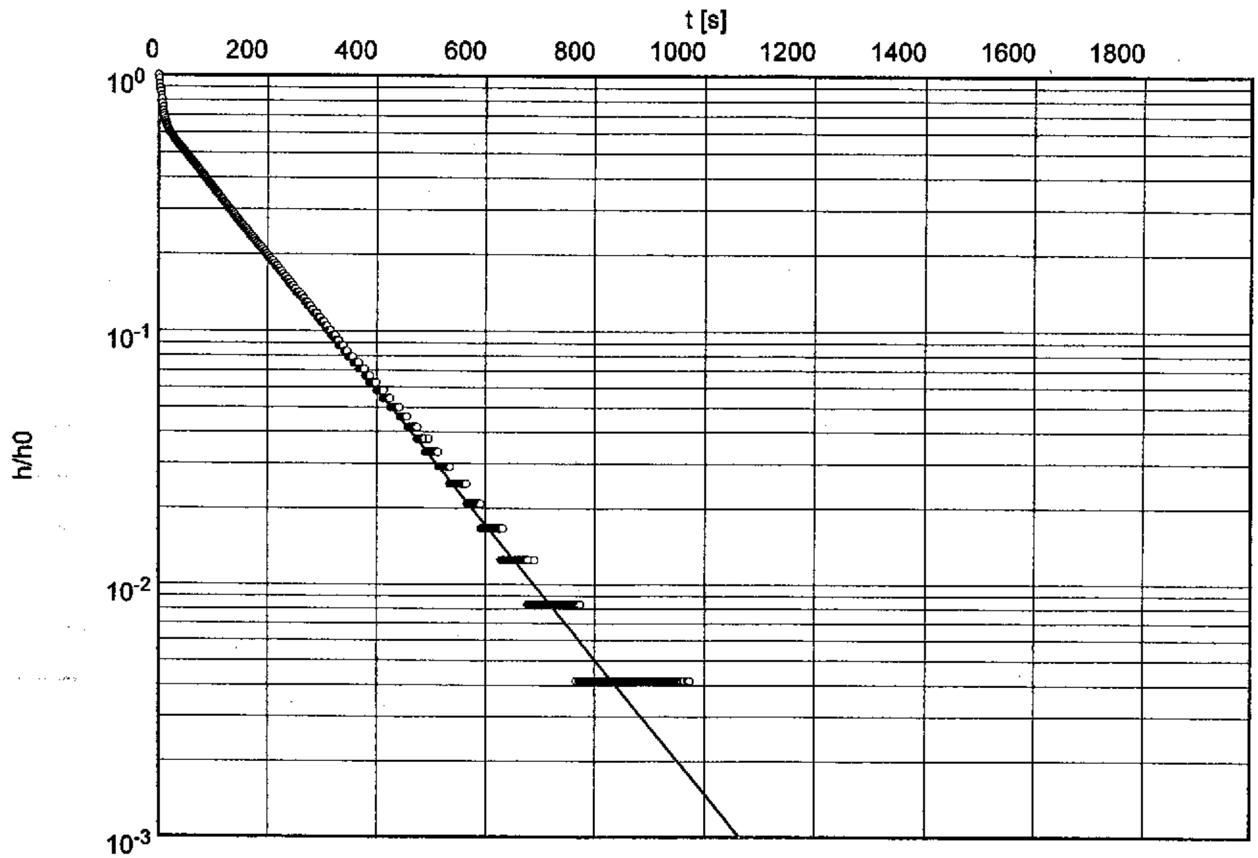
Slug Test No. 1	Test conducted on: 12/8/03
UAL-MW-5	



Hydraulic conductivity [ft/s]: 3.60×10^{-5}

ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1	
		Project: OMC Slug Test	
		Evaluated by: RLS	Date: 12/10/03

Slug Test No. 2	Test conducted on: 12/8/03
UAL-MW-5	

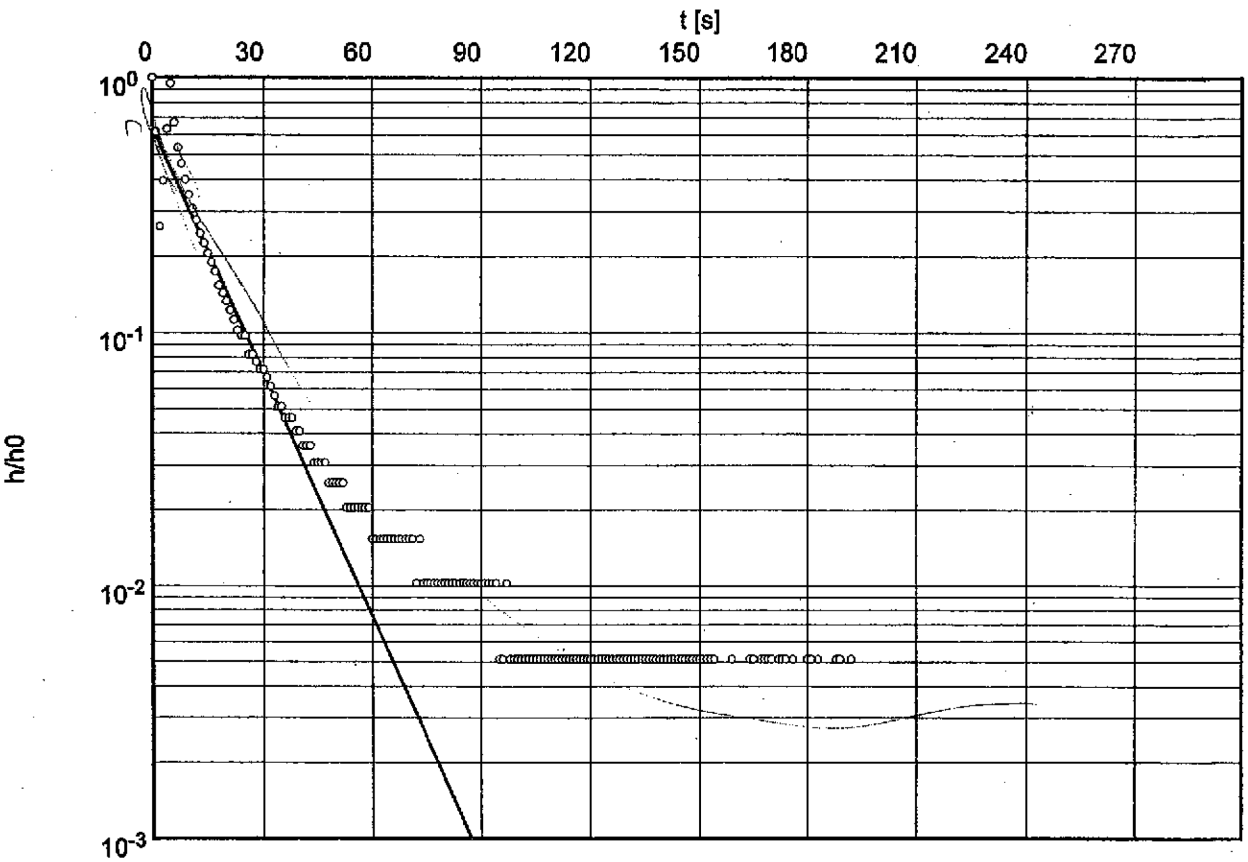


∘ UAL-MW-5

Hydraulic conductivity [ft/s]: 3.80×10^{-5}

ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1	
		Project: OMC Slug Test	
		Evaluated by: RLS	Date: 12/9/03

Slug Test No. 1	Test conducted on: 12/4/03
ERM-MW-7	

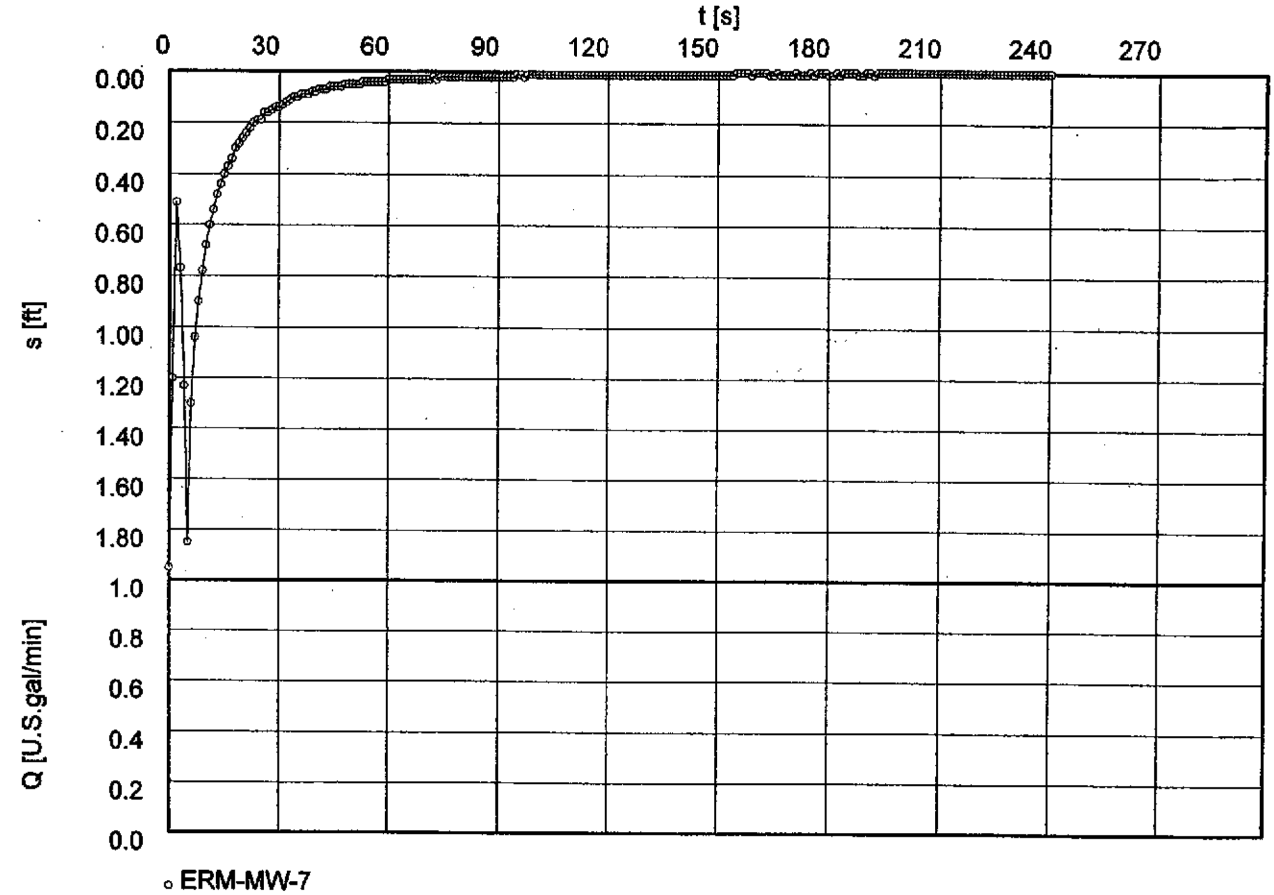


○ ERM-MW-7

Hydraulic conductivity [ft/s]: 1.99×10^{-4}

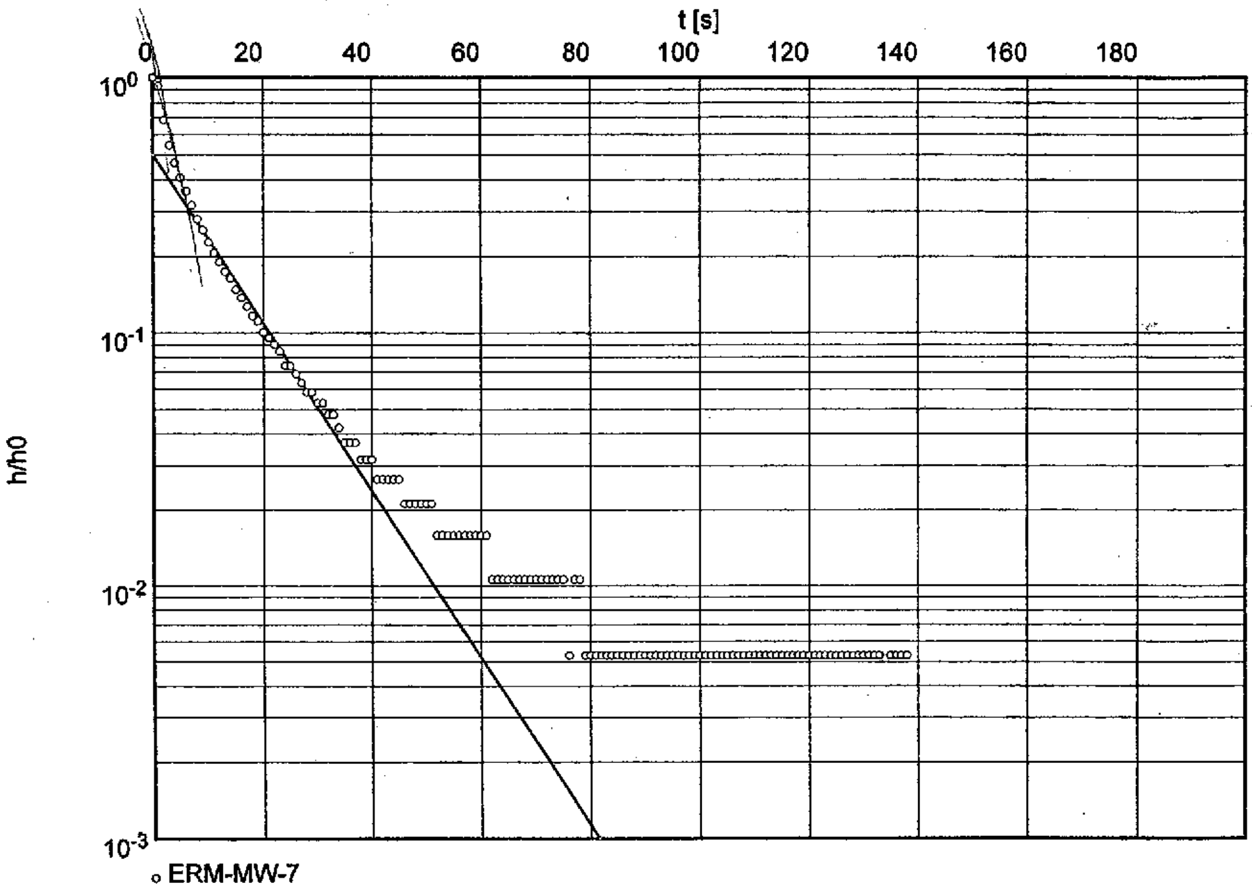
ERM	ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1
			Project: OMC Slug Test
			Evaluated by: RLS / Date: 12/9/03

Pumping Test No. 1	Test conducted on: 12/4/03
ERM-MW-7	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS / Date: 12/9/03

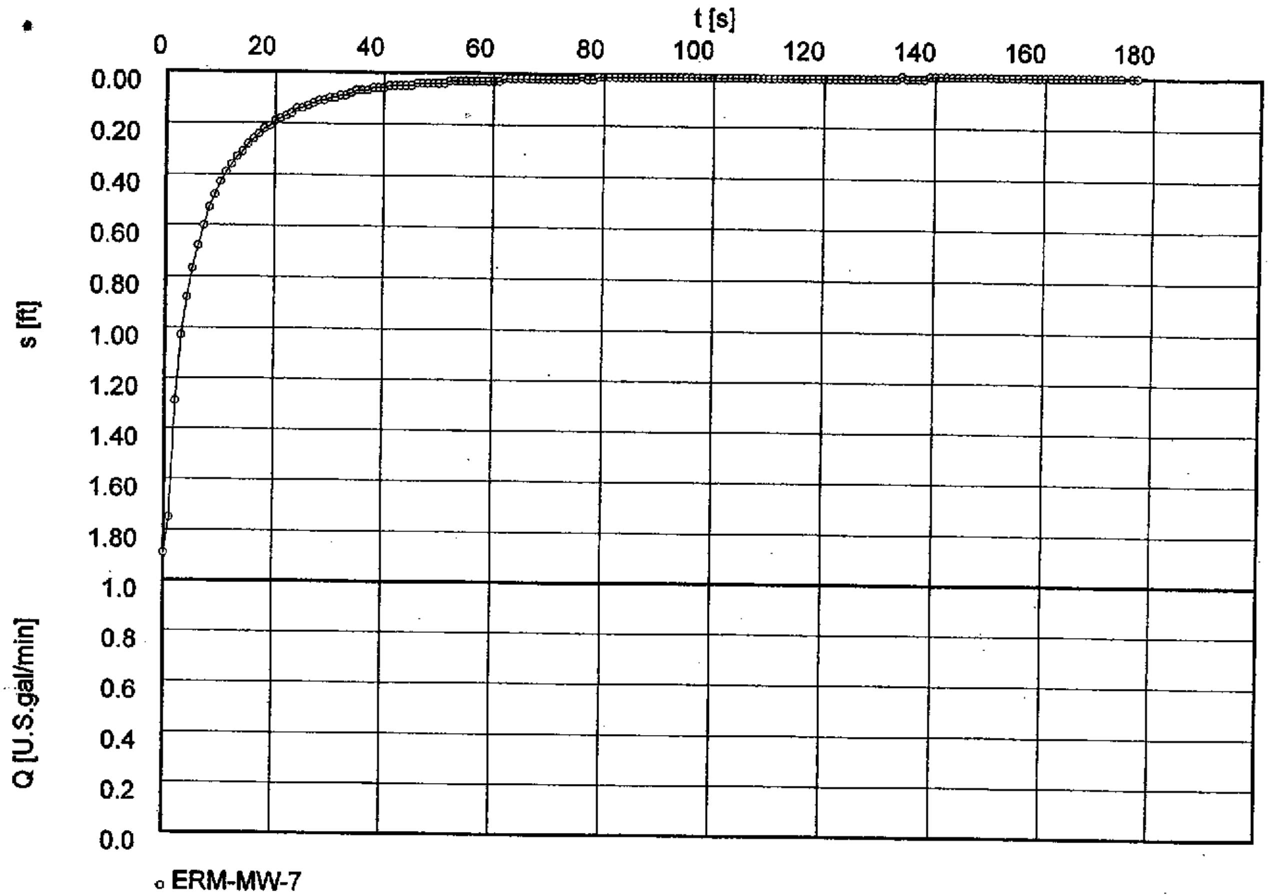
Slug Test No. 2	Test conducted on: 12/4/03
ERM-MW-7	



Hydraulic conductivity [ft/s]: 2.08×10^{-4}

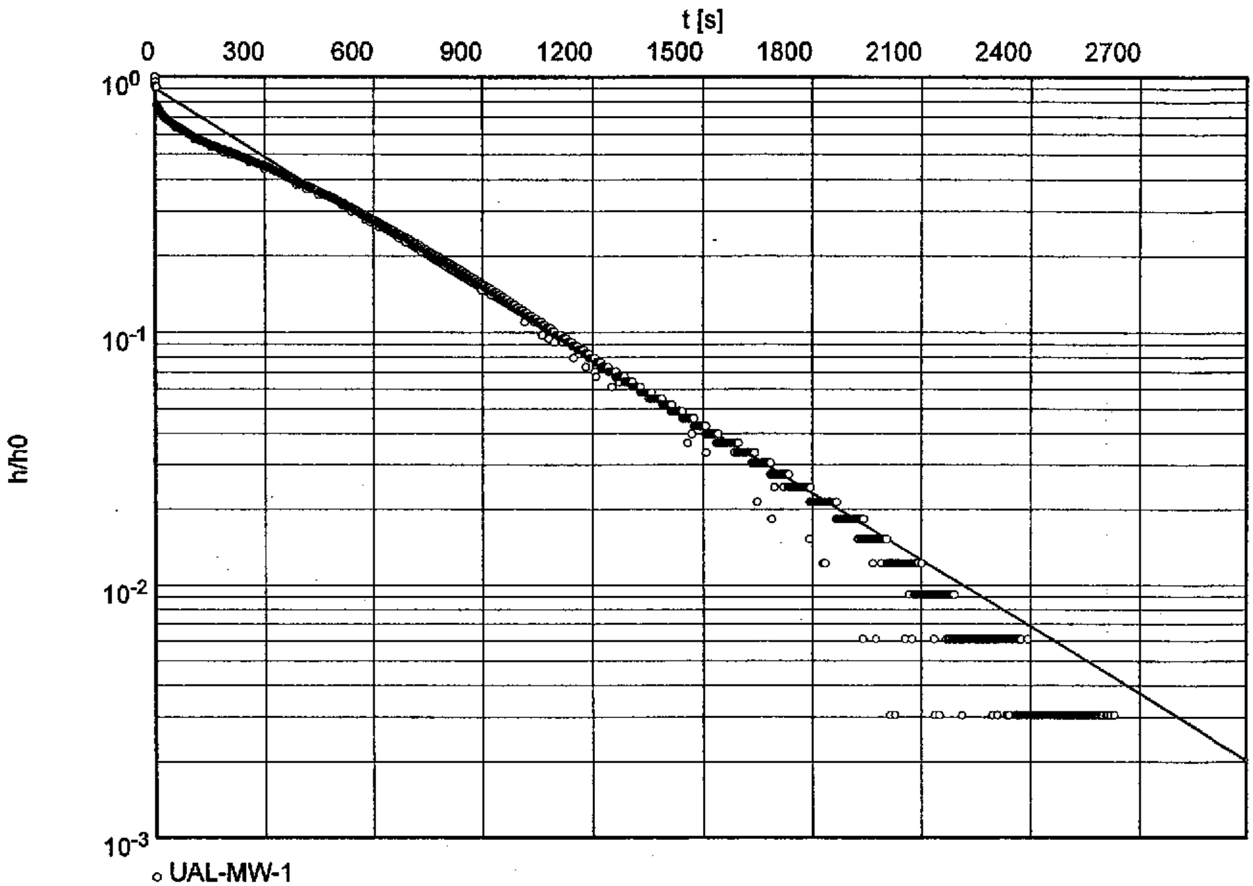
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1
		Project: OMC Slug Test
		Evaluated by: RLS | Date: 12/9/03

Pumping Test No. 2	Test conducted on: 12/4/03
ERM-MW-7	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS · Date: 12/9/03

Slug Test No. 1	Test conducted on: 12/8/03
UAL-MW-1	



Hydraulic conductivity [ft/s]: 1.33×10^{-5}

ERM
1777 Botelho Drive
Walnut Creek, CA 94596
ph.(925)946-0455

Pumping test analysis
Time-Drawdown plot
with discharge

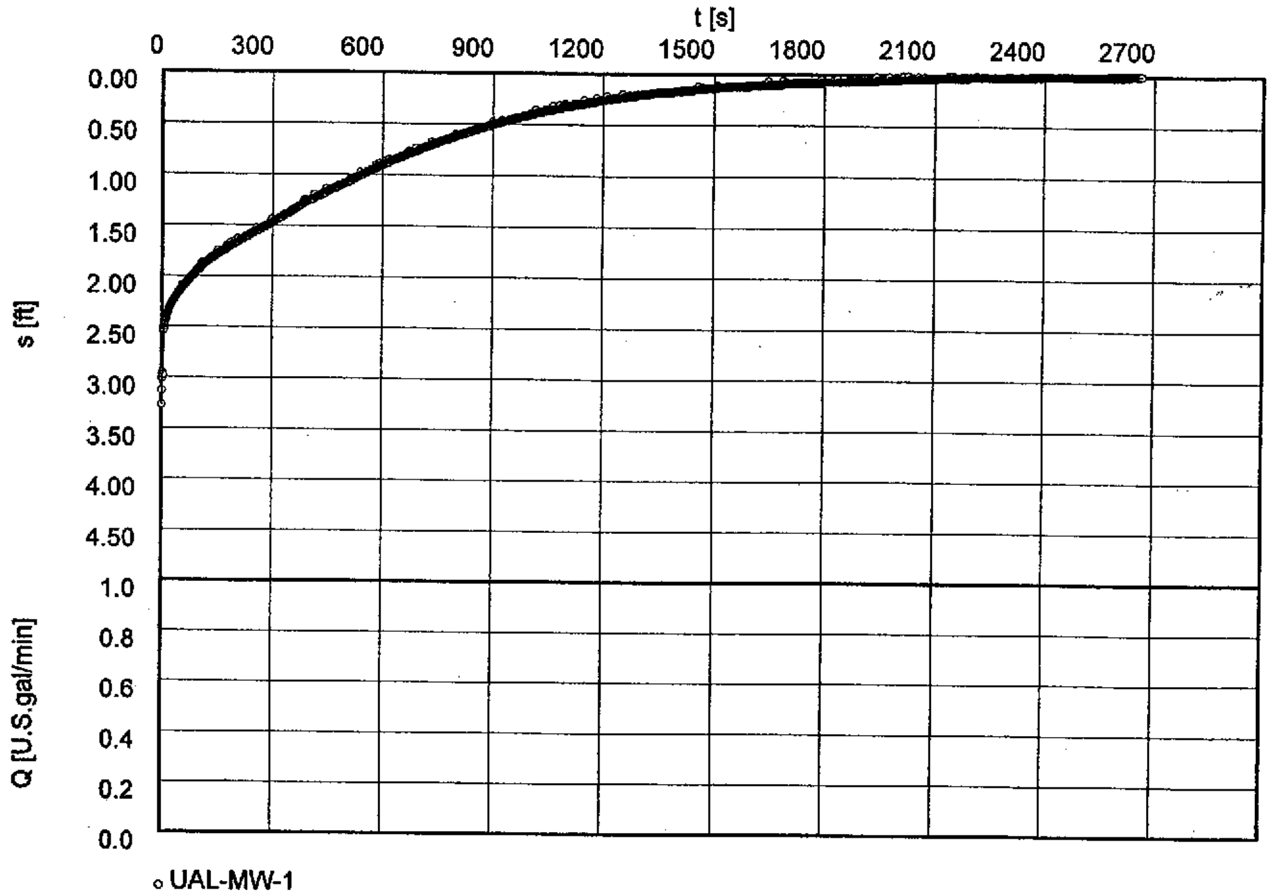
Project: OMC Slug Test

Evaluated by: RLS | Date: 12/9/03

Pumping Test No. 1

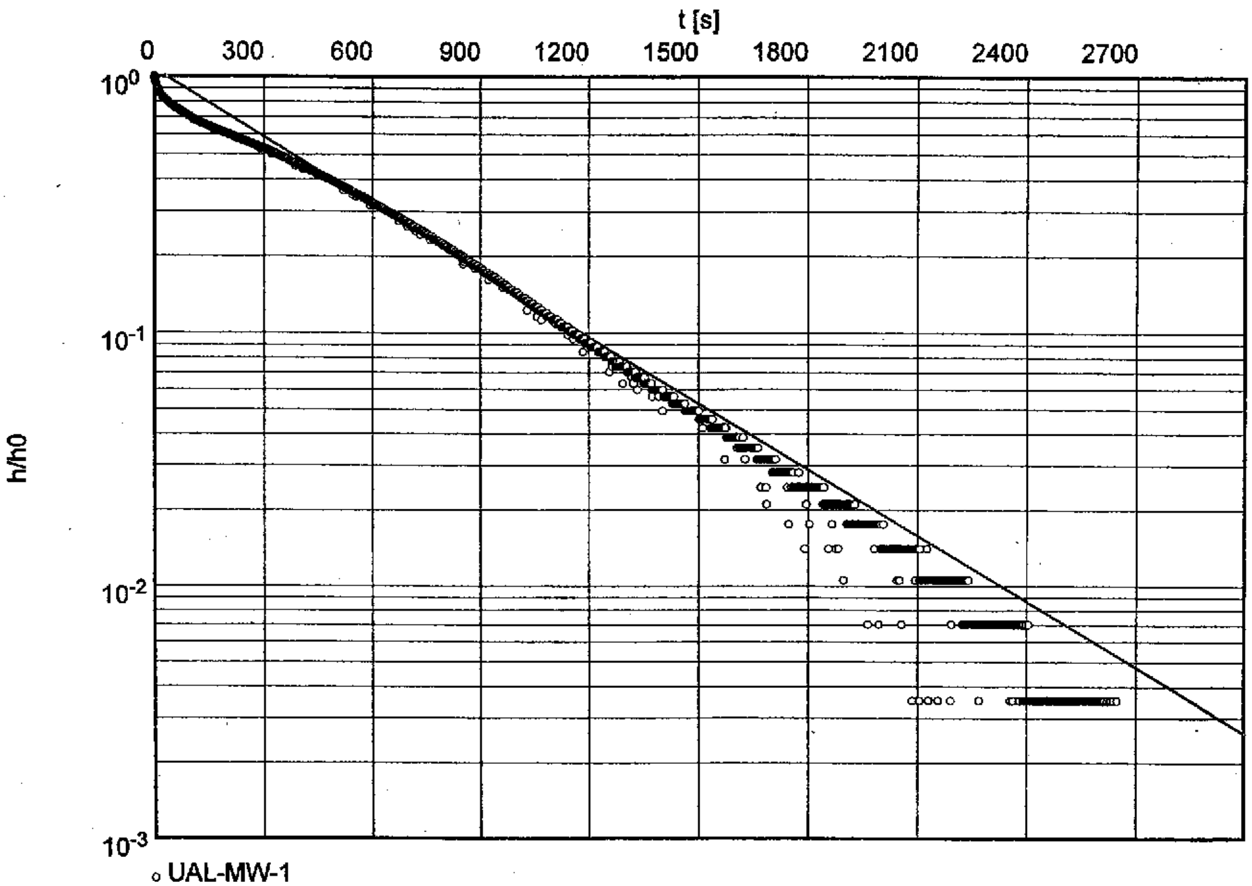
Test conducted on: 12/8/03

UAL-MW-1



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS / Date: 12/9/03

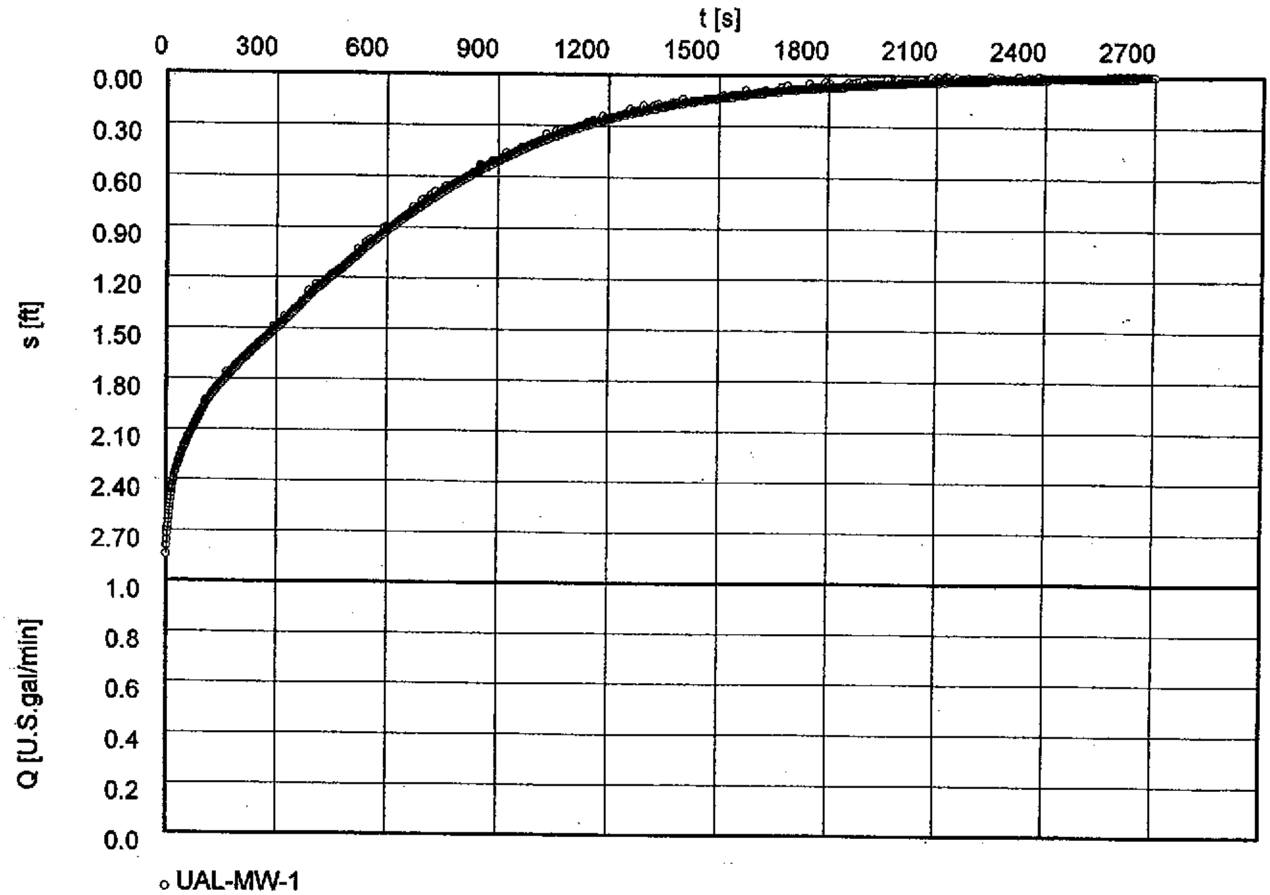
Slug Test No. 2	Test conducted on: 12/8/03
UAL-MW-1	



Hydraulic conductivity [ft/s]: 1.31×10^{-5}

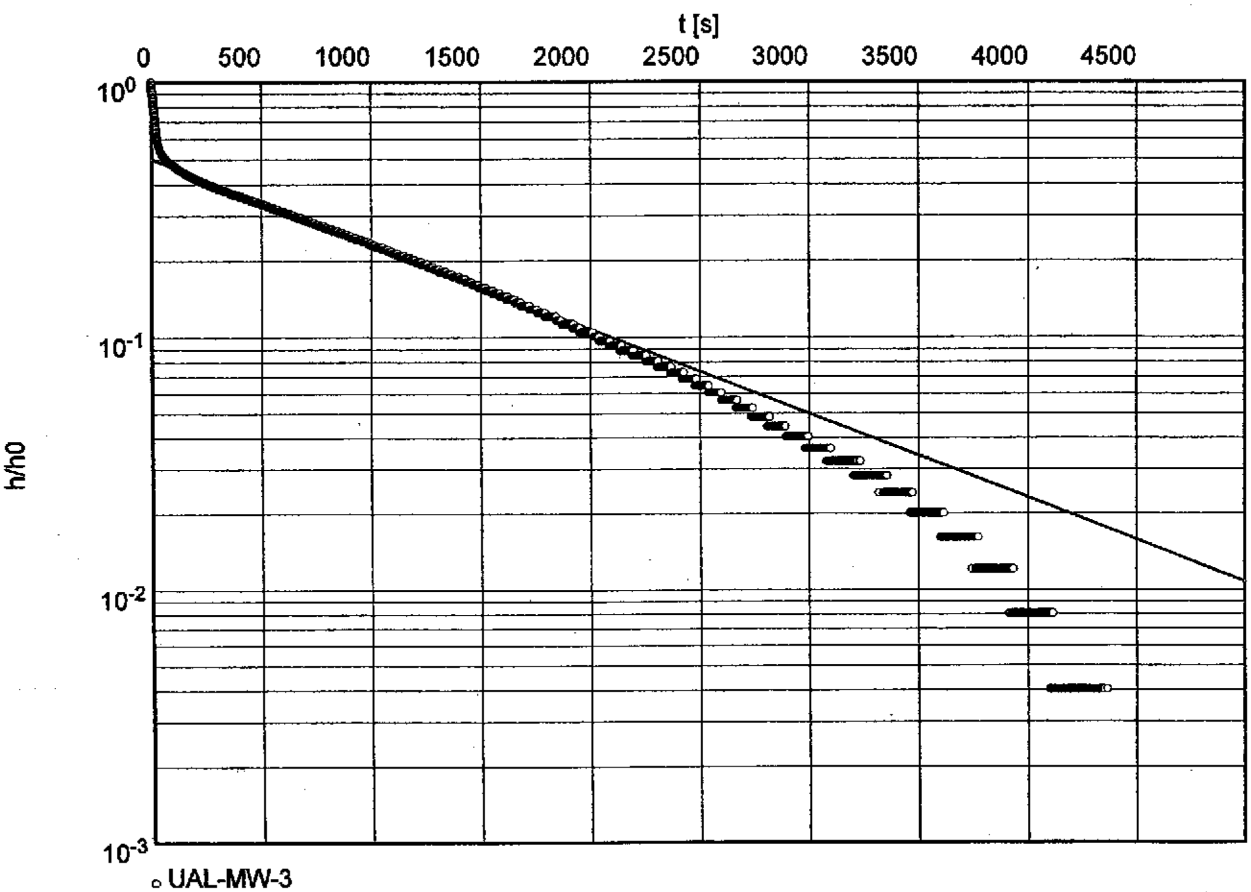
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1 Project: OMC Slug Test Evaluated by: RLS Date: 12/9/03

Pumping Test No. 2	Test conducted on: 12/8/03
UAL-MW-1	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1	
		Project: OMC Slug Test	
		Evaluated by: RLS	Date: 12/9/03

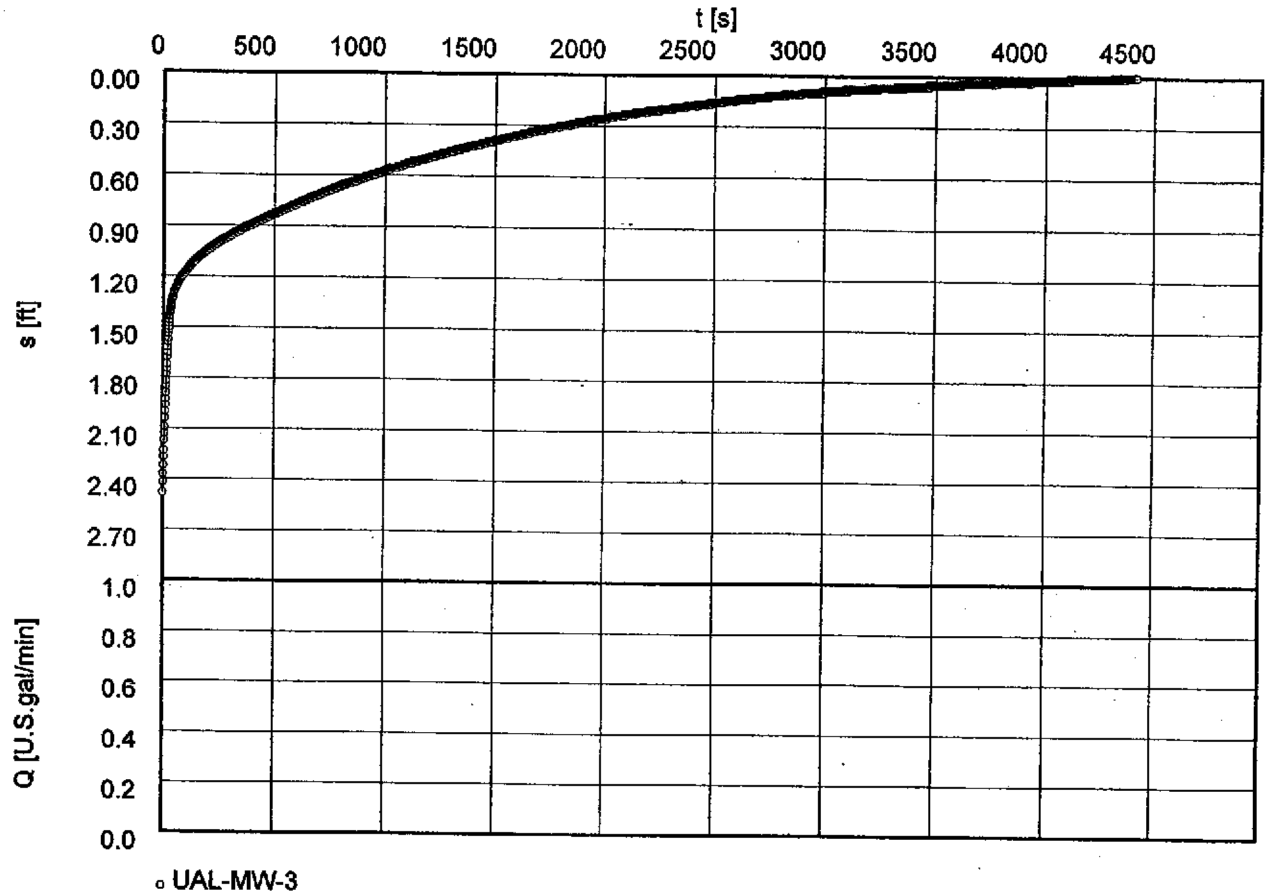
Slug Test No. 1	Test conducted on: 12/8/03
UAL-MW-3	



Hydraulic conductivity [ft/s]: 5.70×10^{-6}

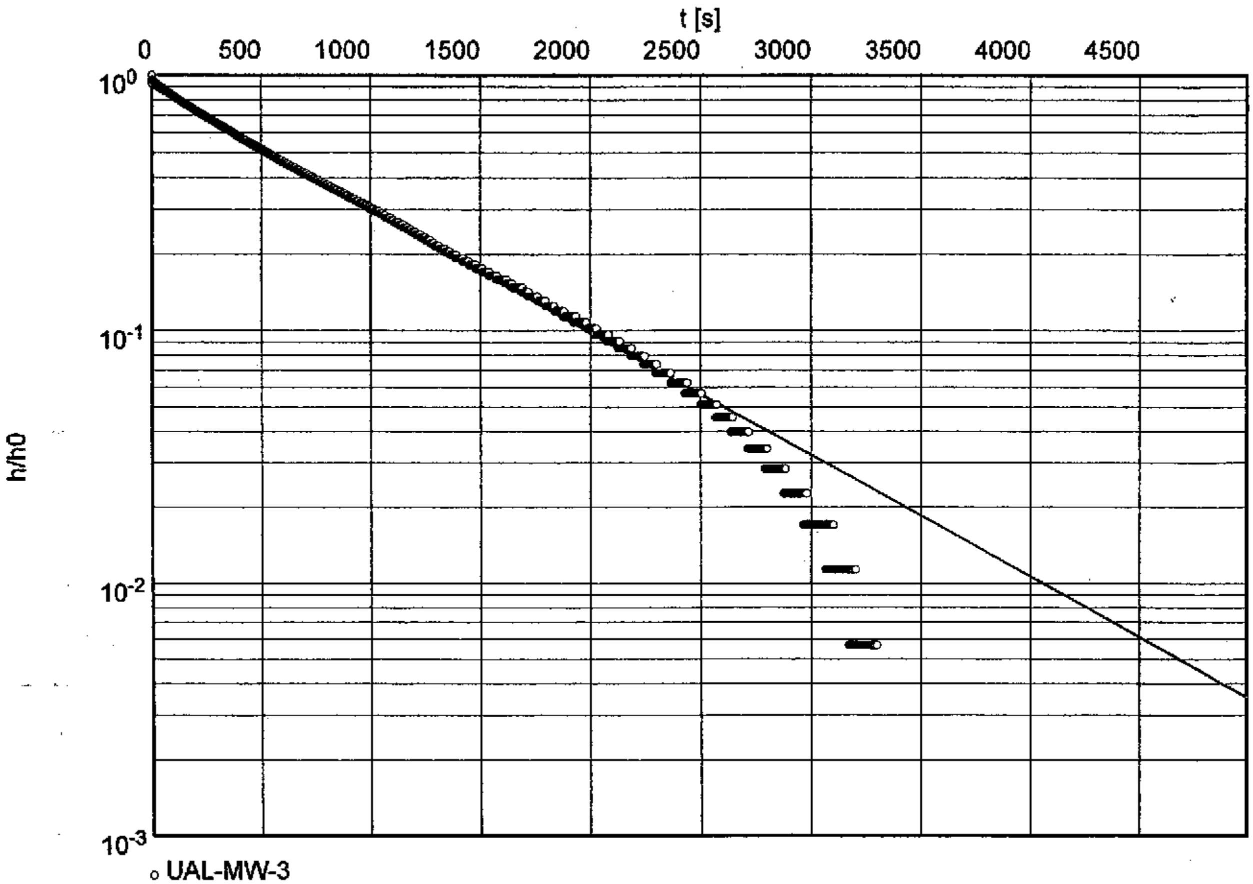
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1 Project: OMC Slug Test Evaluated by: RLS Date: 12/9/03

Pumping Test No. 1	Test conducted on: 12/8/03
UAL-MW-3	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/ball test analysis BOUWER-RICE's method	Page 1
		Project: OMC Slug Test
		Evaluated by: RLS / Date: 12/10/03

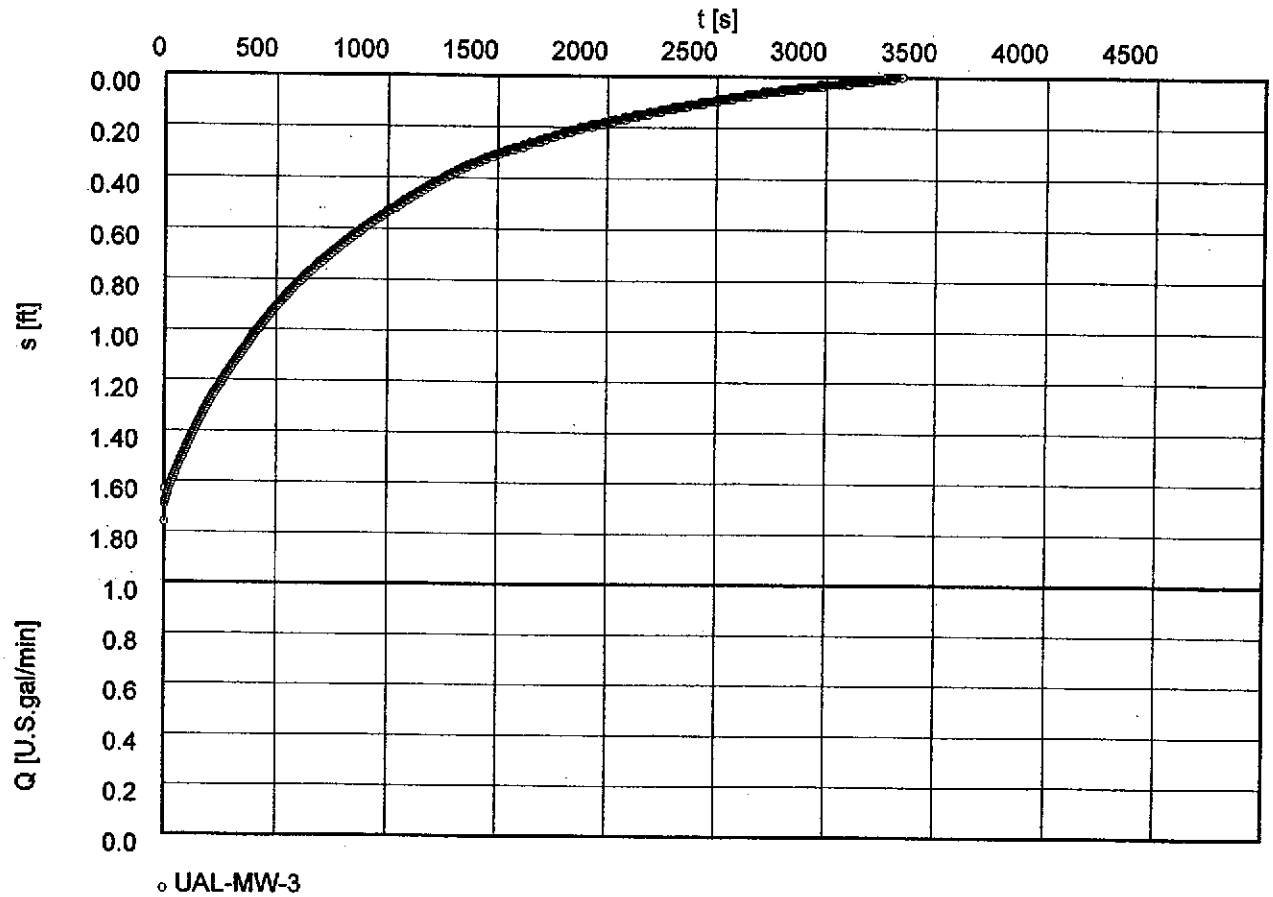
Slug Test No. 2	Test conducted on: 10/8/03
UAL-MW-3	



Hydraulic conductivity [ft/s]: 8.23×10^{-6}

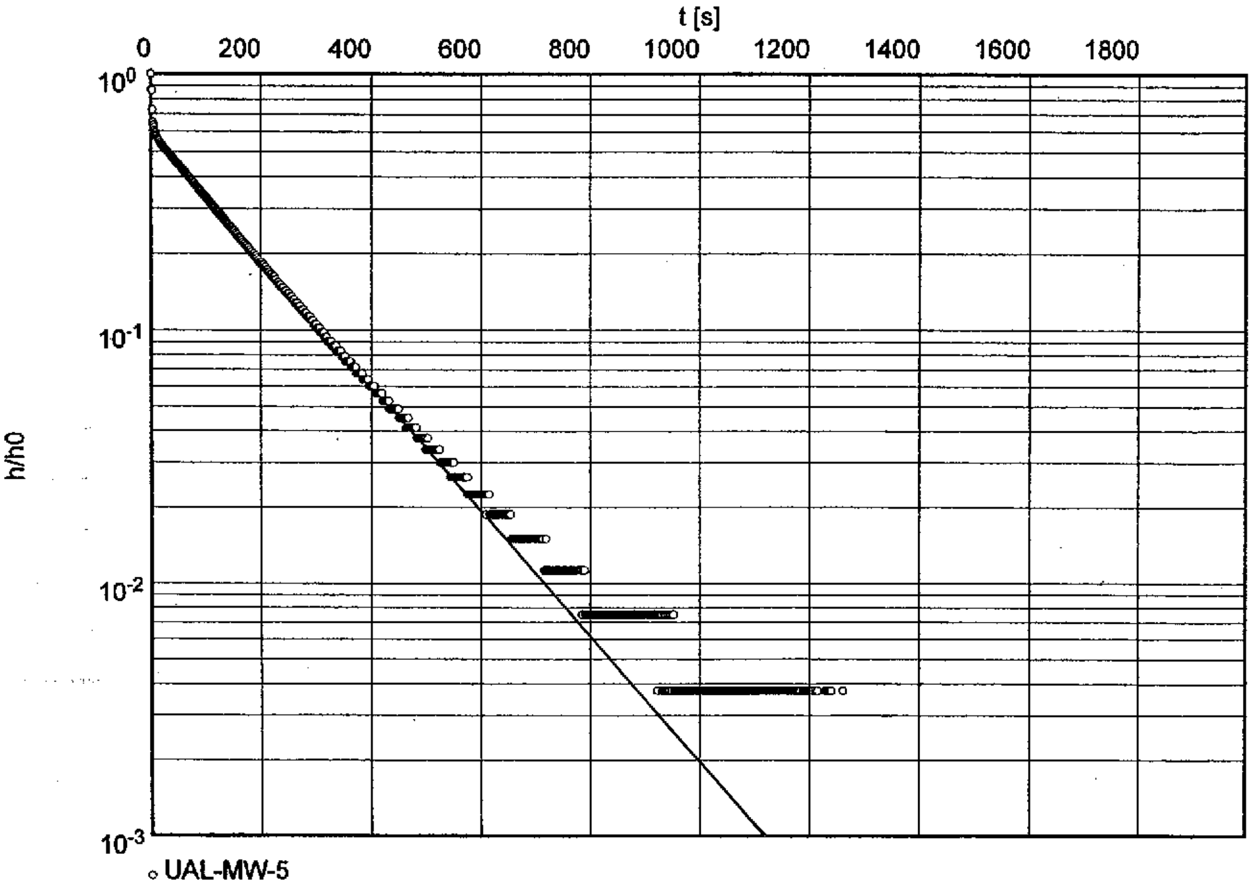
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1	
		Project: OMC Slug Test	
		Evaluated by: RLS	Date: 12/10/03

Pumping Test No. 2	Test conducted on: 10/8/03
UAL-MW-3	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS / Date: 12/9/03

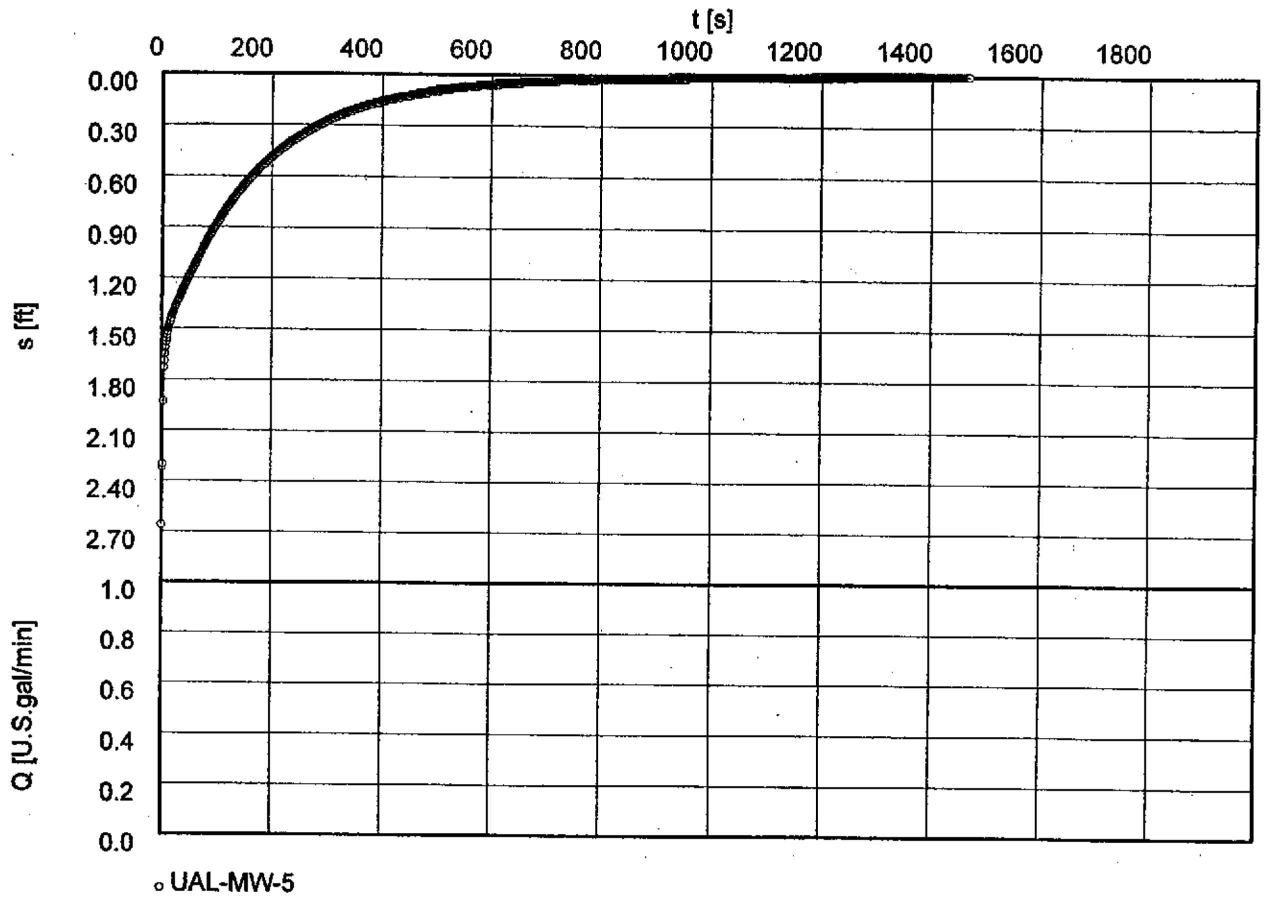
Slug Test No. 1	Test conducted on: 12/8/03
UAL-MW-5	



Hydraulic conductivity [ft/s]: 3.60×10^{-5}

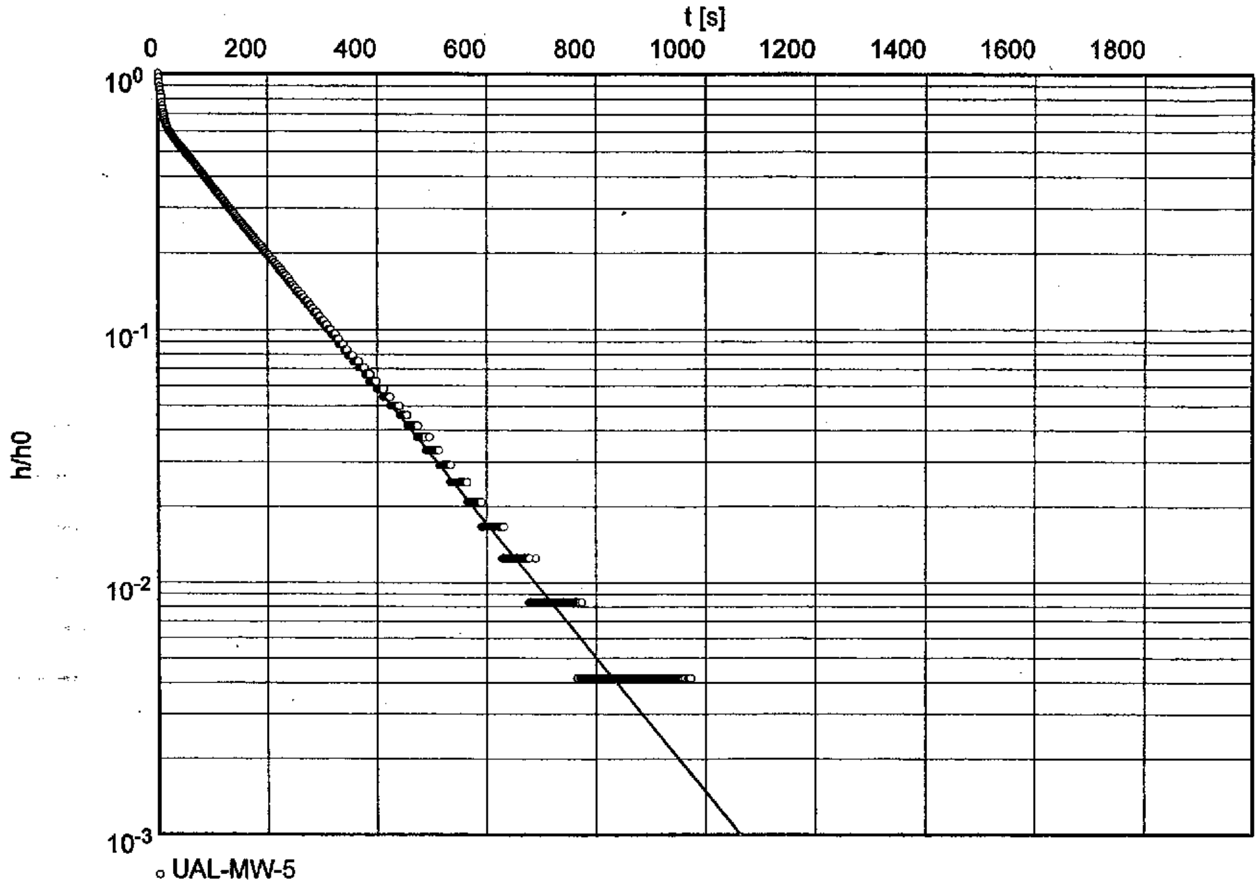
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1 Project: OMC Slug Test Evaluated by: RLS Date: 12/9/03

Pumping Test No. 1	Test conducted on: 12/8/03
UAL-MW-5	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS — Date: 12/10/03

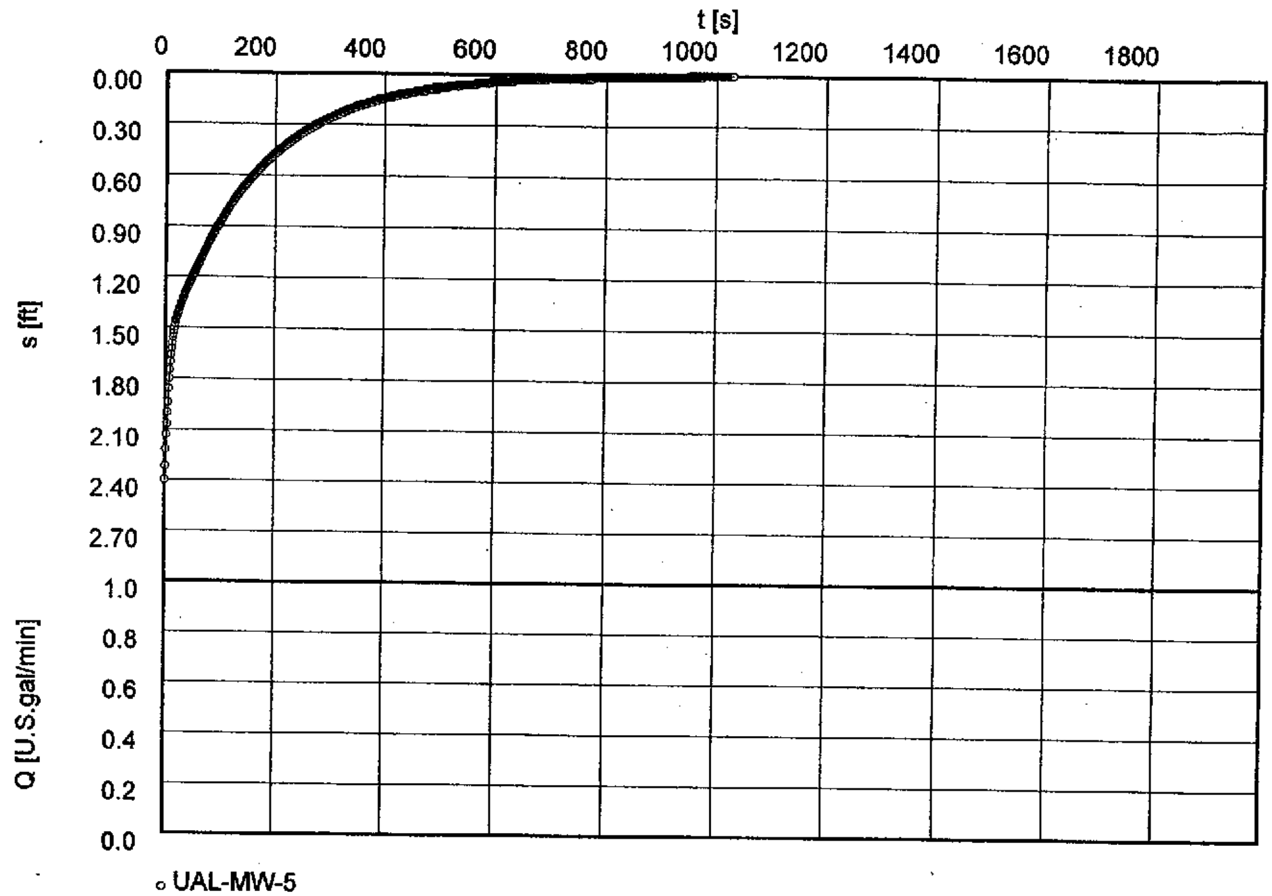
Slug Test No. 2	Test conducted on: 12/8/03
UAL-MW-5	



Hydraulic conductivity [ft/s]: 3.80×10^{-5}

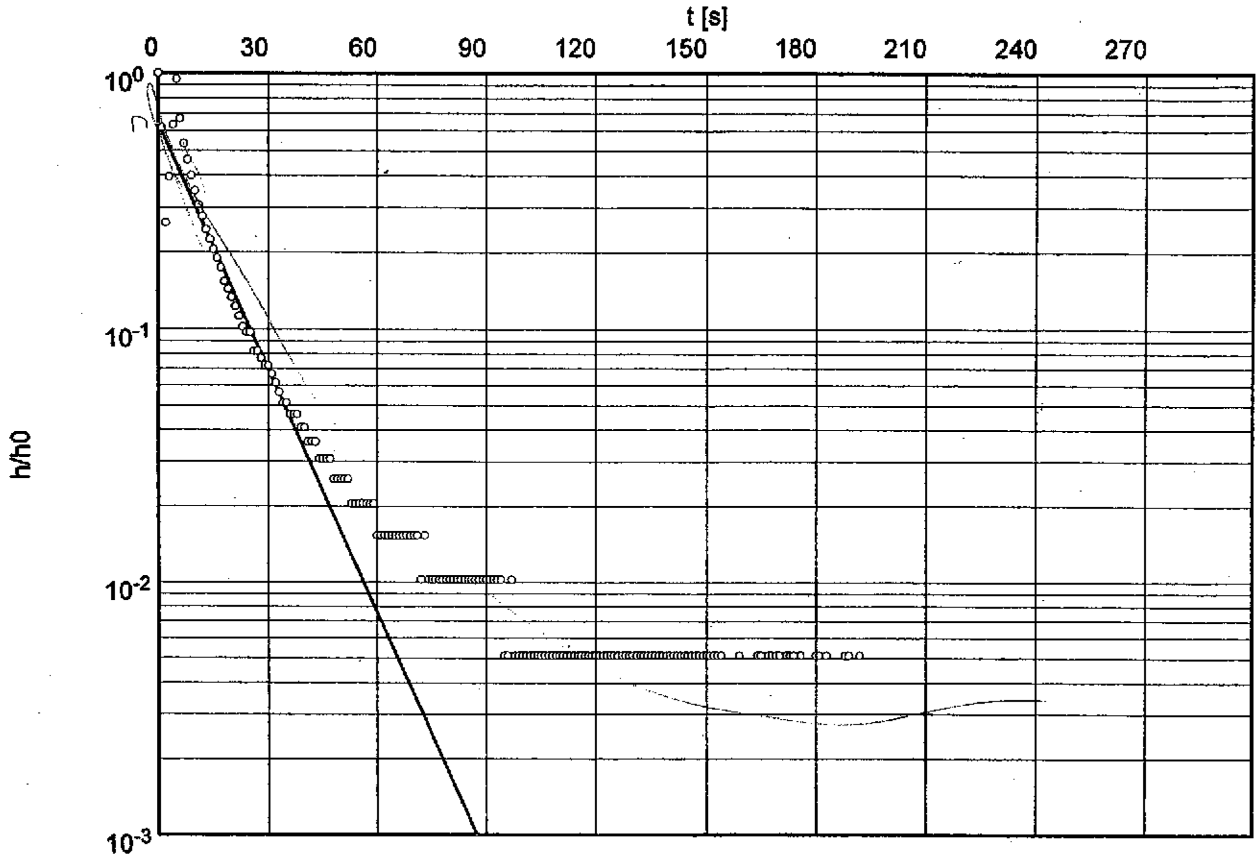
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1
		Project: OMC Slug Test
		Evaluated by: RLS / Date: 12/10/03

Pumping Test No. 2	Test conducted on: 12/8/03
UAL-MW-5	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS — Date: 12/9/03

Slug Test No. 1	Test conducted on: 12/4/03
ERM-MW-7	

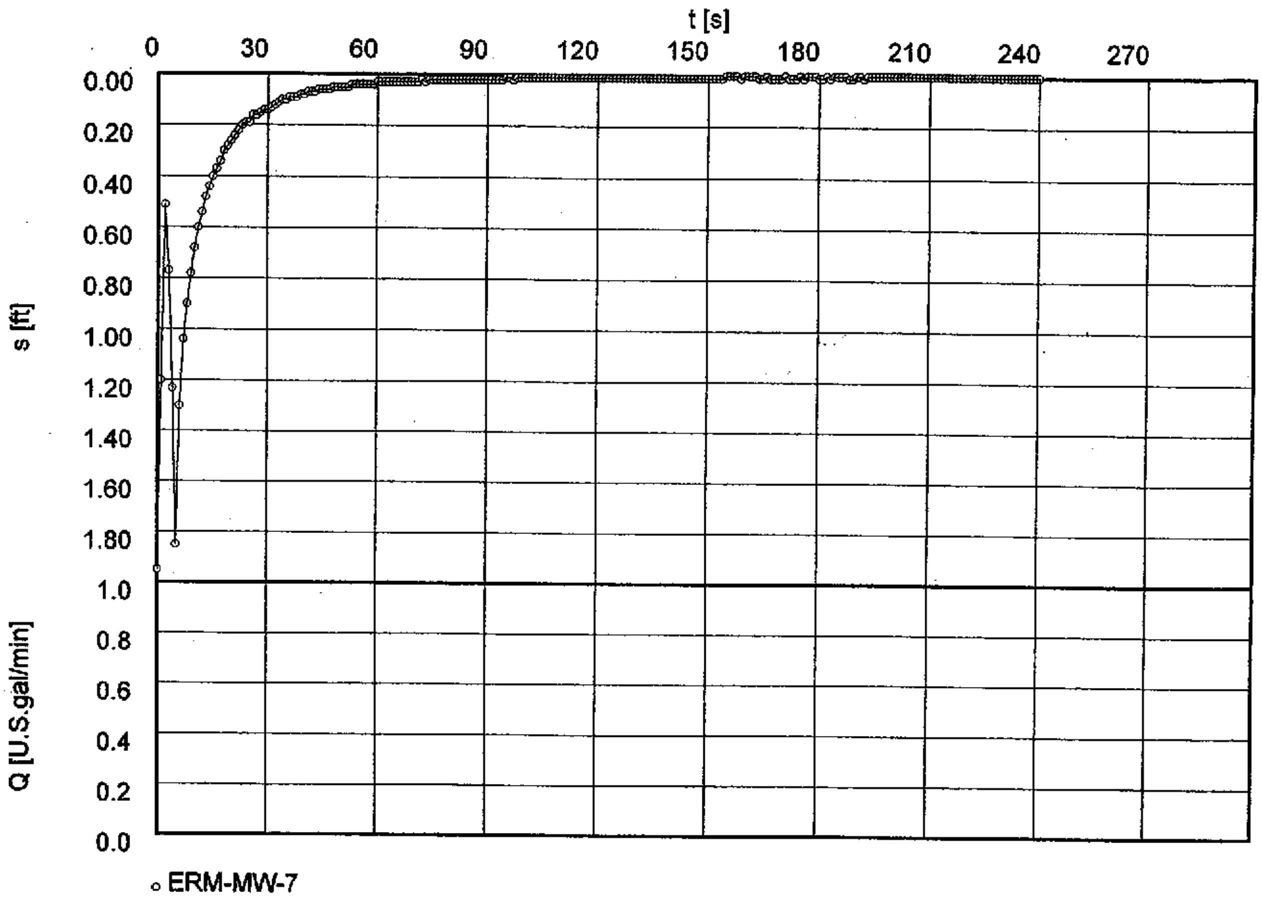


○ ERM-MW-7

Hydraulic conductivity [ft/s]: 1.99×10^{-4}

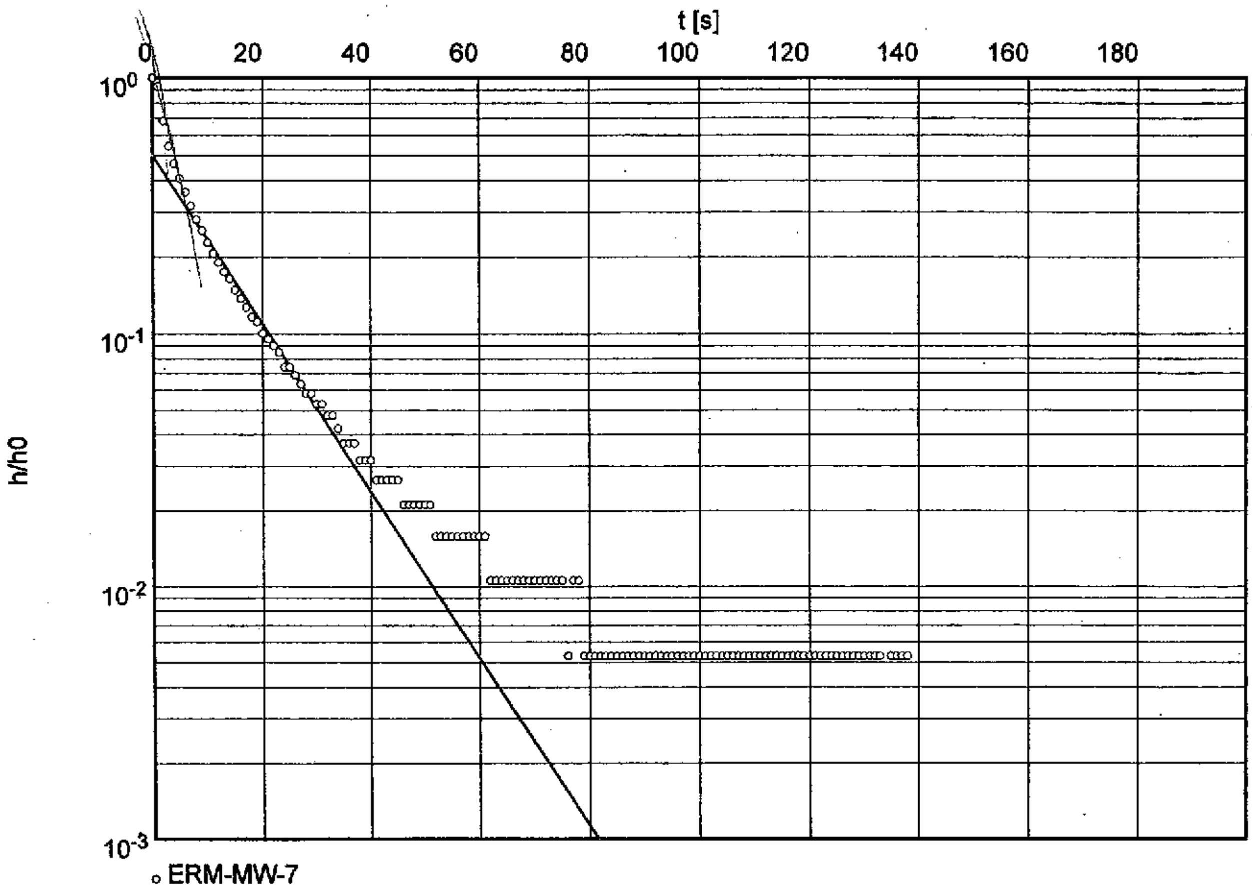
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1 Project: OMC Slug Test Evaluated by: RLS — Date: 12/9/03

Pumping Test No. 1	Test conducted on: 12/4/03
ERM-MW-7	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS — Date: 12/9/03

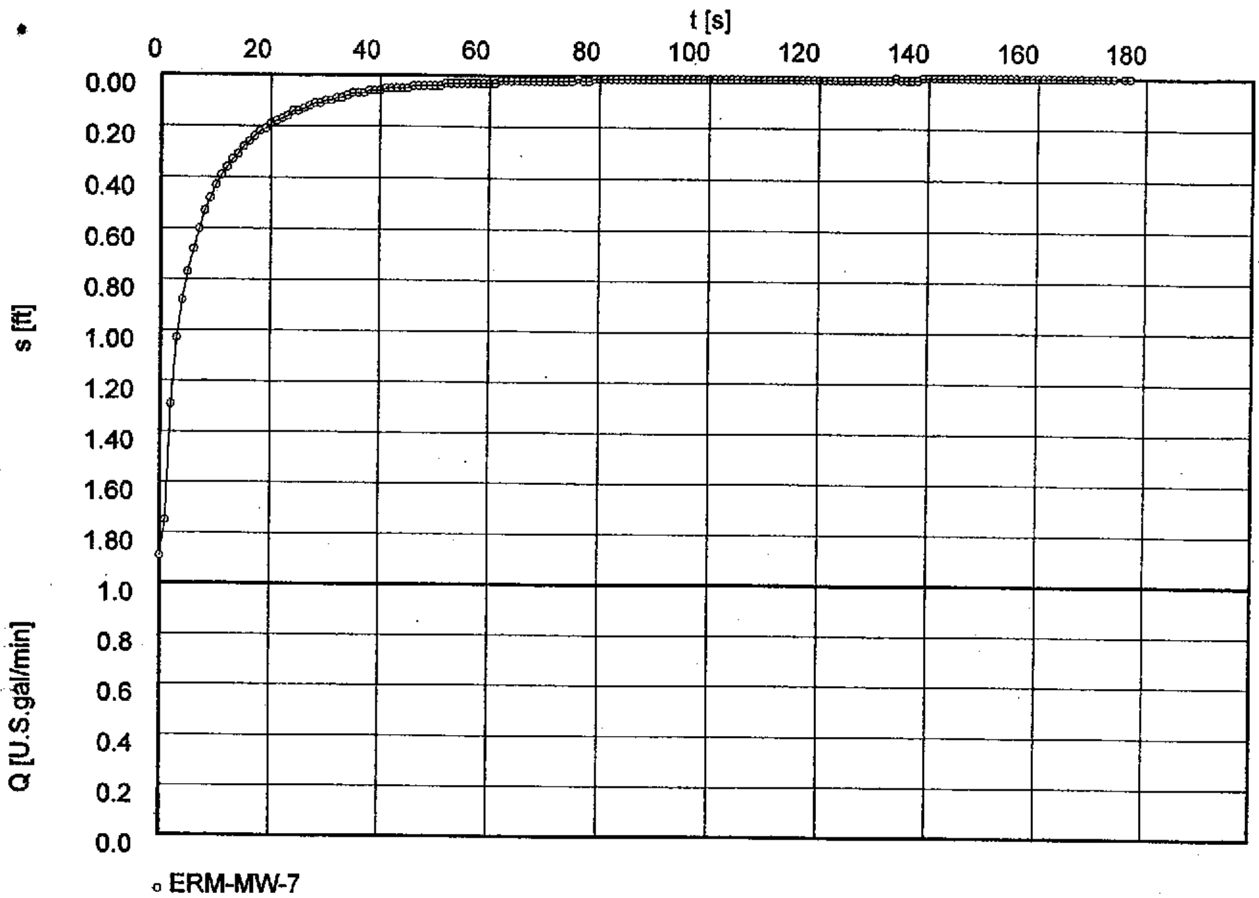
Slug Test No. 2	Test conducted on: 12/4/03
ERM-MW-7	



Hydraulic conductivity [ft/s]: 2.08×10^{-4}

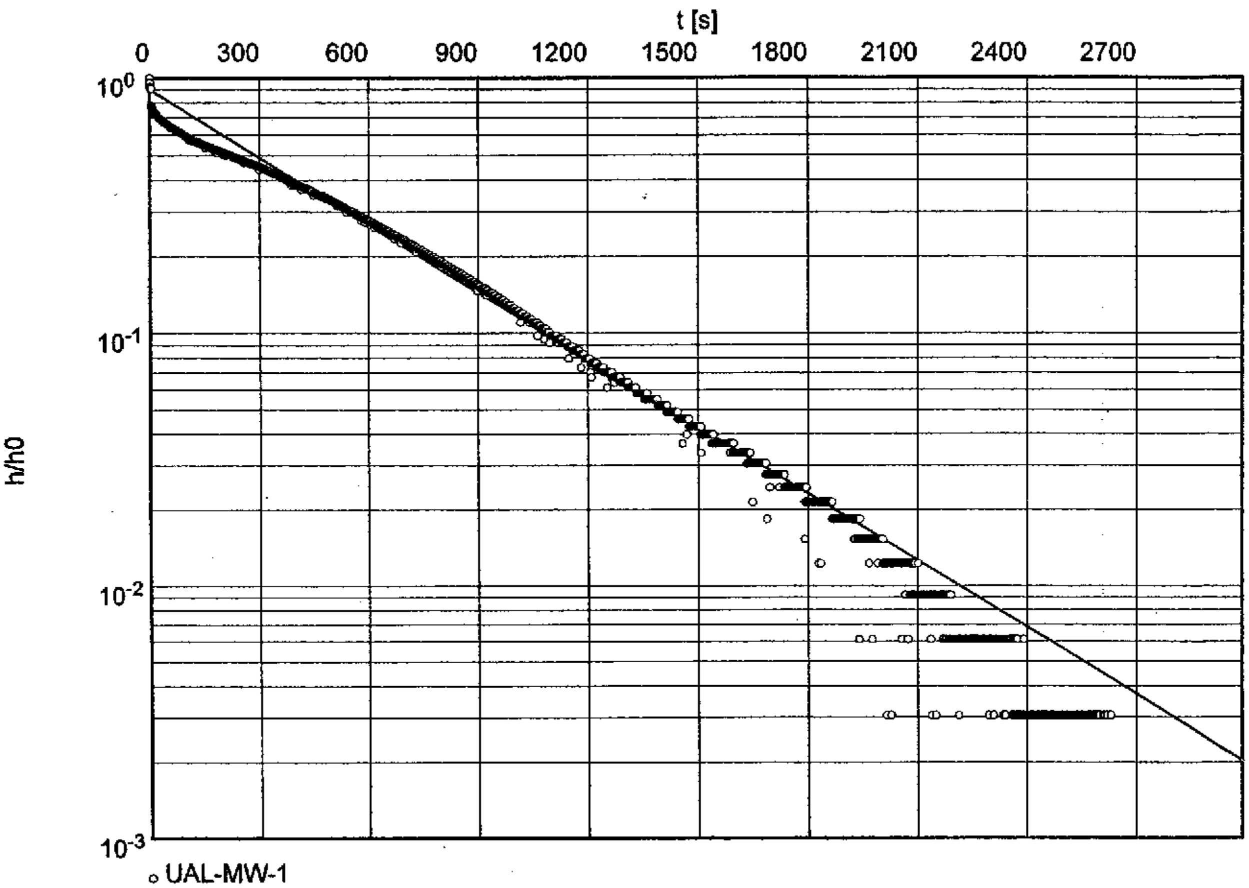
ERM	Pumping test analysis Time-Drawdown plot with discharge	Page 1	
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455		Project: OMC Slug Test	
		Evaluated by: RLS	Date: 12/9/03

Pumping Test No. 2	Test conducted on: 12/4/03
ERM-MW-7	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1	
		Project: OMC Slug Test	
		Evaluated by: RLS	Date: 12/9/03

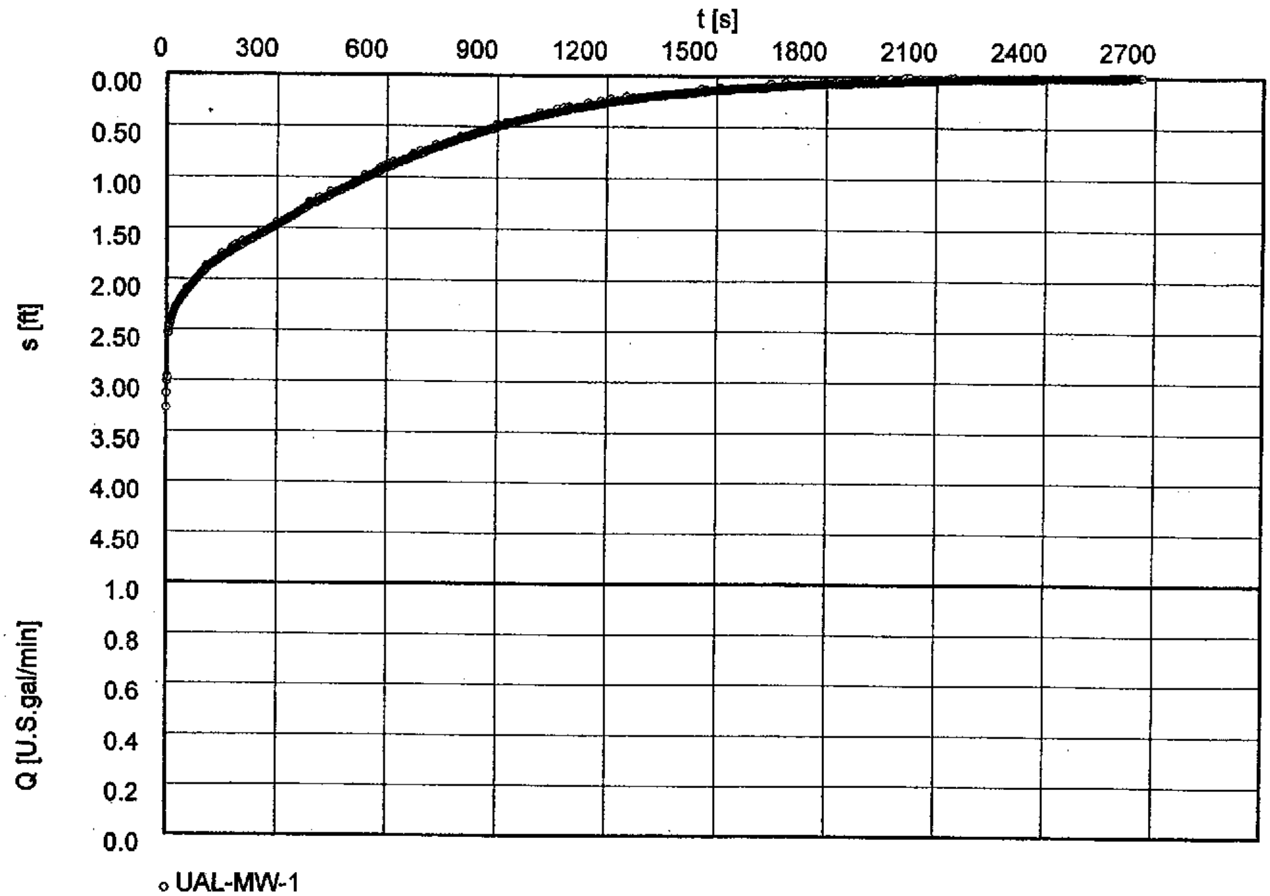
Slug Test No. 1	Test conducted on: 12/8/03
UAL-MW-1	



Hydraulic conductivity [ft/s]: 1.33×10^{-5}

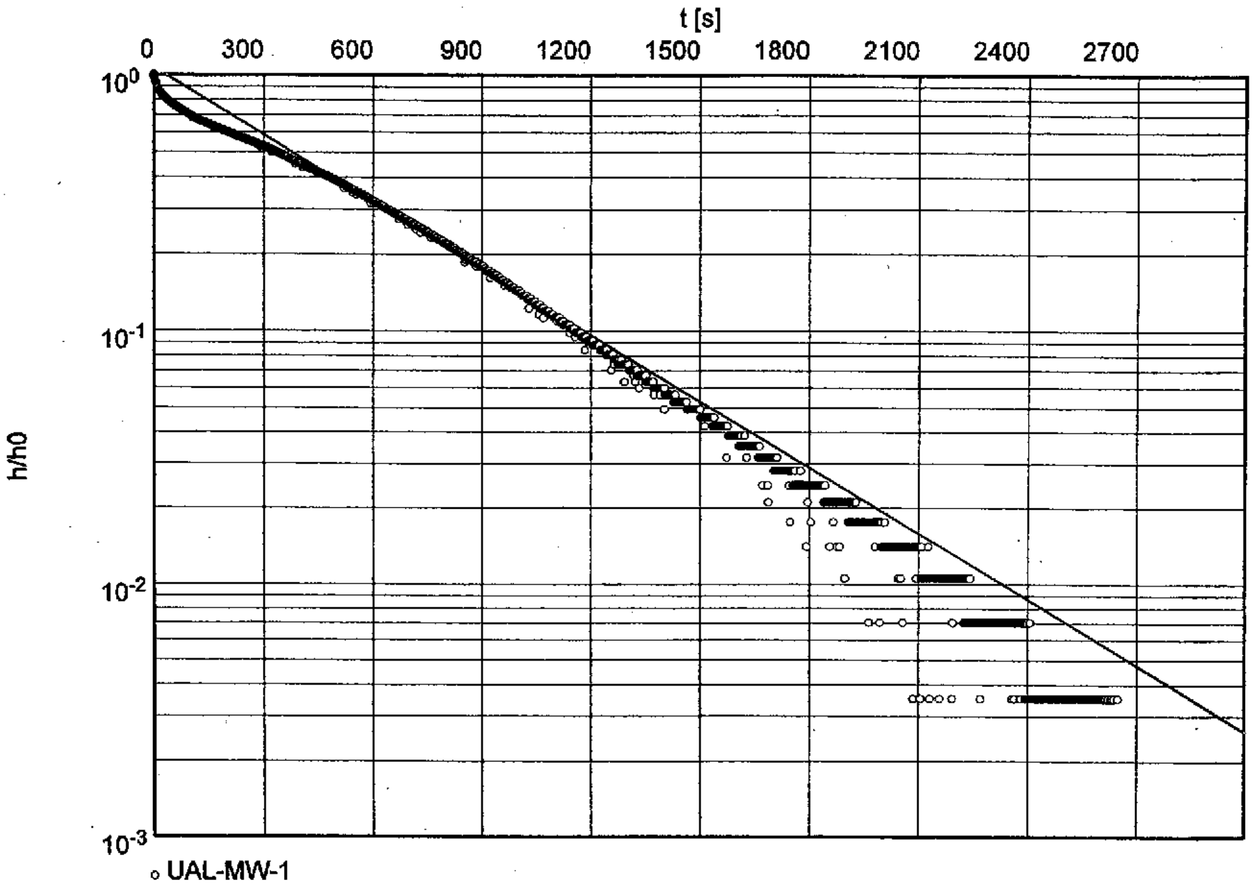
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1
		Project: OMC Slug Test
		Evaluated by: RLS / Date: 12/9/03

Pumping Test No. 1	Test conducted on: 12/8/03
UAL-MW-1	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS · Date: 12/9/03

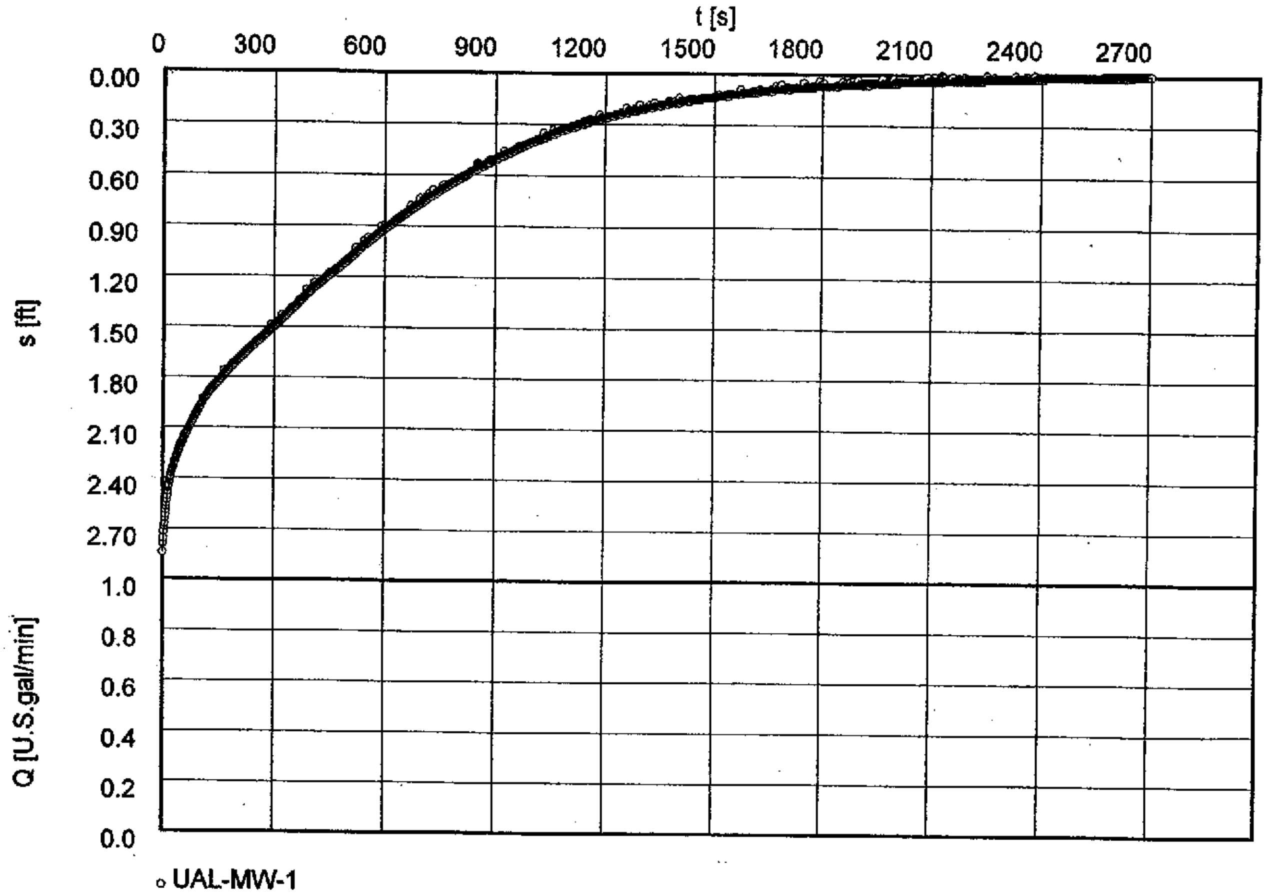
Slug Test No. 2	Test conducted on: 12/8/03
UAL-MW-1	



Hydraulic conductivity [ft/s]: 1.31×10^{-5}

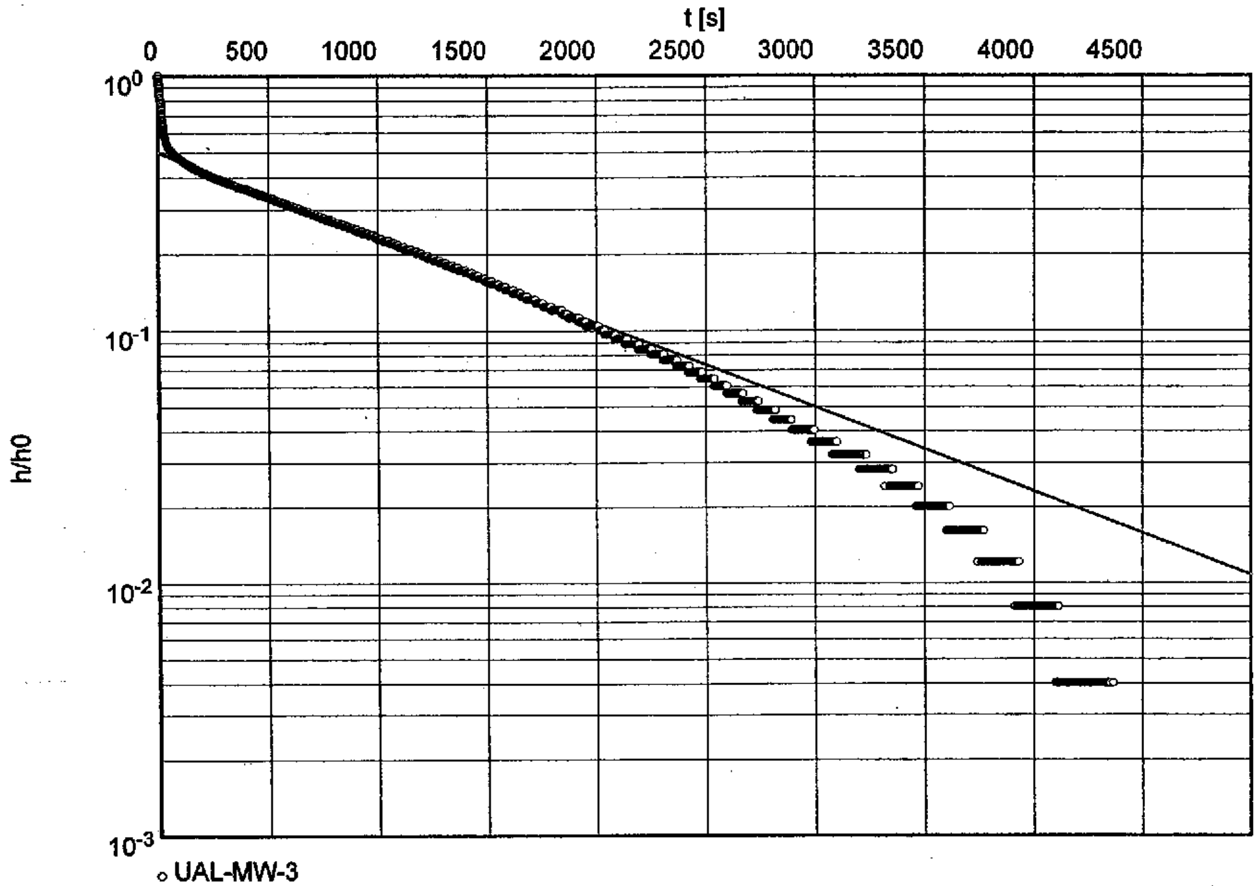
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1 Project: OMC Slug Test Evaluated by: RLS | Date: 12/9/03

Pumping Test No. 2	Test conducted on: 12/8/03
UAL-MW-1	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS Date: 12/9/03

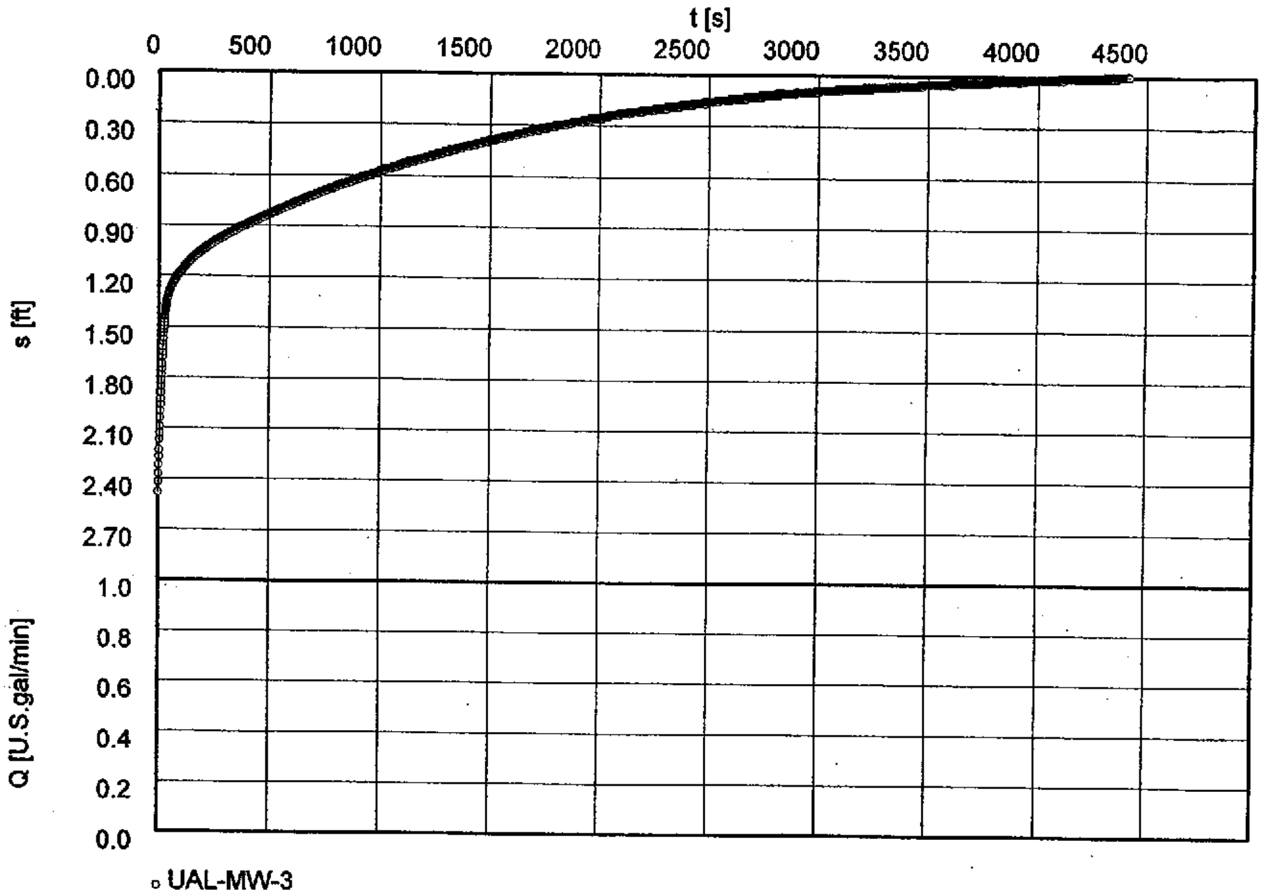
Slug Test No. 1	Test conducted on: 12/8/03
UAL-MW-3	



Hydraulic conductivity [ft/s]: 5.70×10^{-6}

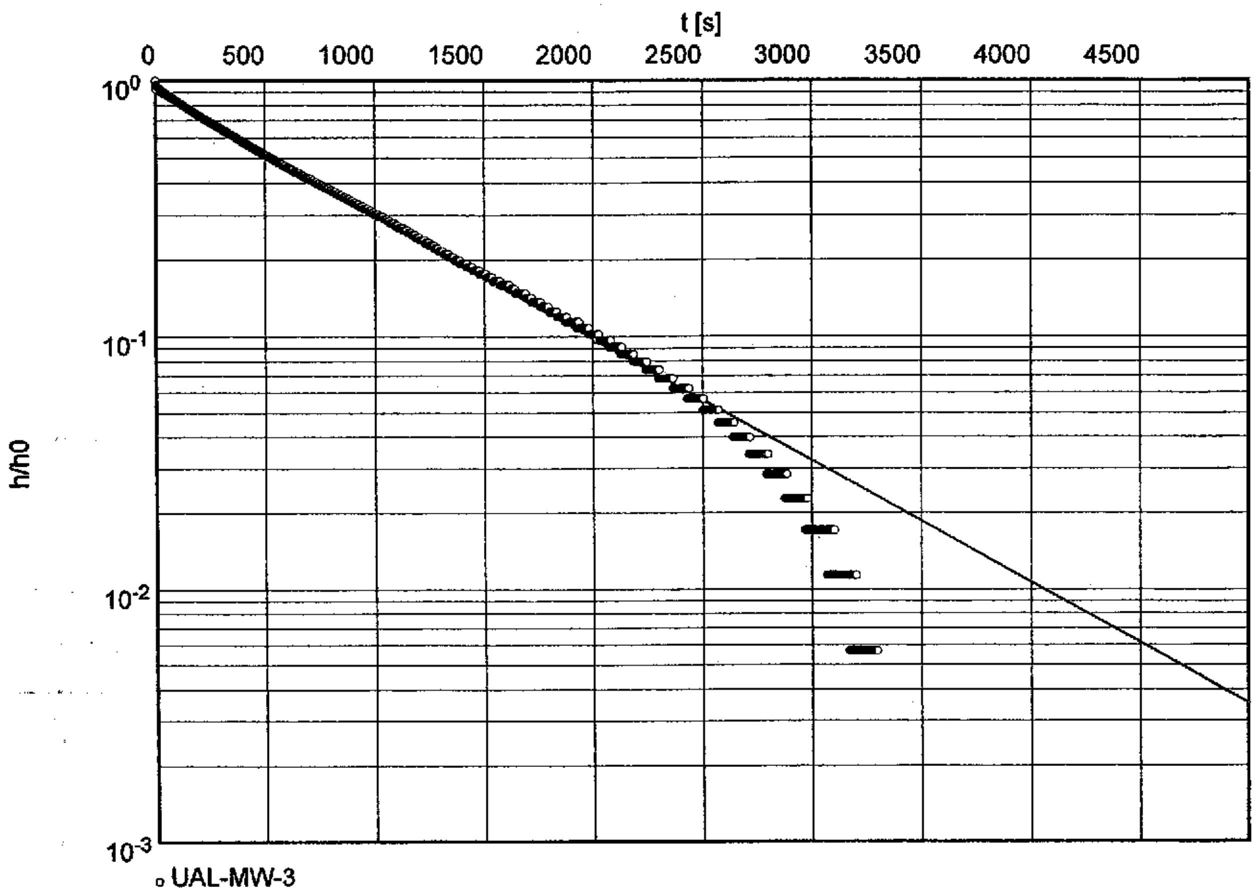
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1 Project: OMC Slug Test Evaluated by: RLS · Date: 12/9/03

Pumping Test No. 1	Test conducted on: 12/8/03
UAL-MW-3	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1	
		Project: OMC Slug Test	
		Evaluated by: RLS	Date: 12/10/03

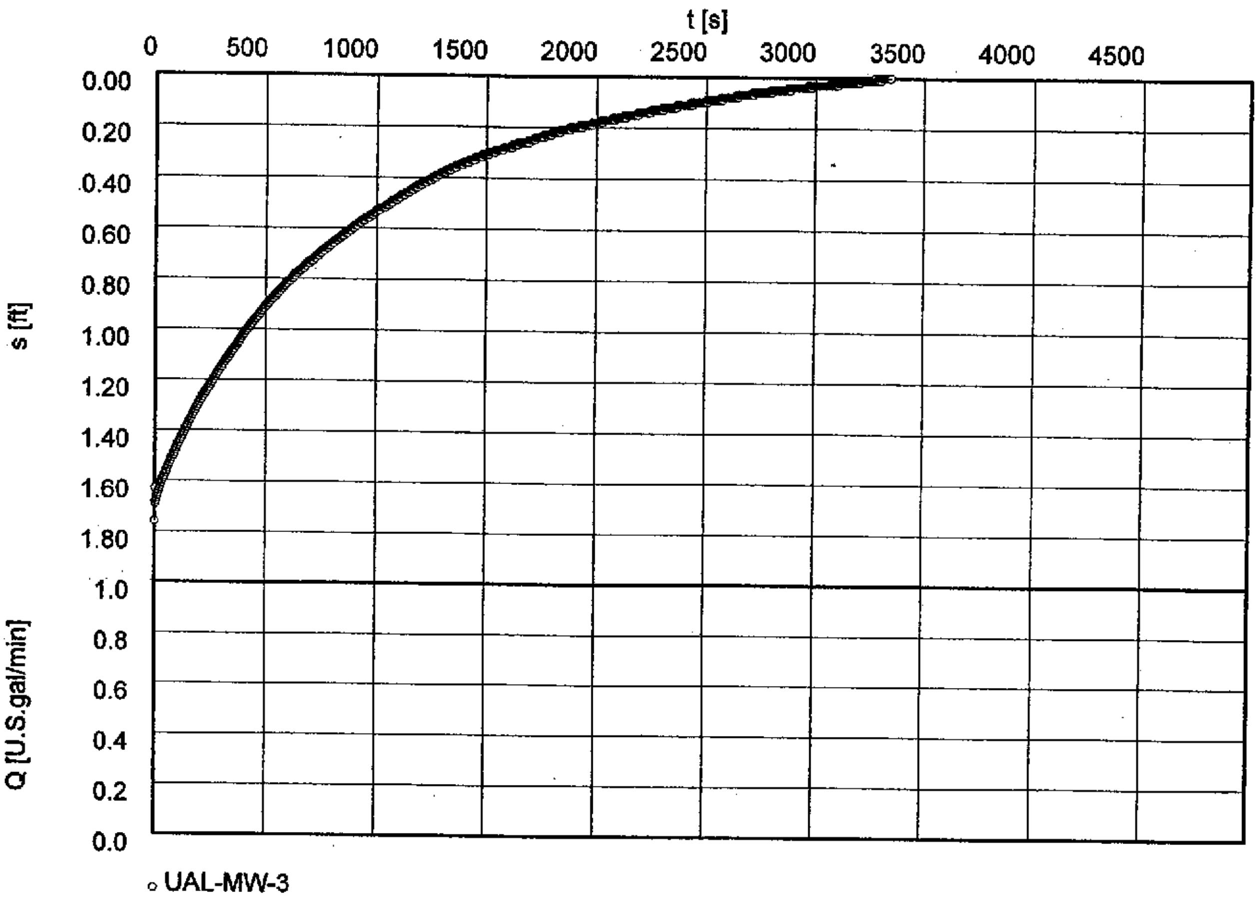
Slug Test No. 2	Test conducted on: 10/8/03
UAL-MW-3	



Hydraulic conductivity [ft/s]: 8.23×10^{-6}

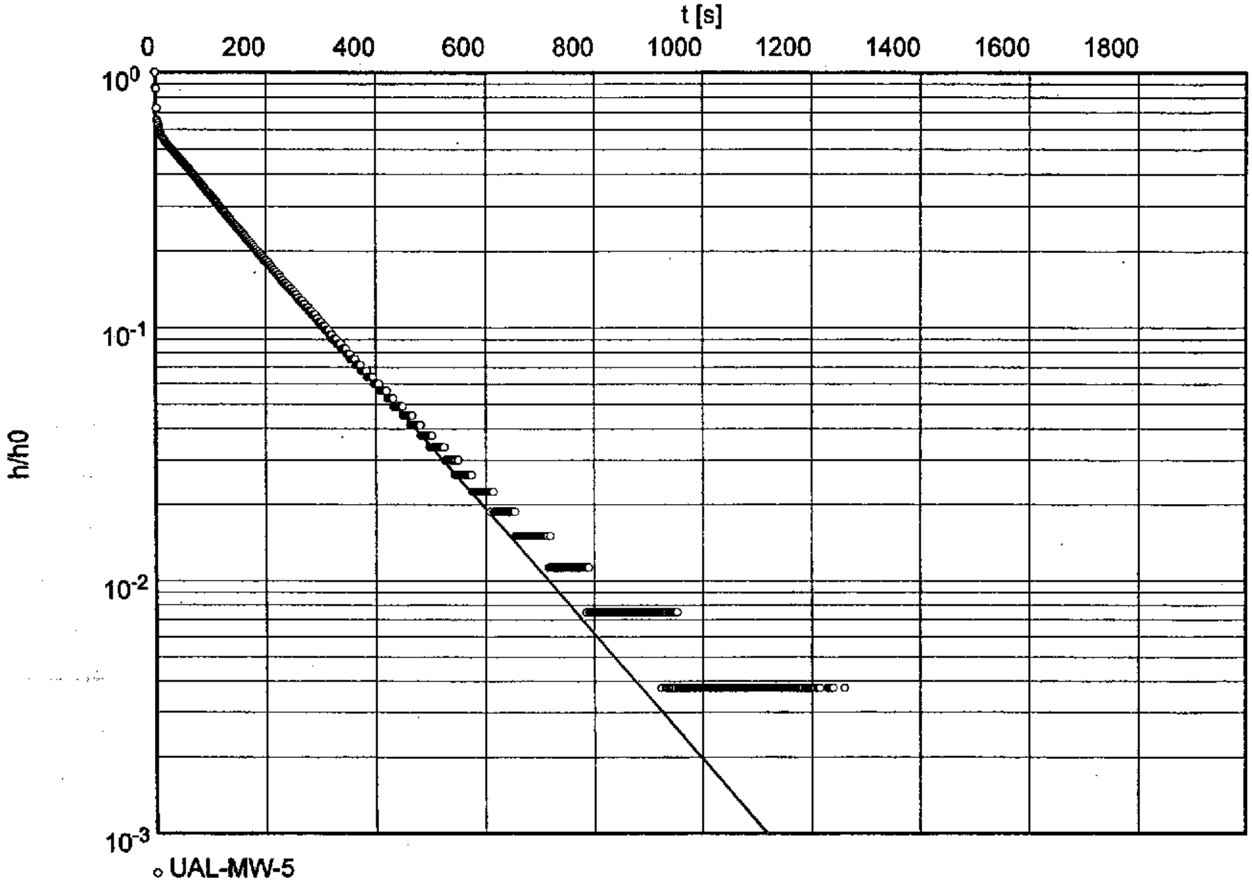
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1	
		Project: OMC Slug Test	
		Evaluated by: RLS	Date: 12/10/03

Pumping Test No. 2	Test conducted on: 10/8/03
UAL-MW-3	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1	
		Project: OMC Slug Test	
		Evaluated by: RLS	Date: 12/9/03

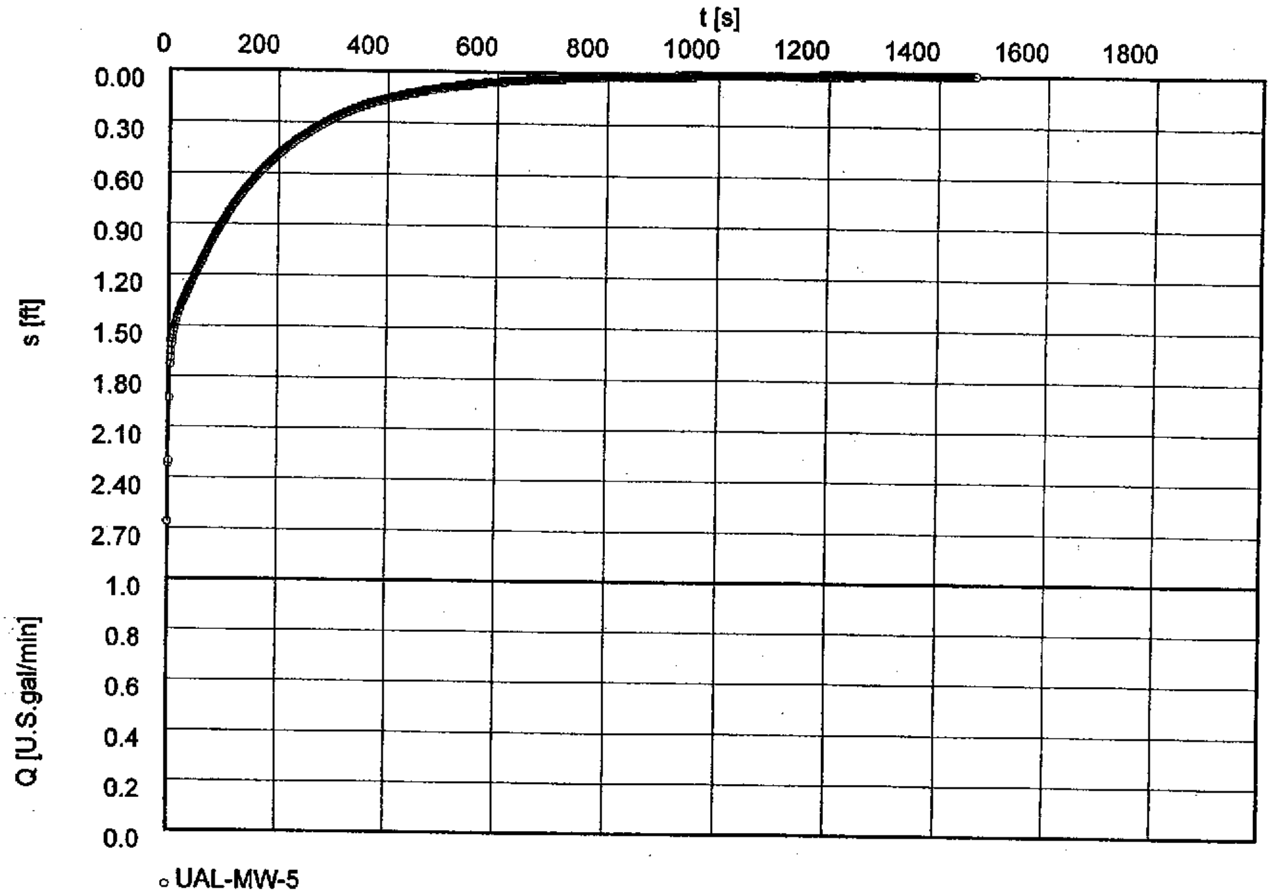
Slug Test No. 1	Test conducted on: 12/8/03
UAL-MW-5	



Hydraulic conductivity [ft/s]: 3.60×10^{-5}

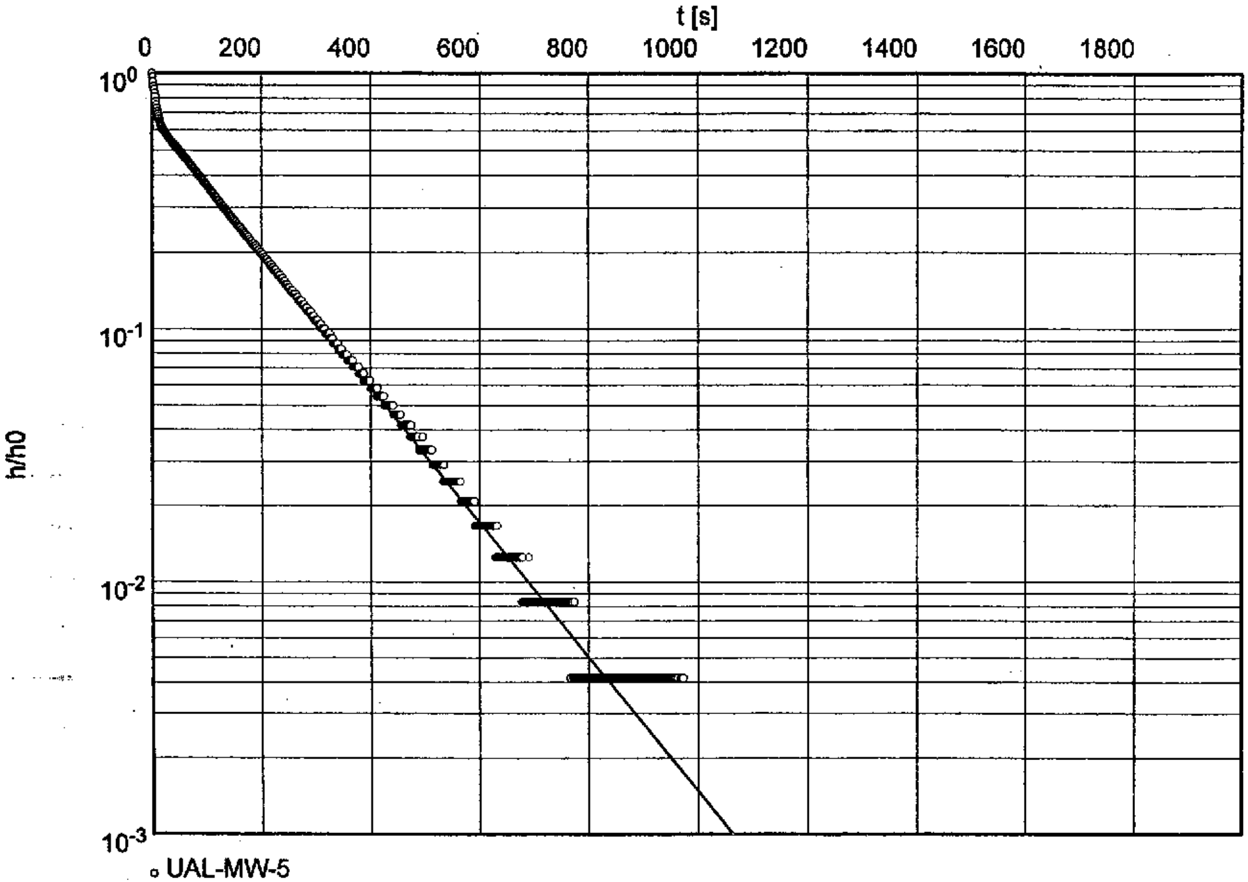
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1 Project: OMC Slug Test Evaluated by: RLS · Date: 12/9/03

Pumping Test No. 1	Test conducted on: 12/8/03
UAL-MW-5	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS — Date: 12/10/03

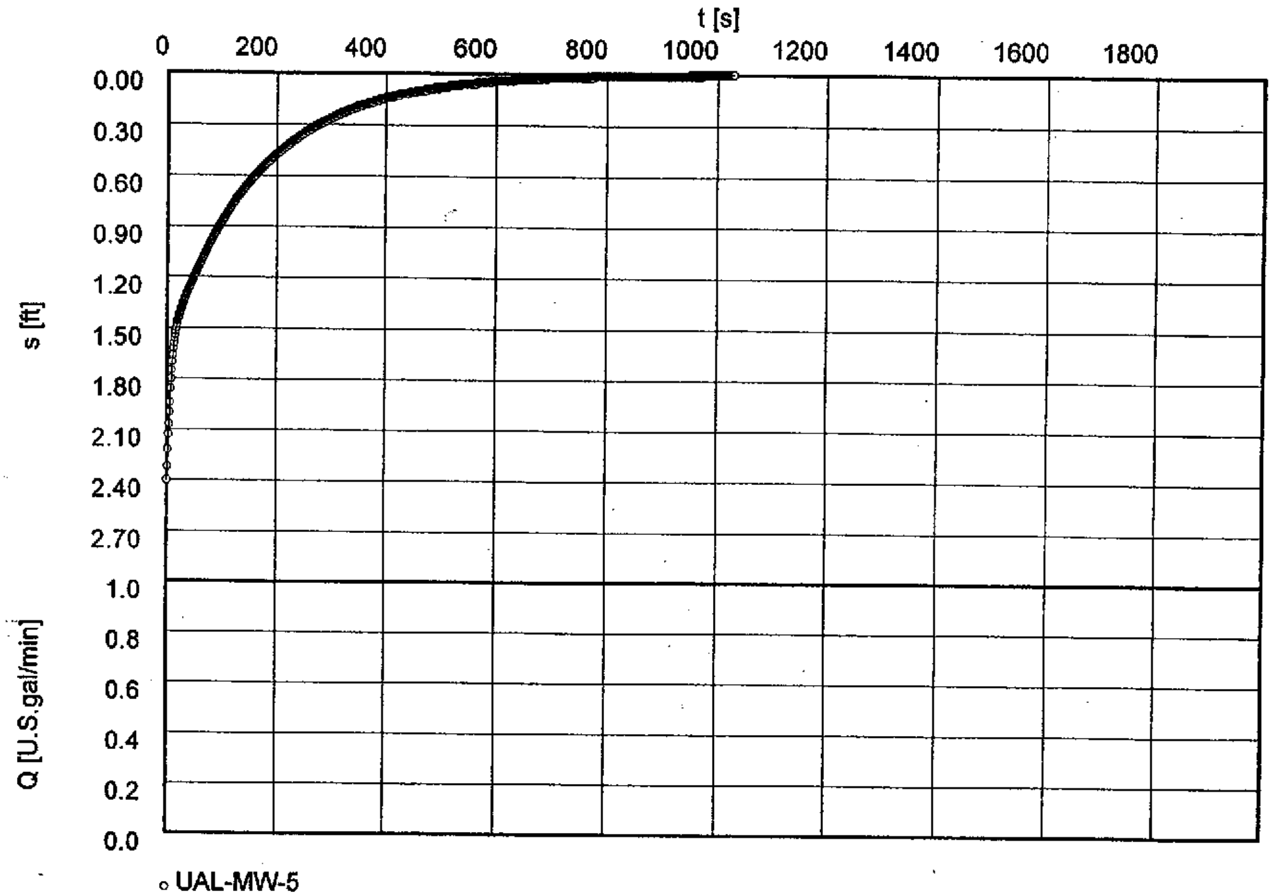
Slug Test No. 2	Test conducted on: 12/8/03
UAL-MW-5	



Hydraulic conductivity [ft/s]: 3.80×10^{-5}

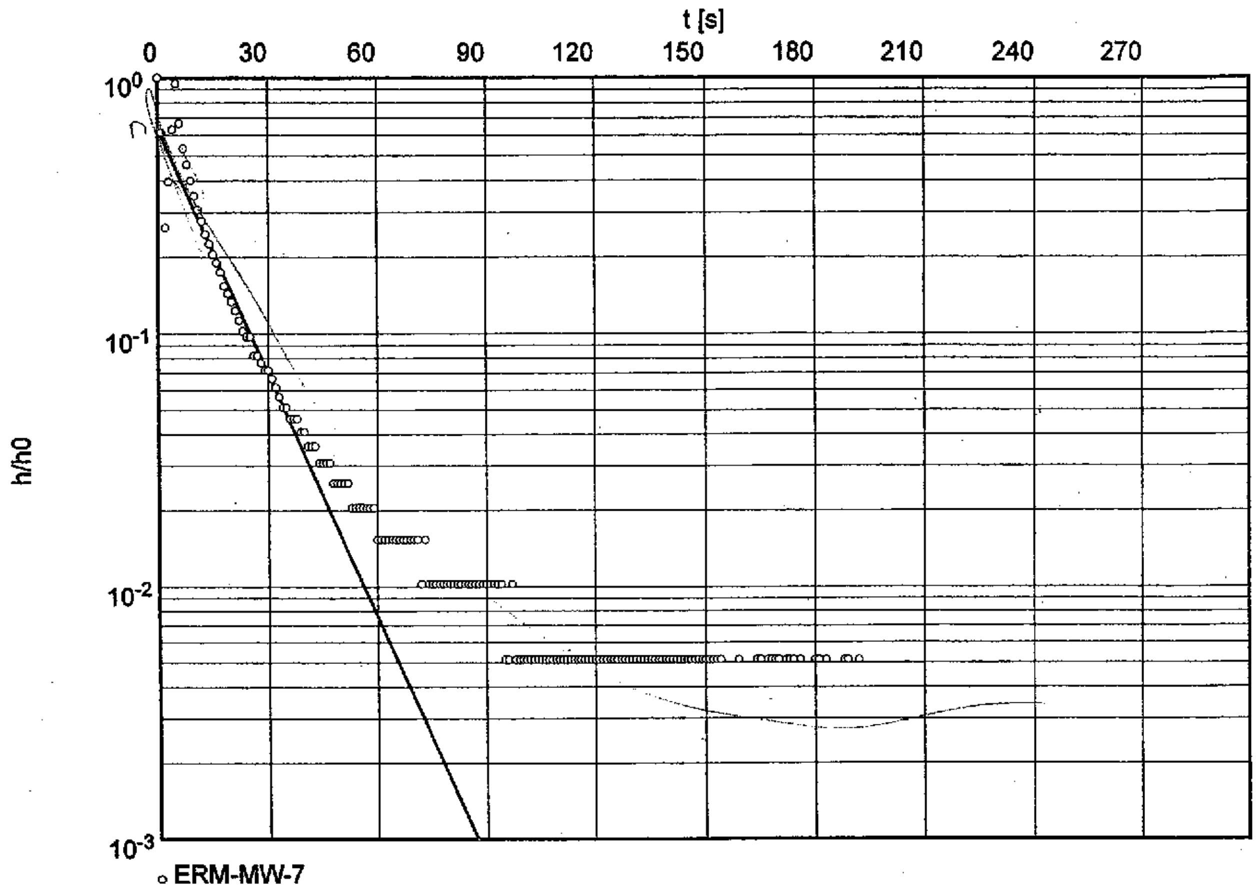
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1 Project: OMC Slug Test Evaluated by: RLS / Date: 12/10/03

Pumping Test No. 2	Test conducted on: 12/8/03
UAL-MW-5	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS / Date: 12/9/03

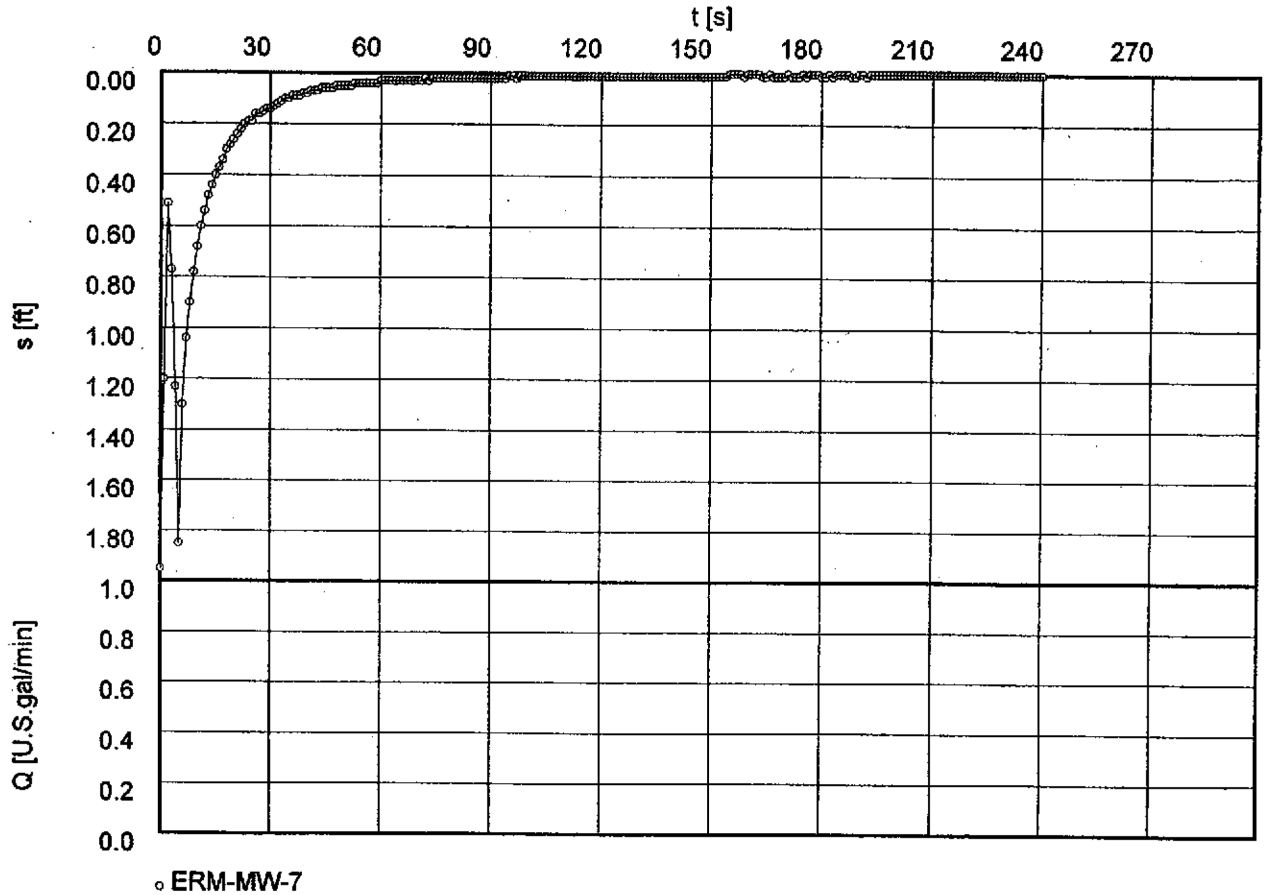
Slug Test No. 1	Test conducted on: 12/4/03
ERM-MW-7	



Hydraulic conductivity [ft/s]: 1.99×10^{-4}

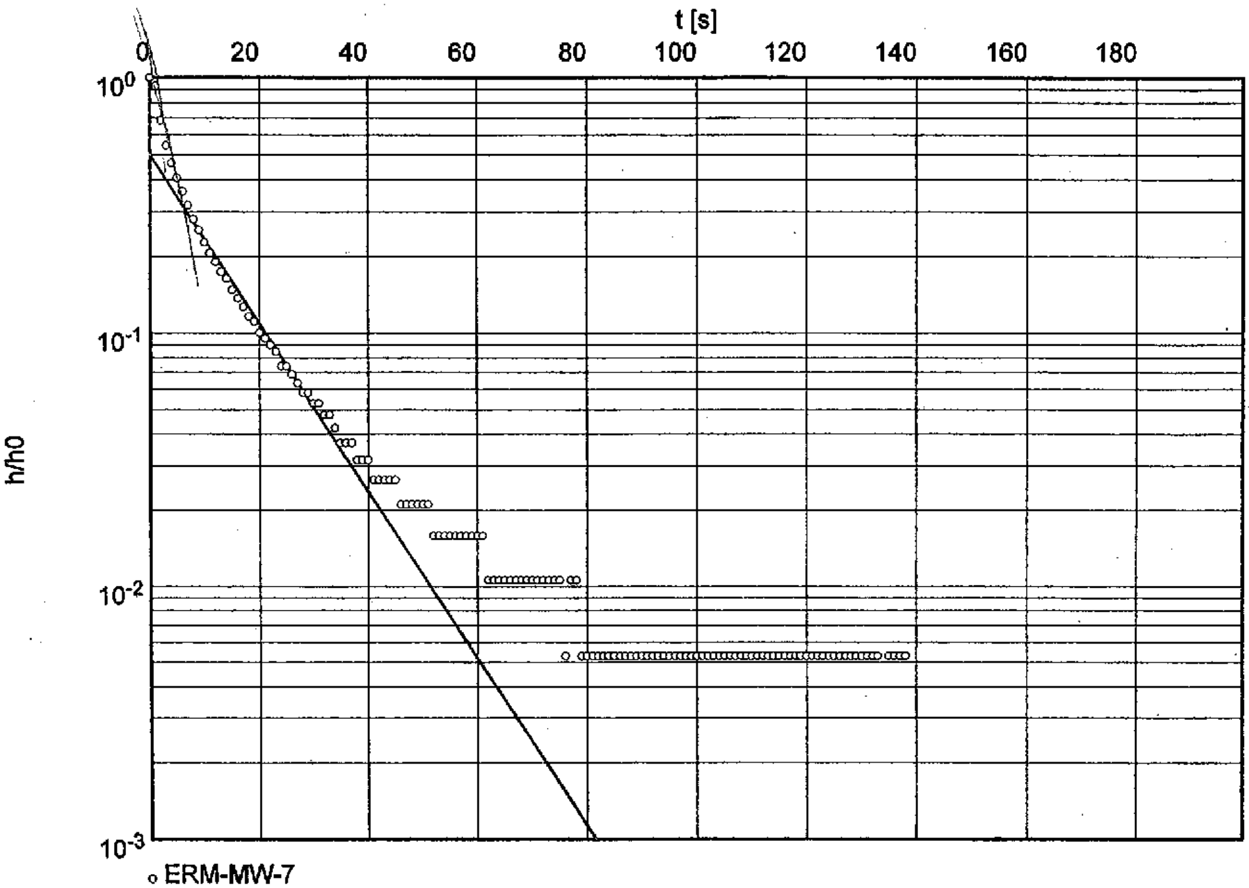
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1 Project: OMC Slug Test Evaluated by: RLS · Date: 12/9/03

Pumping Test No. 1	Test conducted on: 12/4/03
ERM-MW-7	



ERM	ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1
			Project: OMC Slug Test
			Evaluated by: RLS / Date: 12/9/03

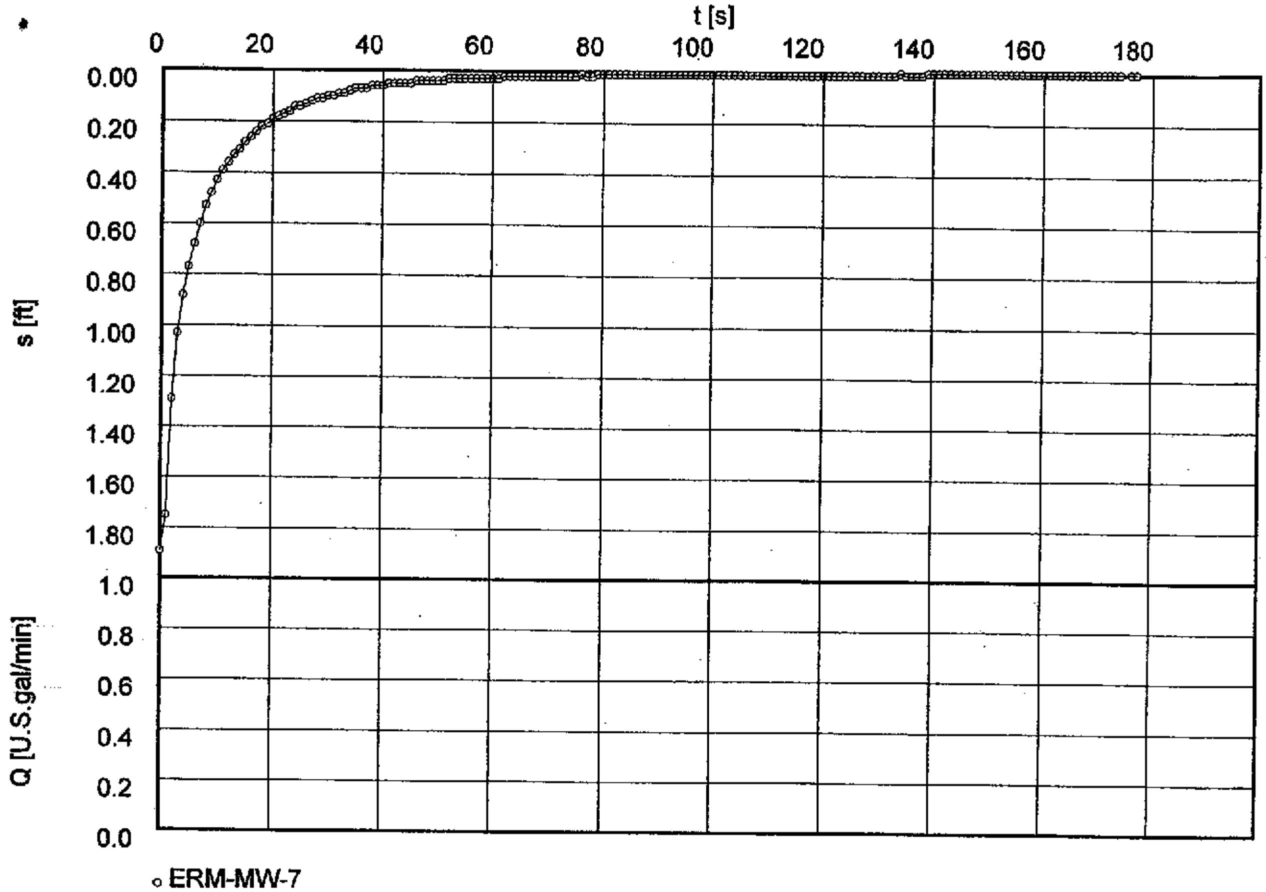
Slug Test No. 2	Test conducted on: 12/4/03
ERM-MW-7	



Hydraulic conductivity [ft/s]: 2.08×10^{-4}

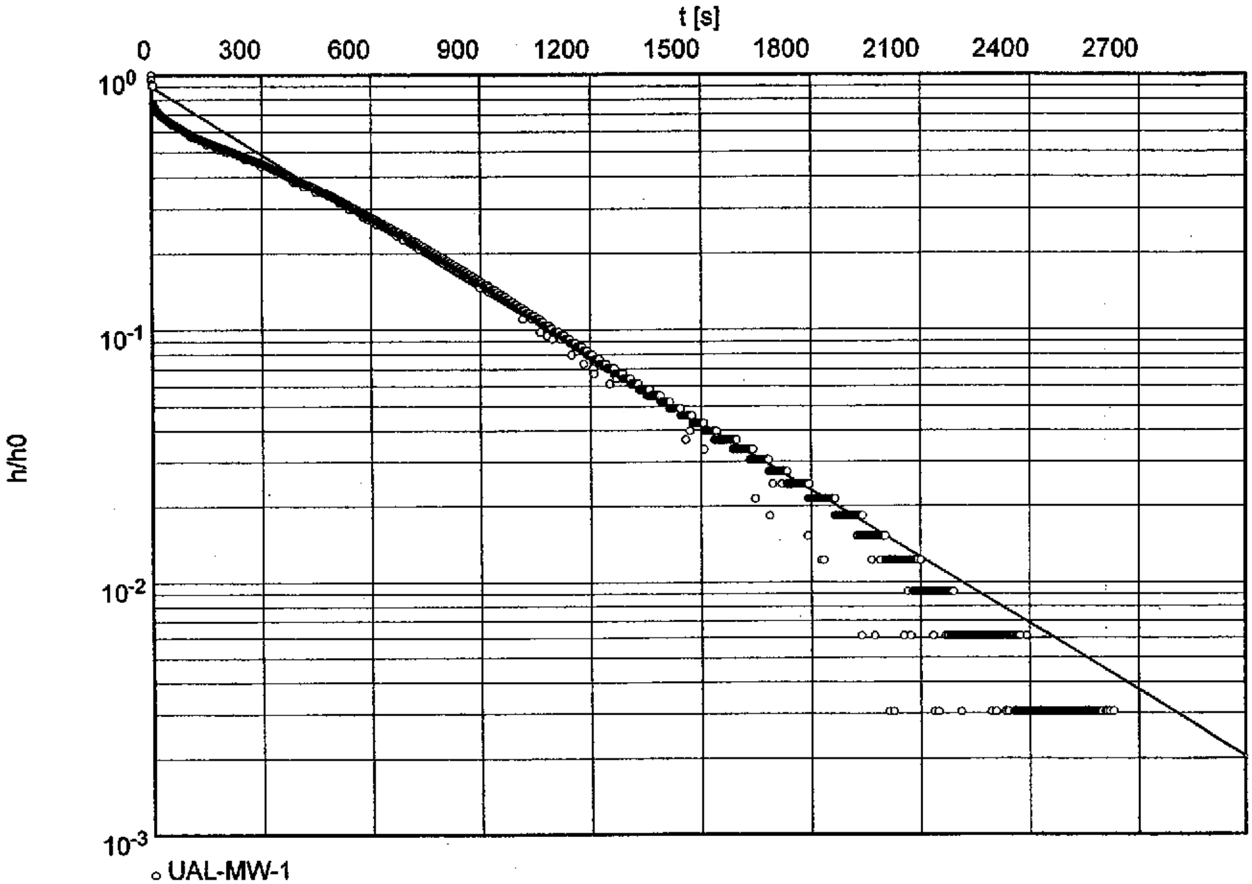
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1 Project: OMC Slug Test Evaluated by: RLS / Date: 12/9/03

Pumping Test No. 2	Test conducted on: 12/4/03
ERM-MW-7	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS — Date: 12/9/03

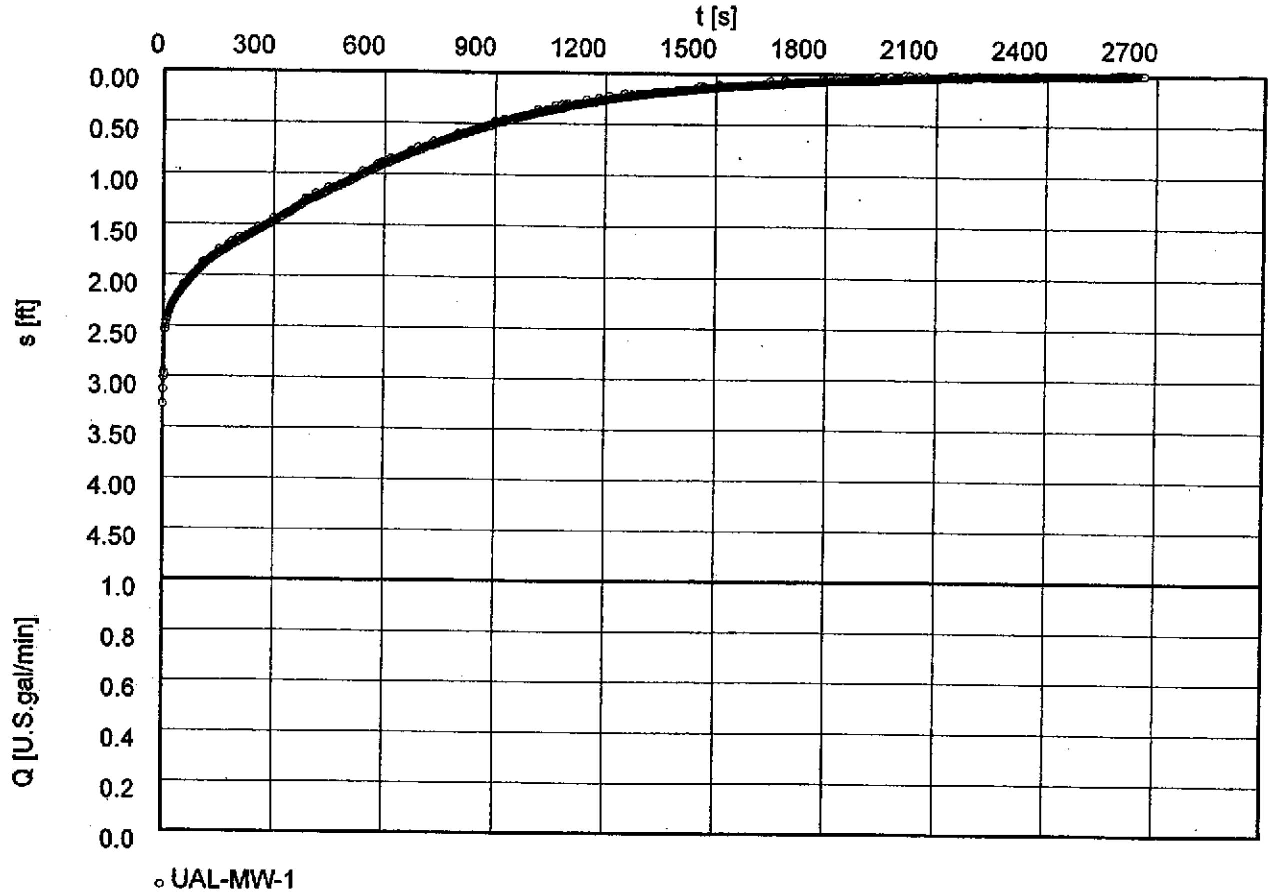
Slug Test No. 1	Test conducted on: 12/8/03
UAL-MW-1	



Hydraulic conductivity [ft/s]: 1.33×10^{-5}

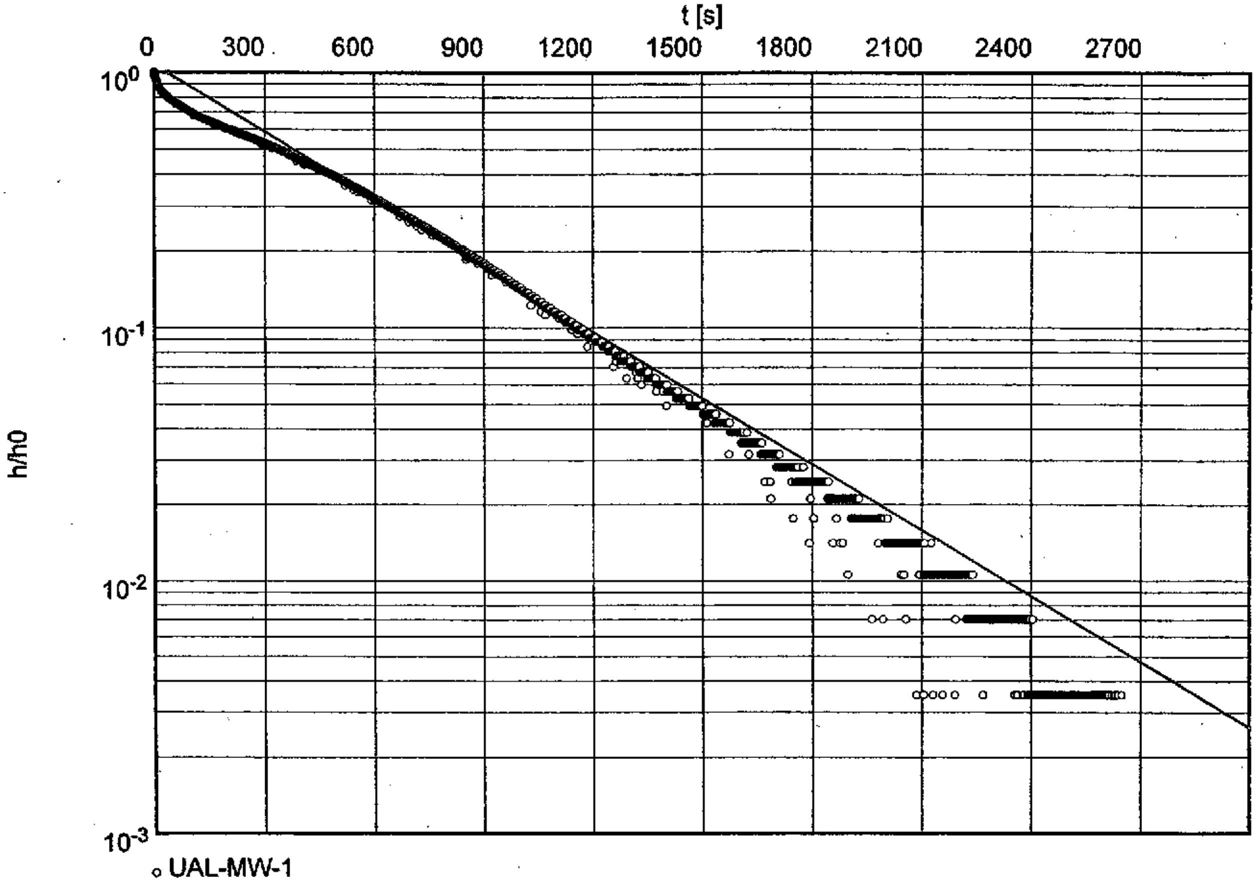
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1 Project: OMC Slug Test Evaluated by: RLS / Date: 12/9/03

Pumping Test No. 1	Test conducted on: 12/8/03
UAL-MW-1	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS Date: 12/9/03

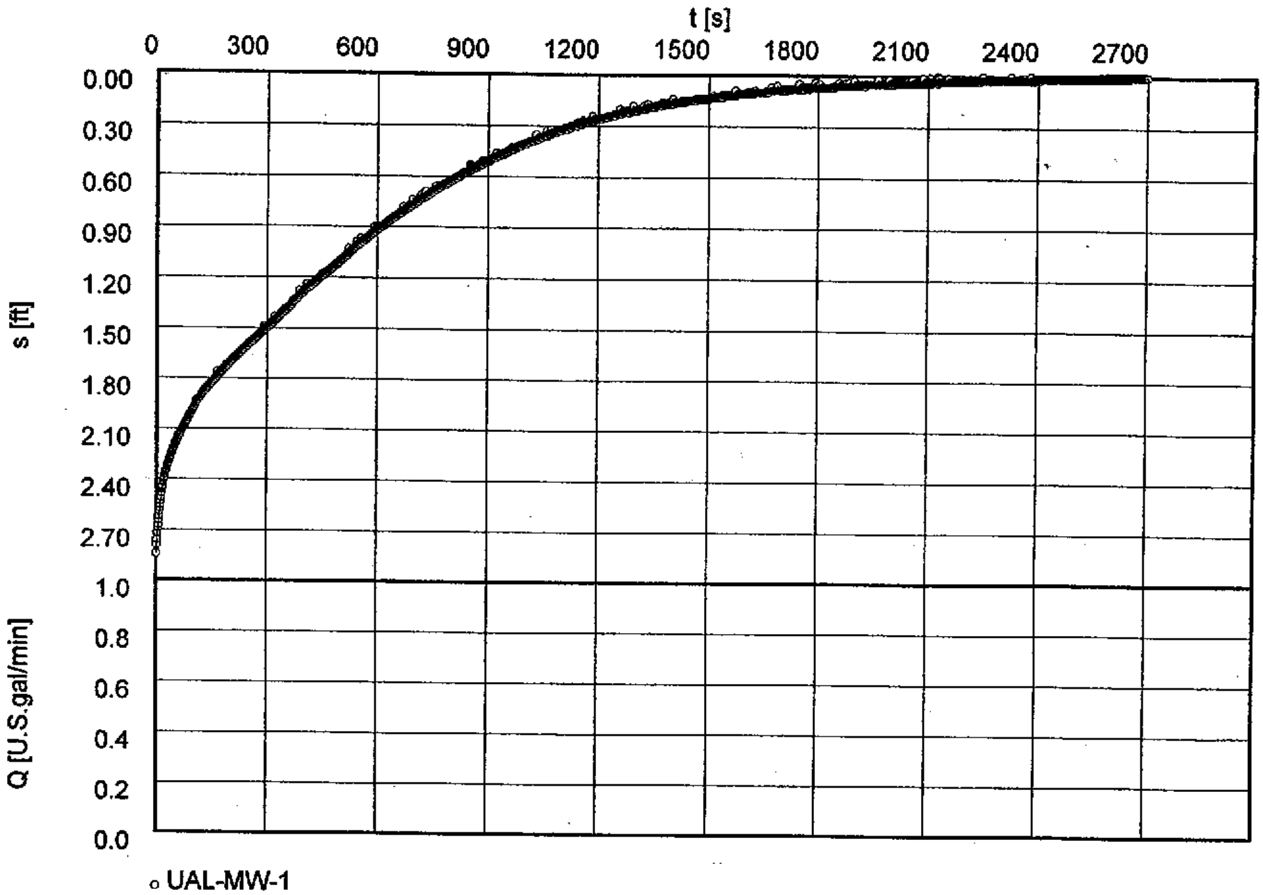
Slug Test No. 2	Test conducted on: 12/8/03
UAL-MW-1	



Hydraulic conductivity [ft/s]: 1.31×10^{-5}

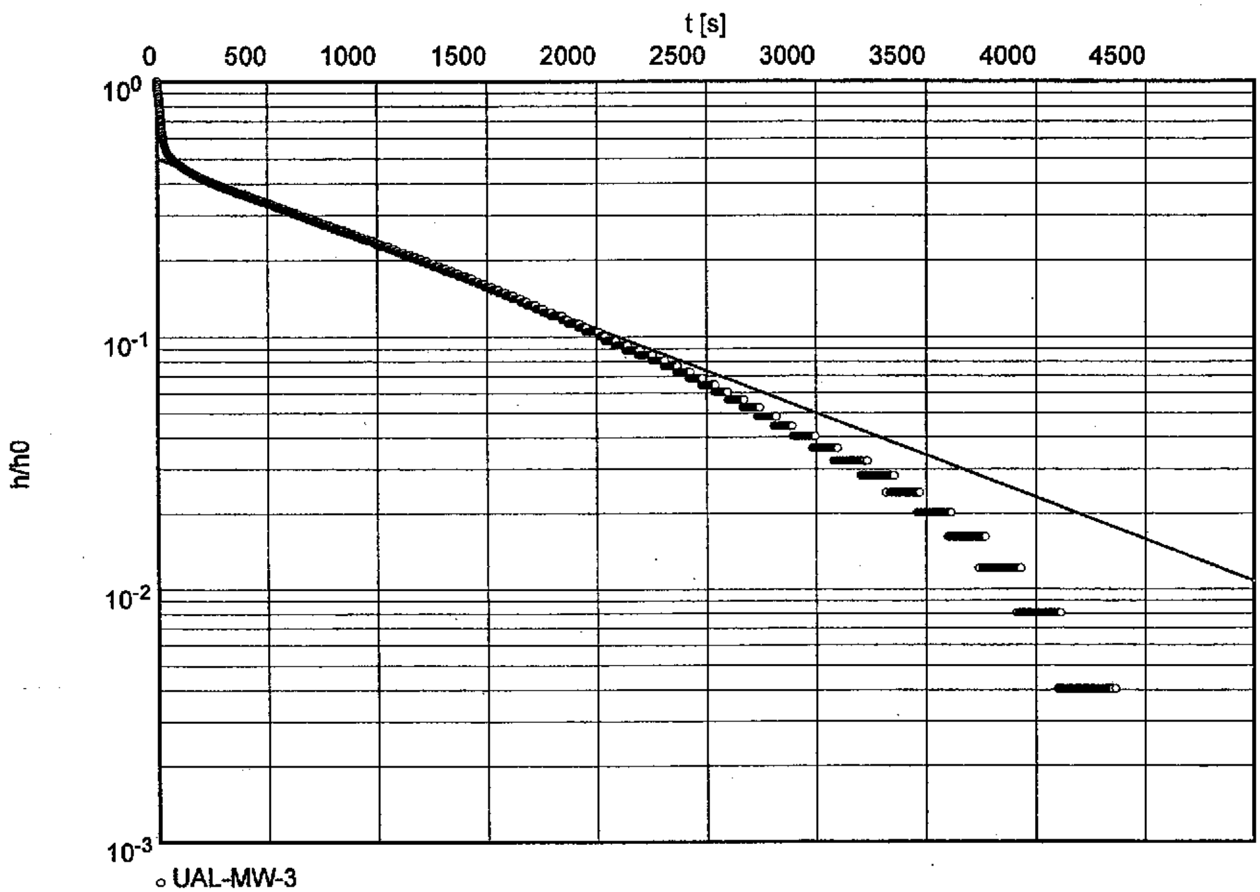
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1 Project: OMC Slug Test Evaluated by: RLS Date: 12/9/03

Pumping Test No. 2	Test conducted on: 12/8/03
UAL-MW-1	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1
		Project: OMC Slug Test
		Evaluated by: RLS / Date: 12/9/03

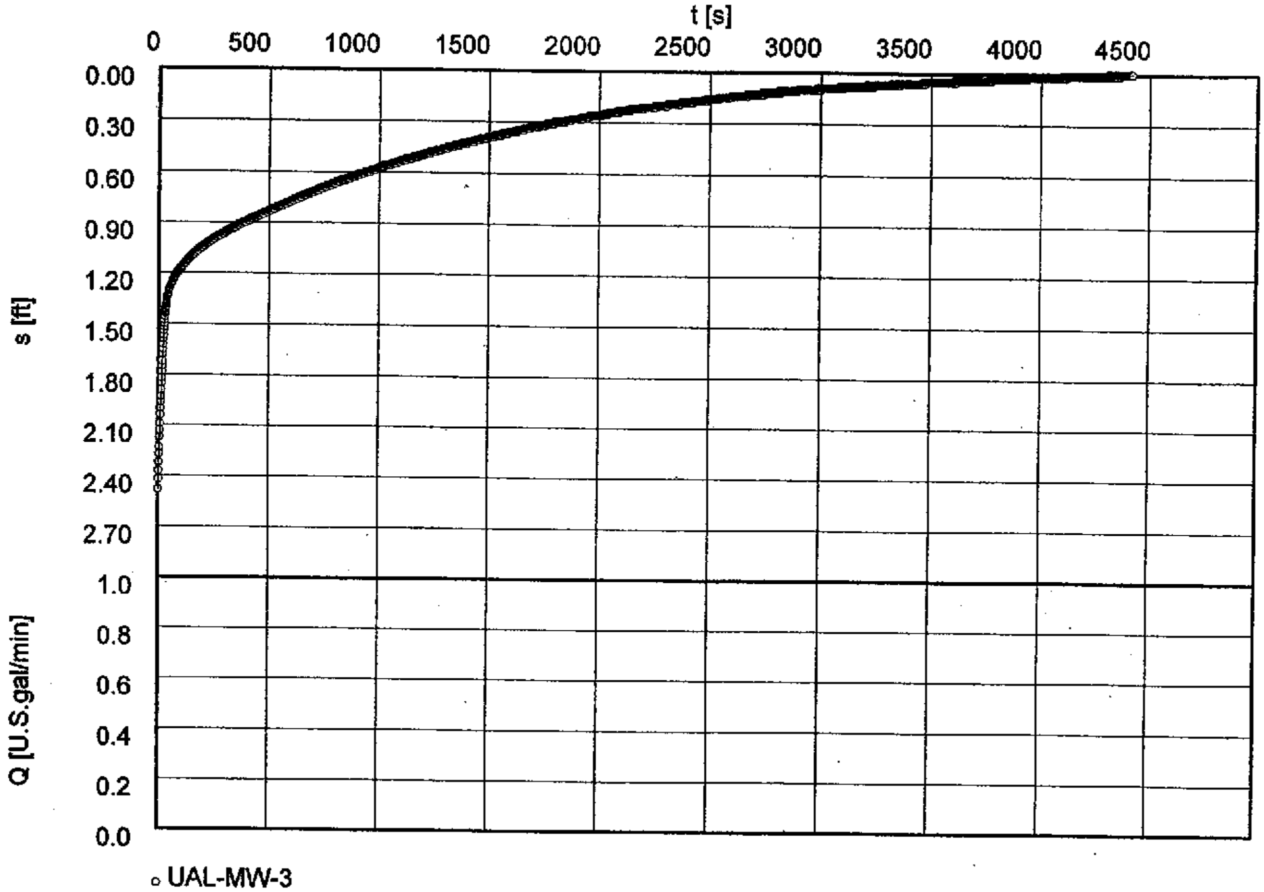
Slug Test No. 1	Test conducted on: 12/8/03
UAL-MW-3	



Hydraulic conductivity [ft/s]: 5.70×10^{-6}

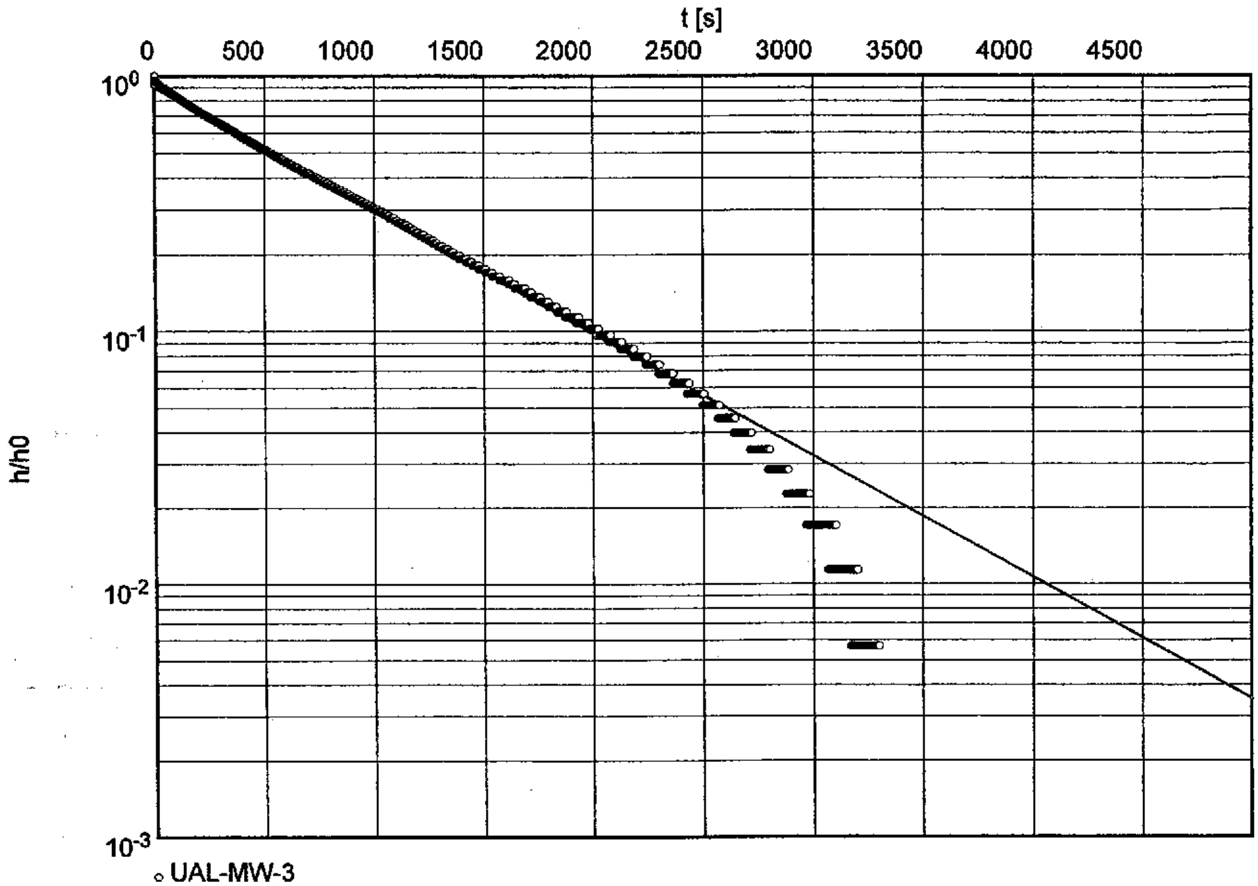
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1 Project: OMC Slug Test Evaluated by: RLS · Date: 12/9/03

Pumping Test No. 1	Test conducted on: 12/8/03
UAL-MW-3	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS · Date: 12/10/03

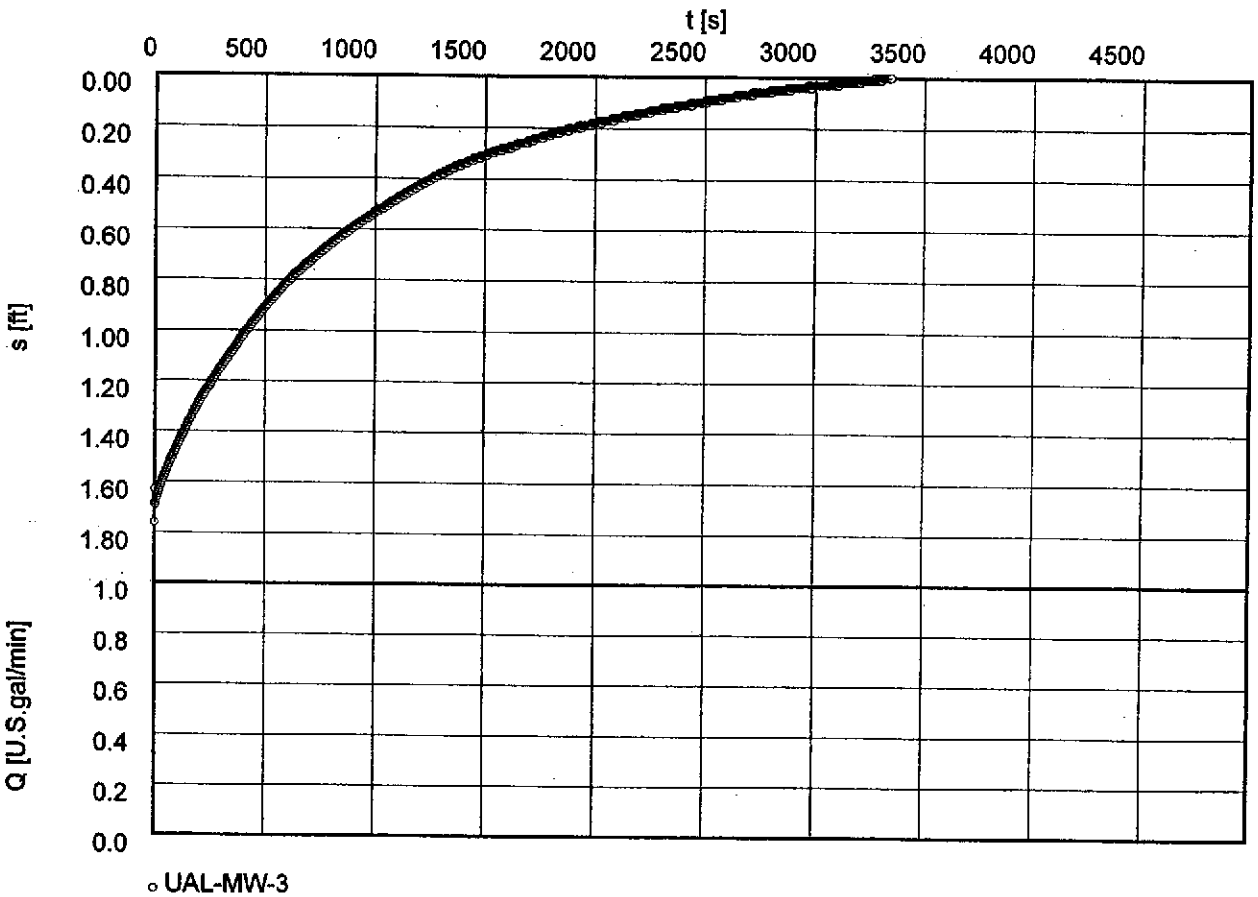
Slug Test No. 2	Test conducted on: 10/8/03
UAL-MW-3	



Hydraulic conductivity [ft/s]: 8.23×10^{-6}

ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1 Project: OMC Slug Test Evaluated by: RLS — Date: 12/10/03

Pumping Test No. 2	Test conducted on: 10/8/03
UAL-MW-3	



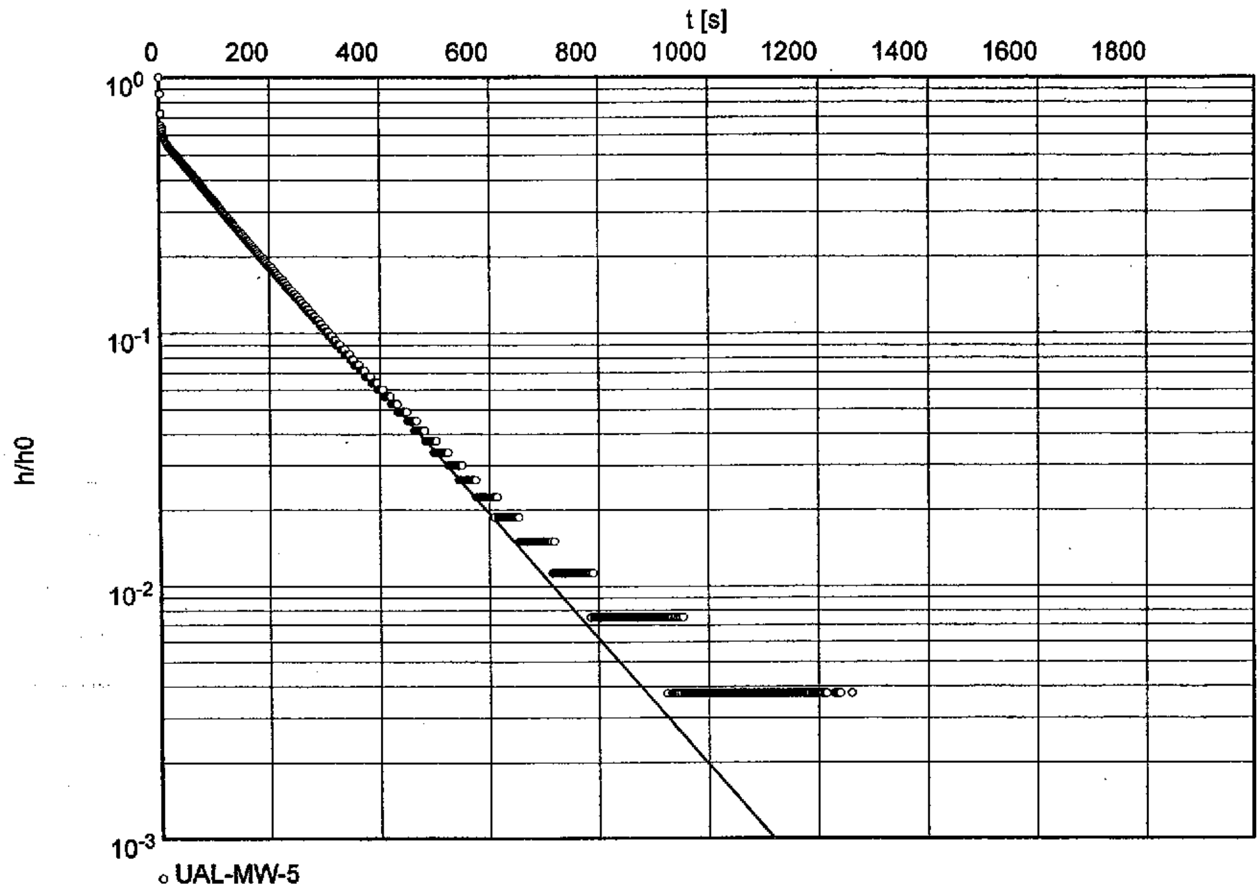
ERM
1777 Botelho Drive
Walnut Creek, CA 94596
ph.(925)946-0455

slug/bail test analysis
BOUWER-RICE's method

Project: OMC Slug Test

Evaluated by: RLS | Date: 12/9/03

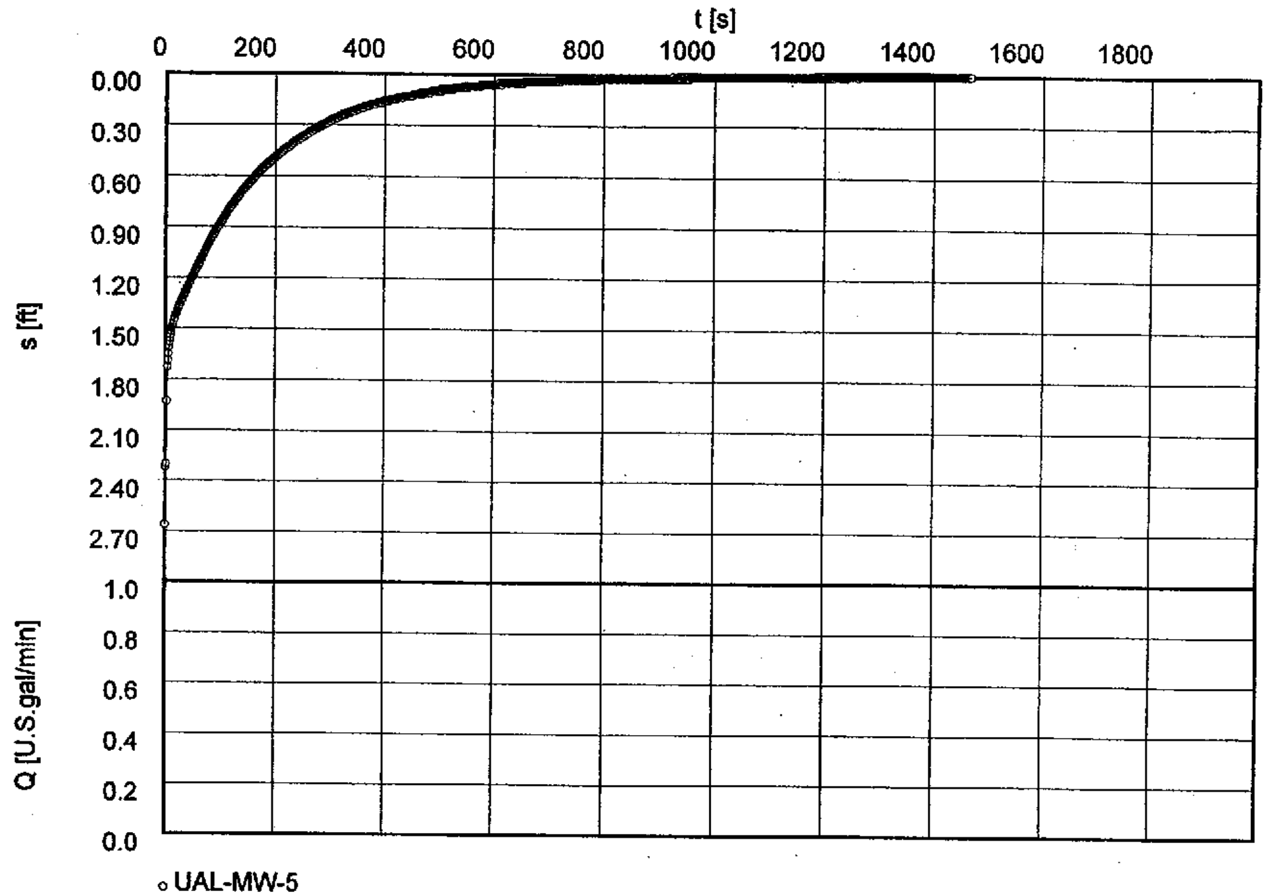
Slug Test No. 1	Test conducted on: 12/8/03
UAL-MW-5	



Hydraulic conductivity [ft/s]: 3.60×10^{-5}

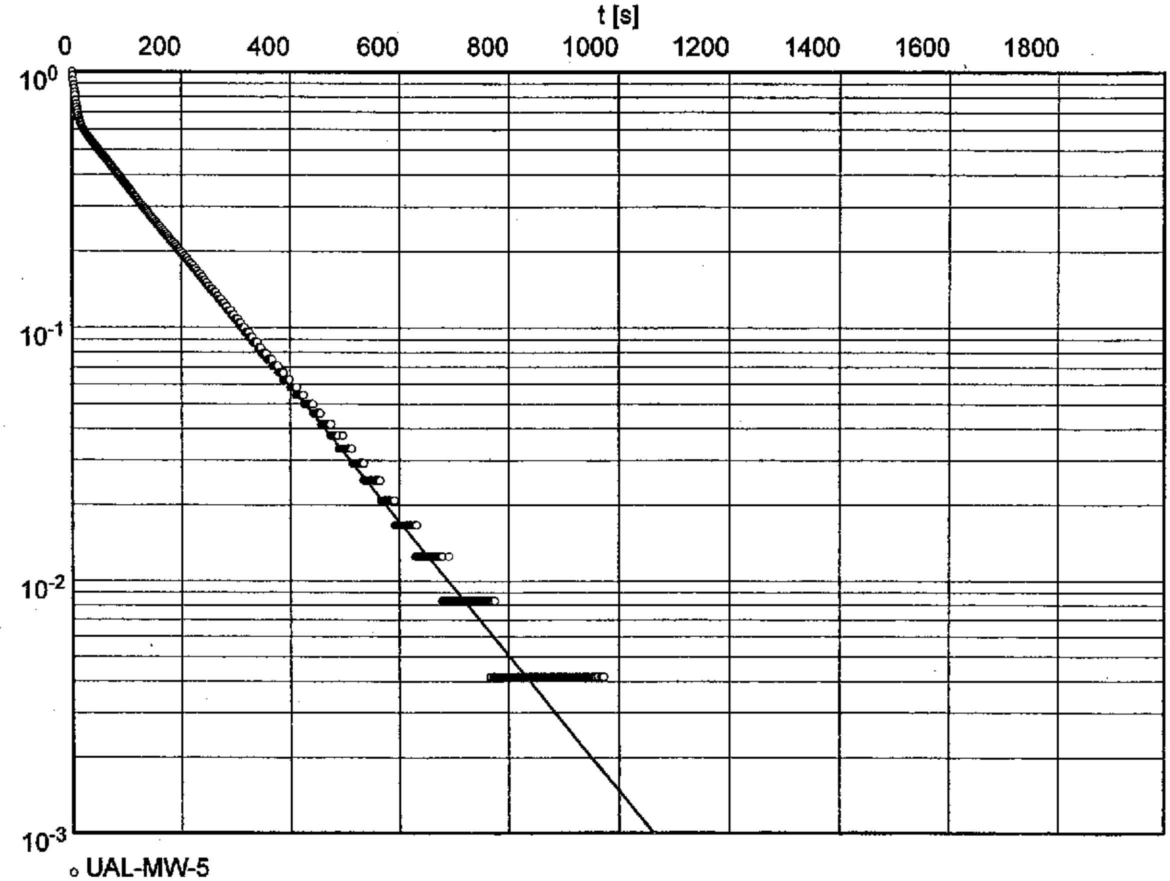
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1 Project: OMC Slug Test Evaluated by: RLS Date: 12/9/03

Pumping Test No. 1	Test conducted on: 12/8/03
UAL-MW-5	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS / Date: 12/10/03

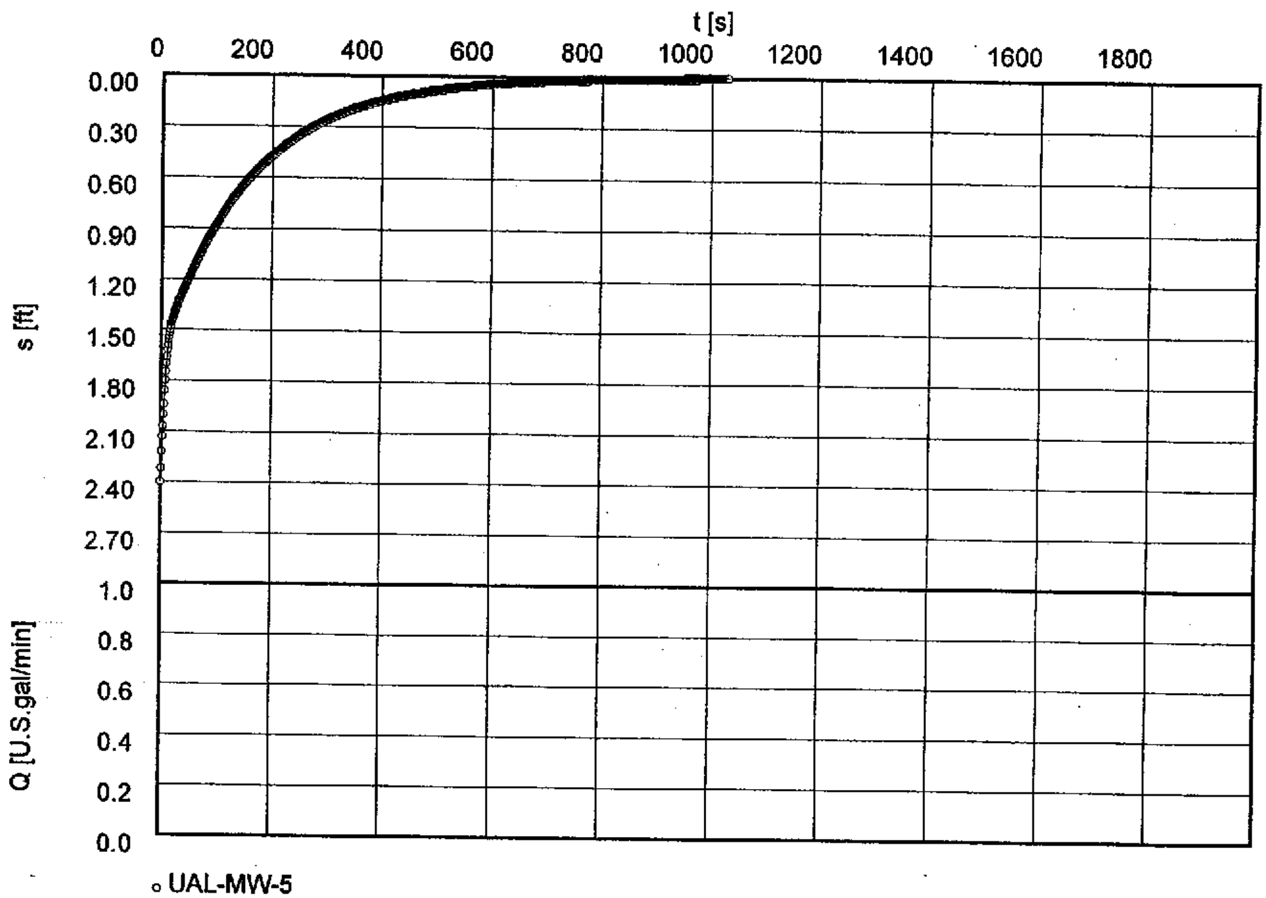
Slug Test No. 2	Test conducted on: 12/8/03
UAL-MW-5	



Hydraulic conductivity [ft/s]: 3.80×10^{-5}

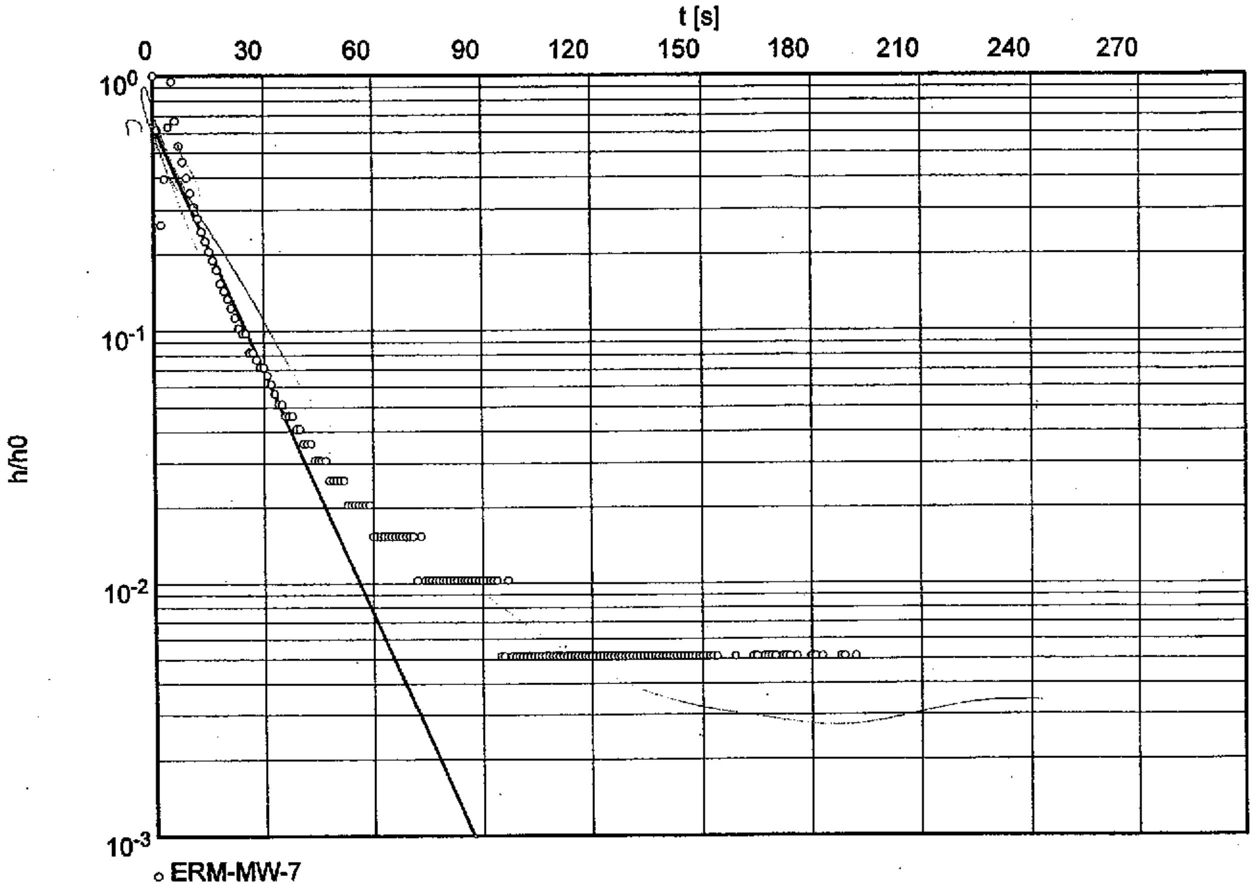
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1
		Project: OMC Slug Test
		Evaluated by: RLS / Date: 12/10/03

Pumping Test No. 2	Test conducted on: 12/8/03
UAL-MW-5	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1	
		Project: OMC Slug Test	
		Evaluated by: RLS	Date: 12/9/03

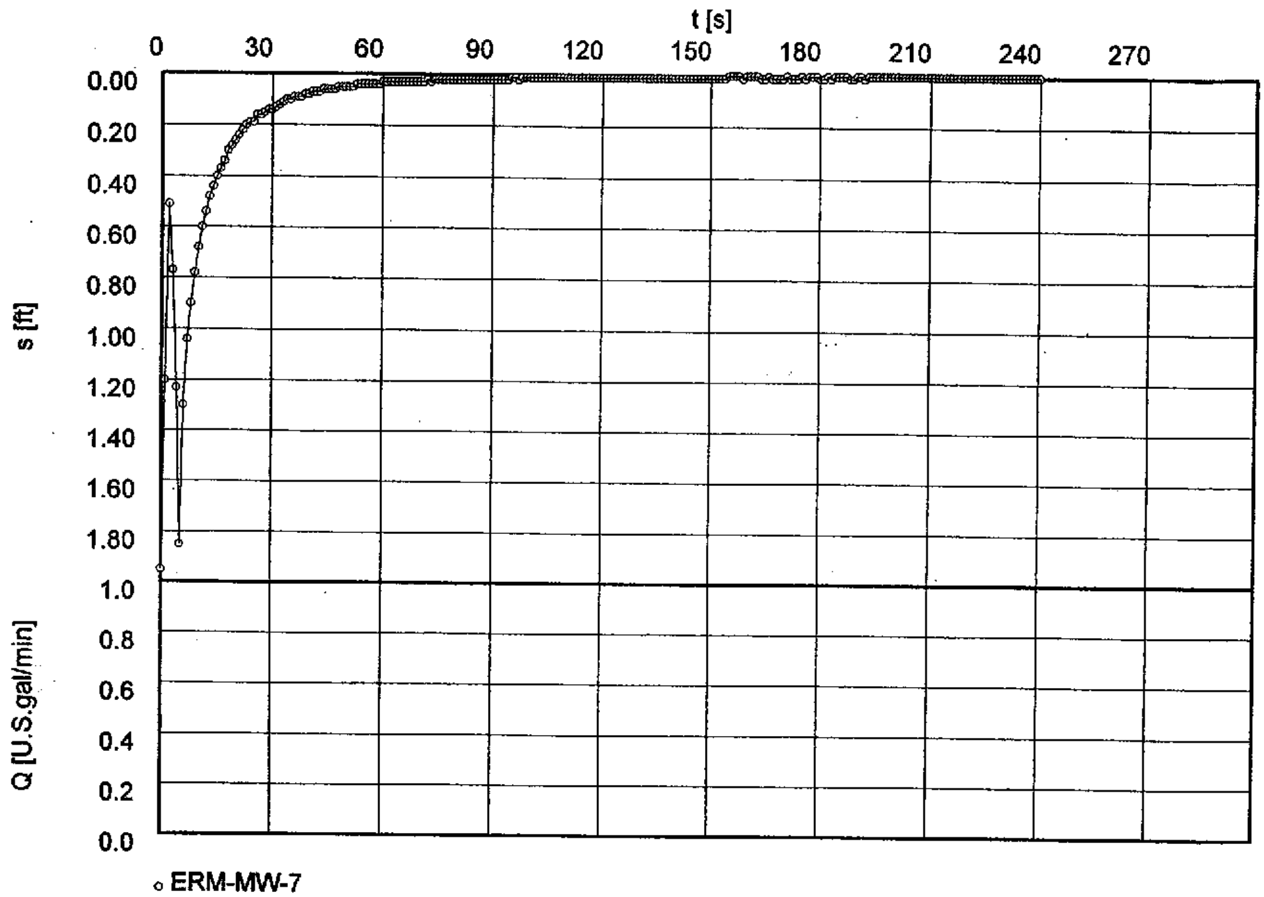
Slug Test No. 1	Test conducted on: 12/4/03
ERM-MW-7	



Hydraulic conductivity [ft/s]: 1.99×10^{-4}

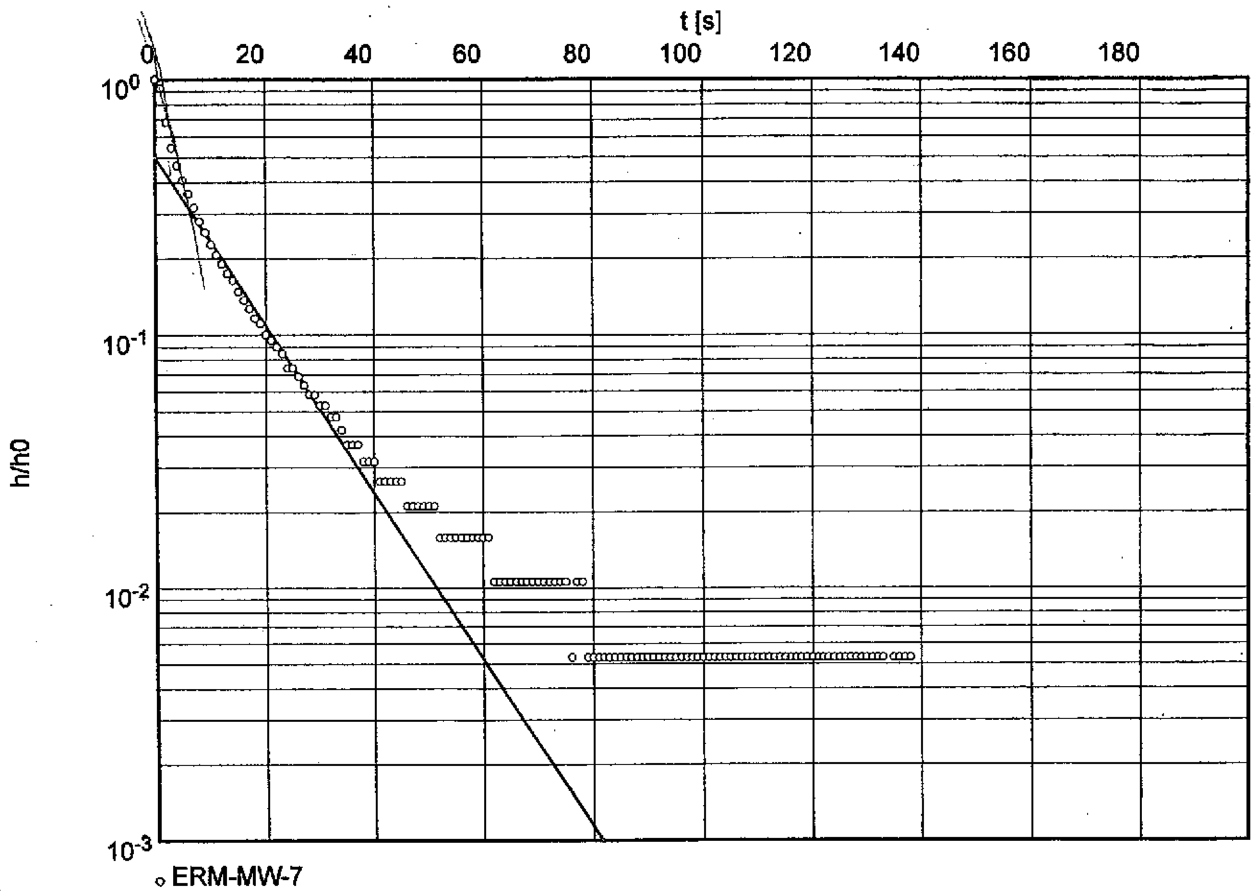
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1
		Project: OMC Slug Test
		Evaluated by: RLS / Date: 12/9/03

Pumping Test No. 1	Test conducted on: 12/4/03
ERM-MW-7	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS Date: 12/9/03

Slug Test No. 2	Test conducted on: 12/4/03
ERM-MW-7	



Hydraulic conductivity [ft/s]: 2.08×10^{-4}

ERM
1777 Botelho Drive
Walnut Creek, CA 94596
ph.(925)946-0455

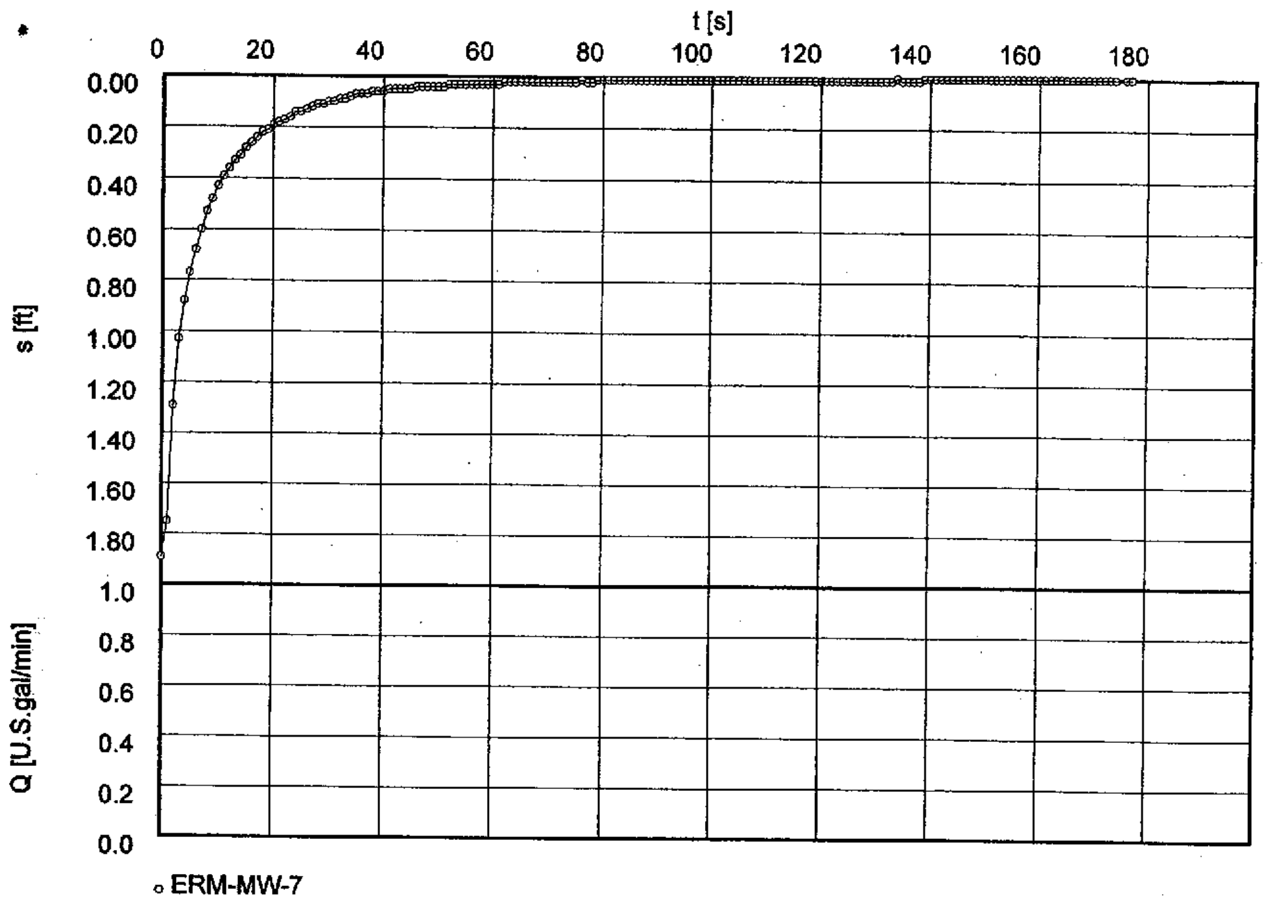
Pumping test analysis
Time-Drawdown plot
with discharge

Project: OMC Slug Test

Evaluated by: RLS | Date: 12/9/03

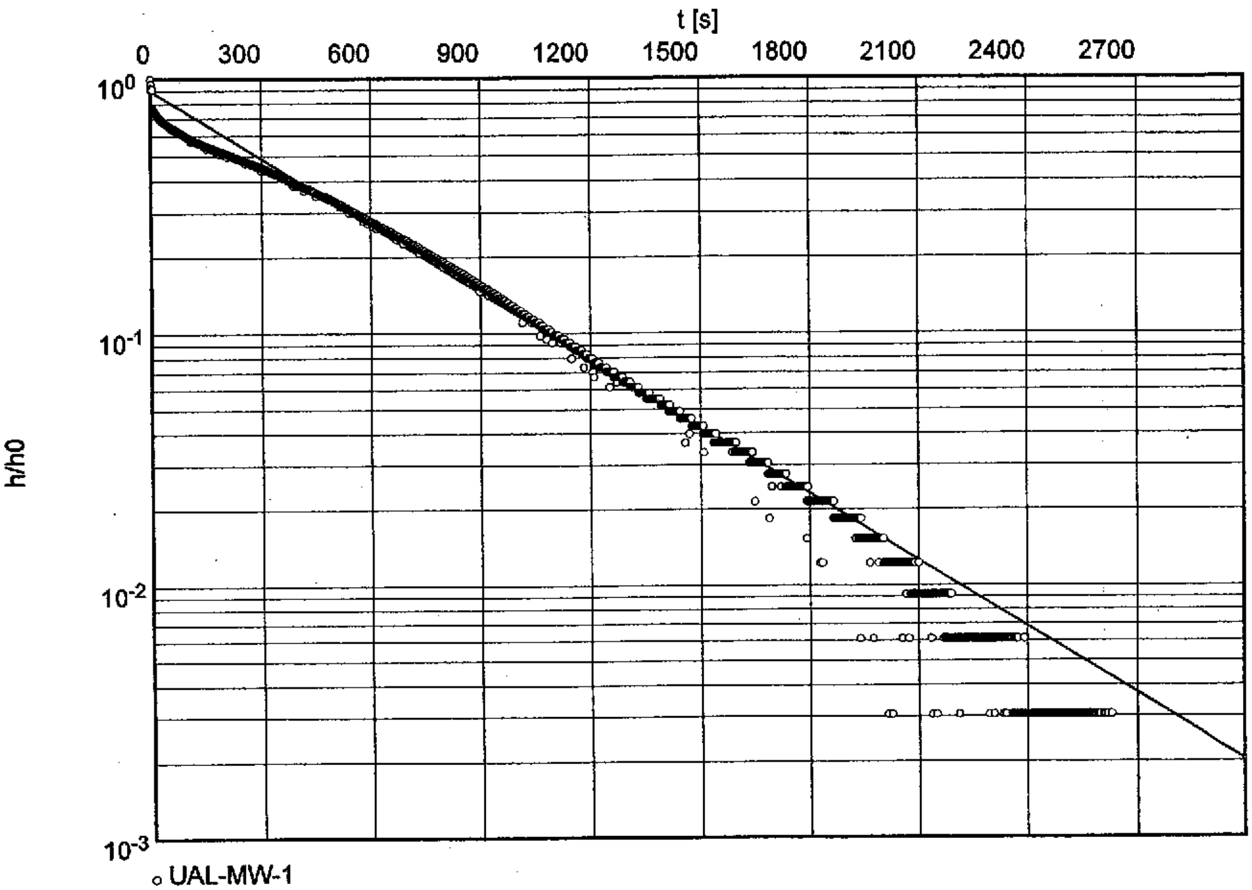
Pumping Test No. 2 | Test conducted on: 12/4/03

ERM-MW-7



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS · Date: 12/9/03

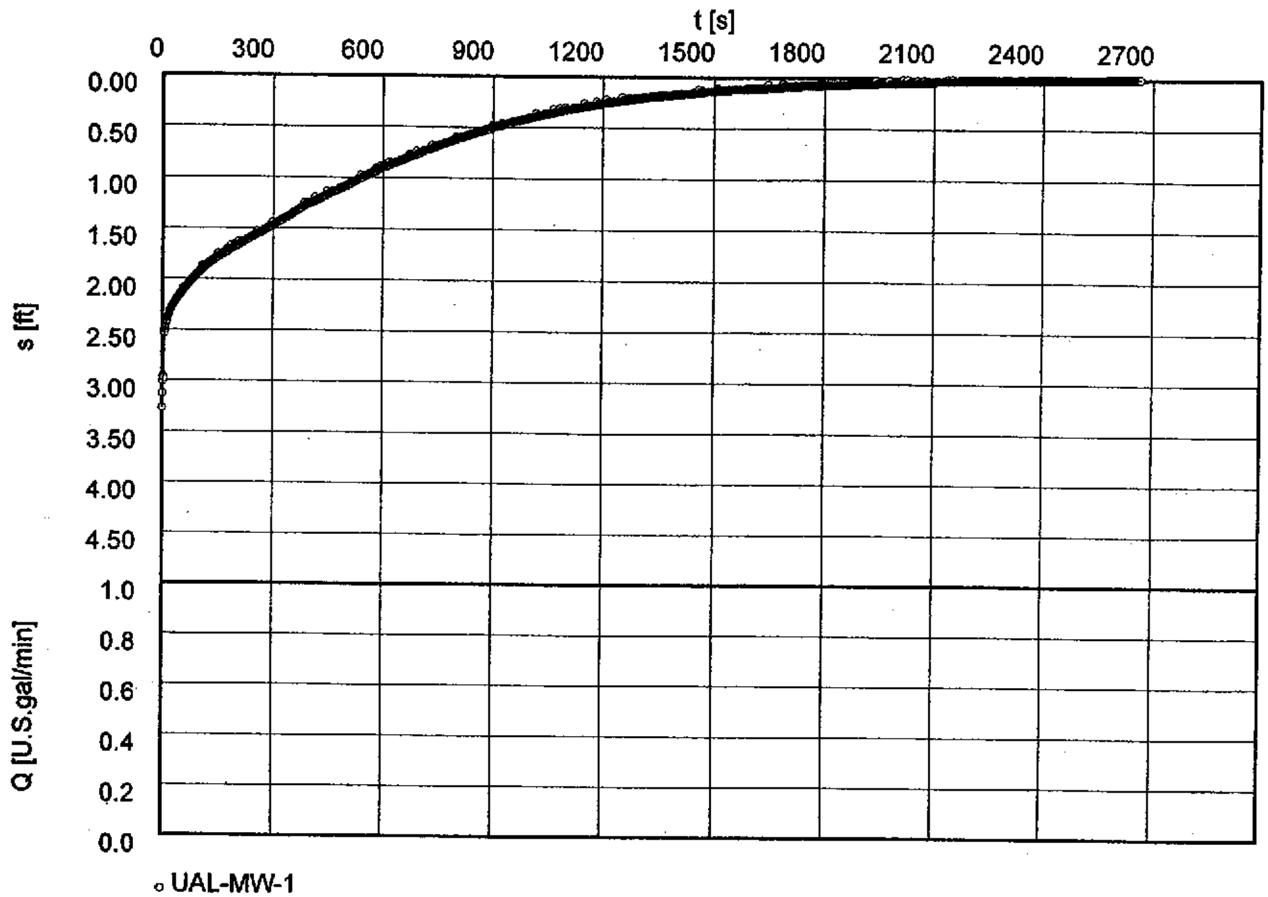
Slug Test No. 1	Test conducted on: 12/8/03
UAL-MW-1	



Hydraulic conductivity [ft/s]: 1.33×10^{-5}

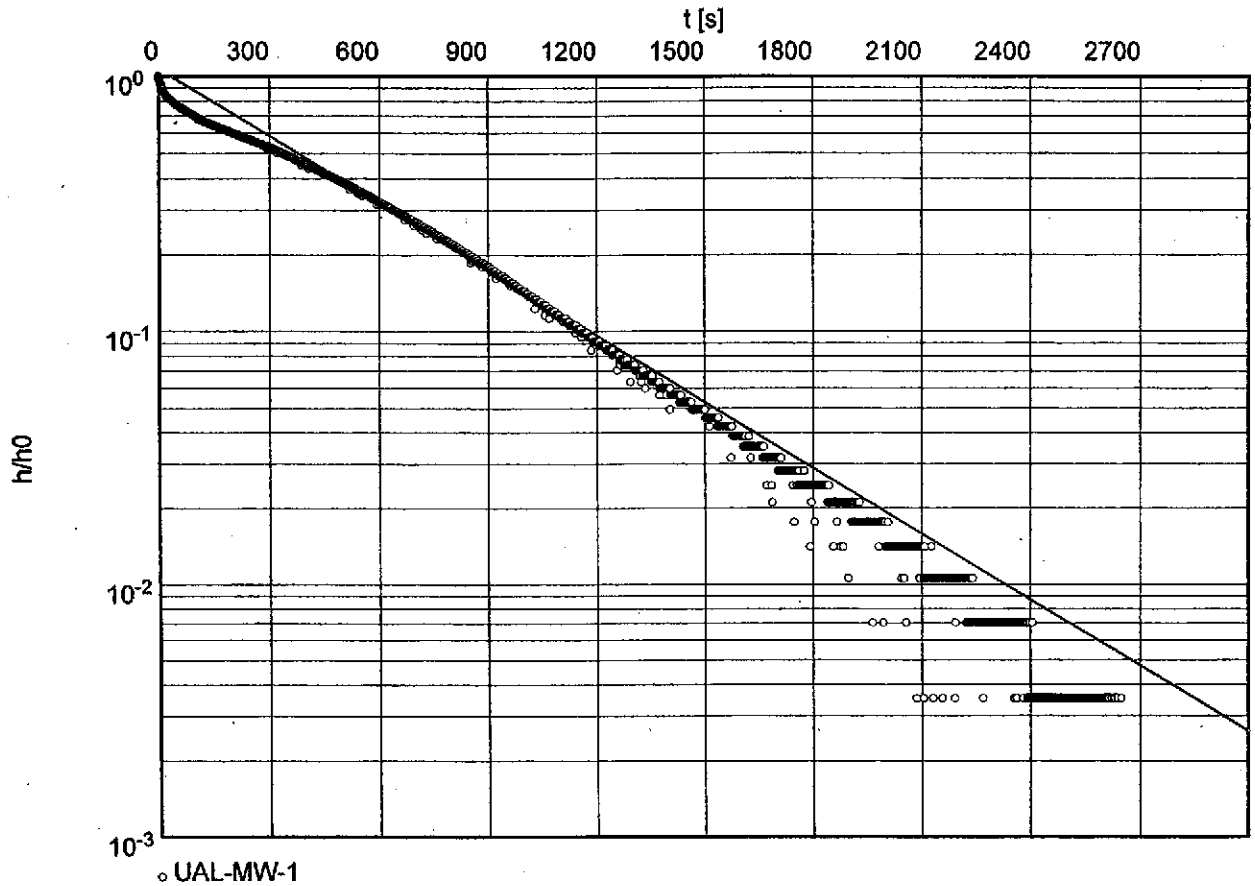
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1 Project: OMC Slug Test Evaluated by: RLS · Date: 12/9/03

Pumping Test No. 1	Test conducted on: 12/8/03
UAL-MW-1	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS	Date: 12/9/03

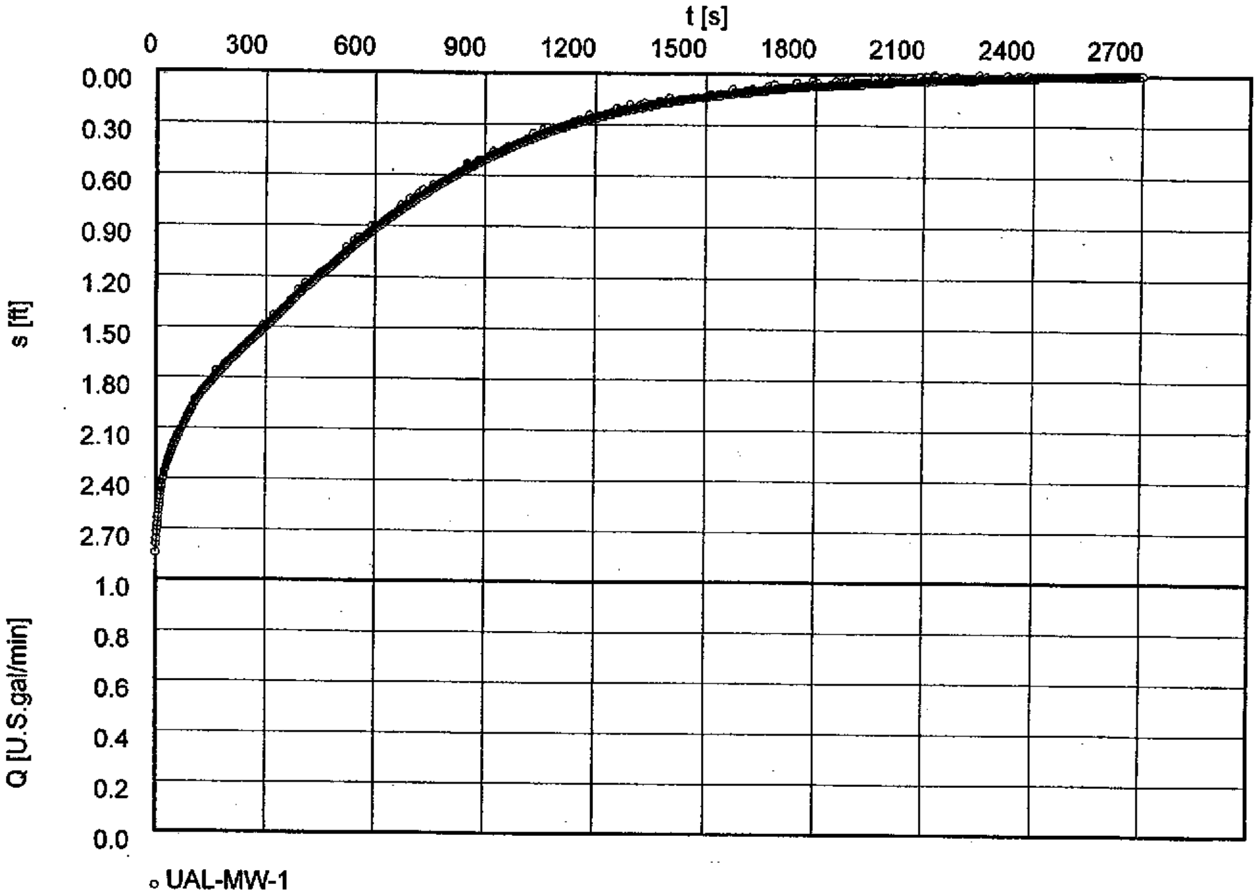
Slug Test No. 2	Test conducted on: 12/8/03
UAL-MW-1	



Hydraulic conductivity [ft/s]: 1.31×10^{-5}

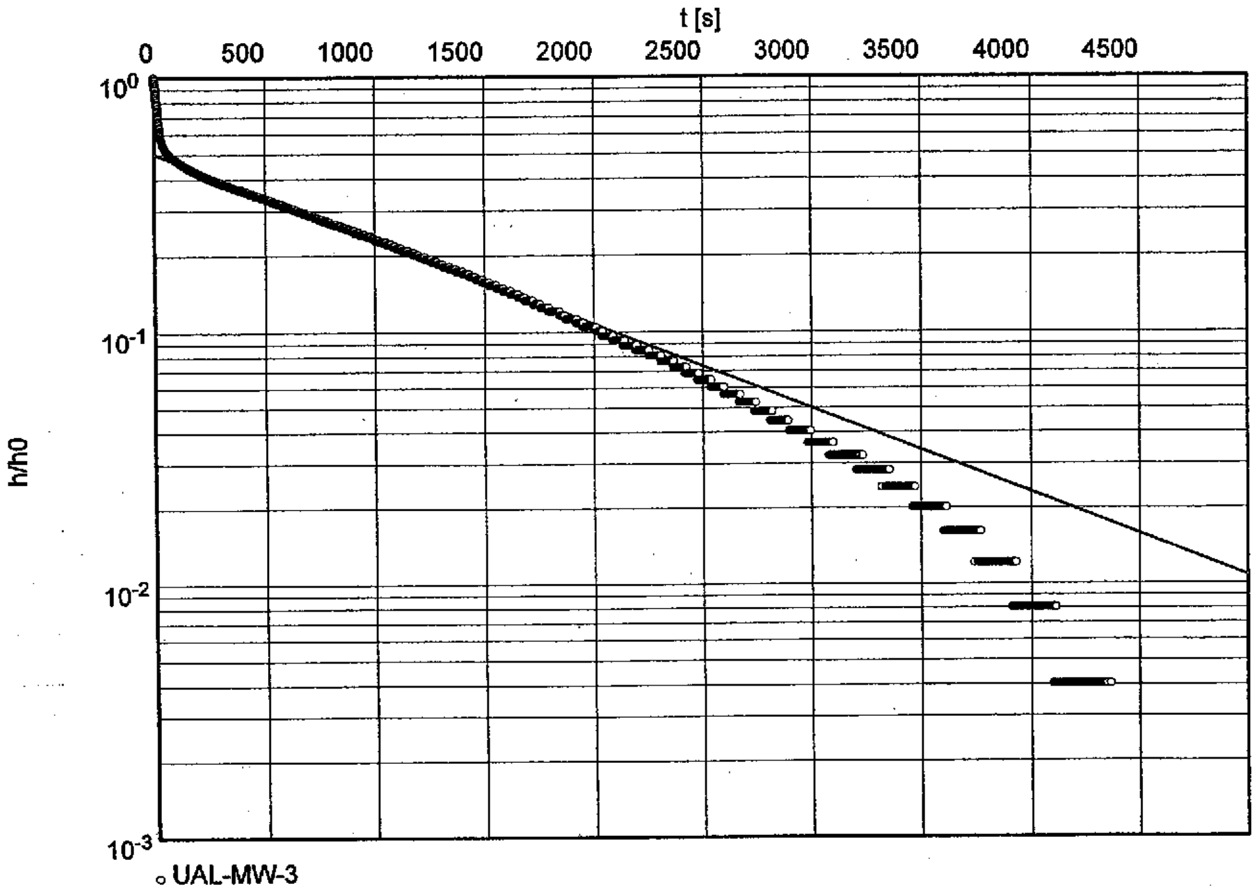
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1	
		Project: OMC Slug Test	
		Evaluated by: RLS	Date: 12/9/03

Pumping Test No. 2	Test conducted on: 12/8/03
UAL-MW-1	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS · Date: 12/9/03

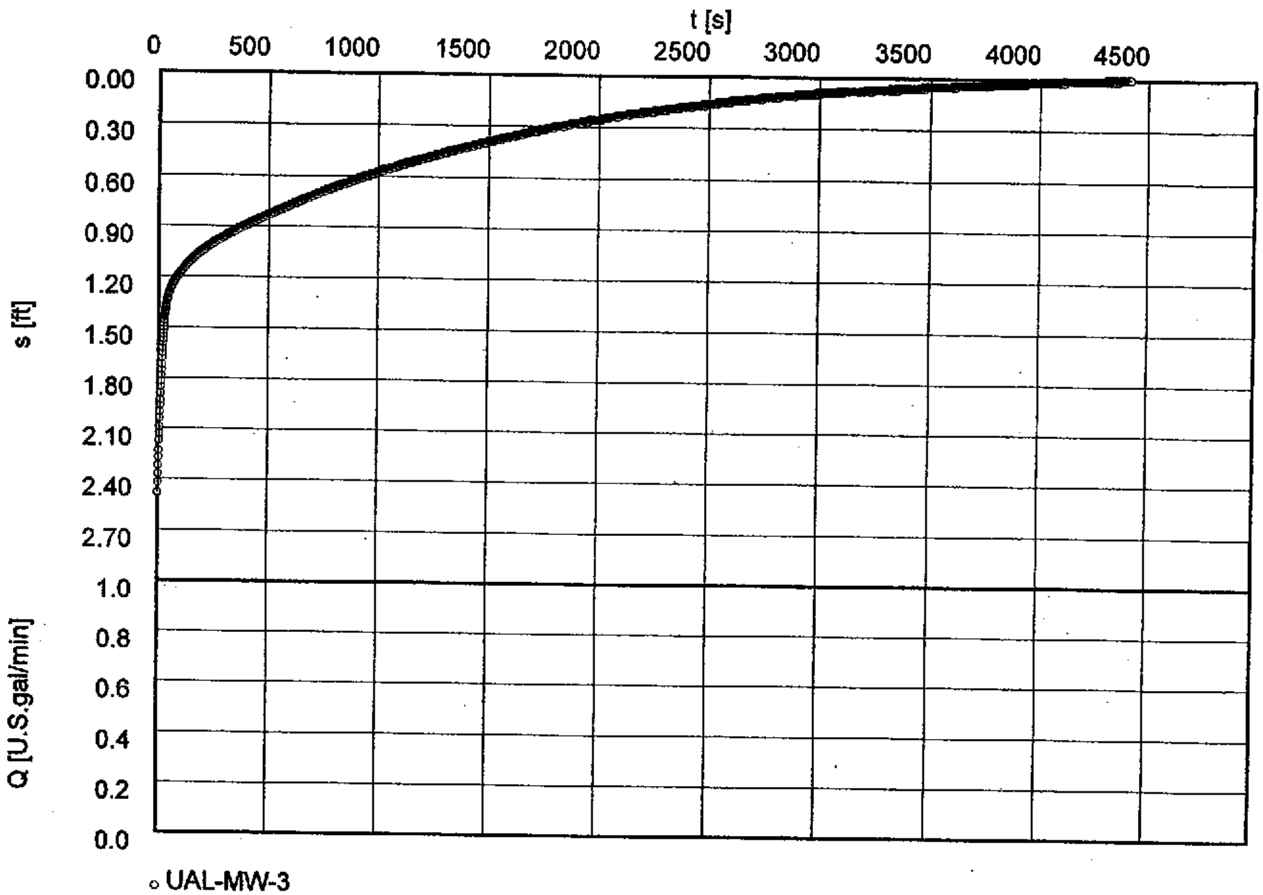
Slug Test No. 1	Test conducted on: 12/8/03
UAL-MW-3	



Hydraulic conductivity [ft/s]: 5.70×10^{-6}

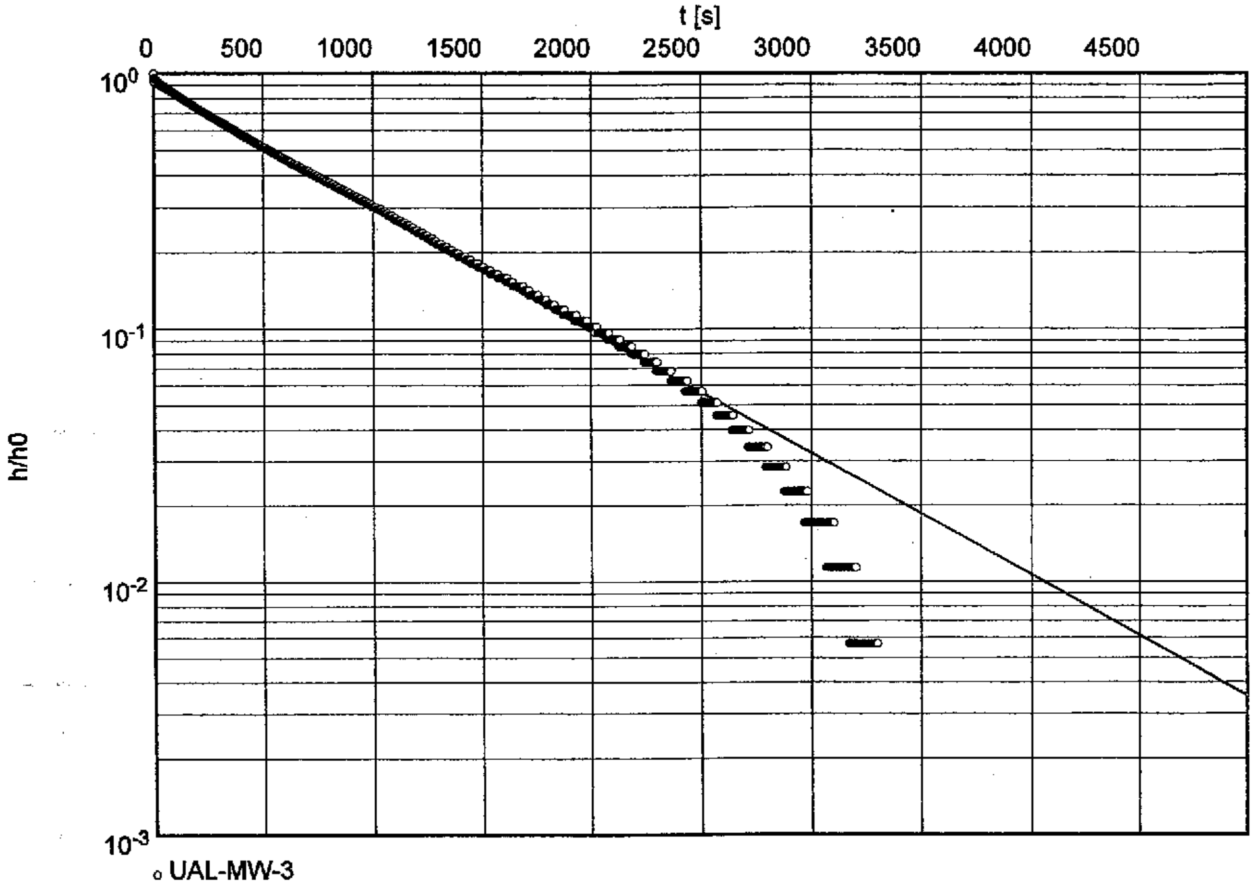
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1 Project: OMC Slug Test Evaluated by: RLS / Date: 12/9/03

Pumping Test No. 1	Test conducted on: 12/8/03
UAL-MW-3	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: OMC Slug Test Evaluated by: RLS — Date: 12/10/03

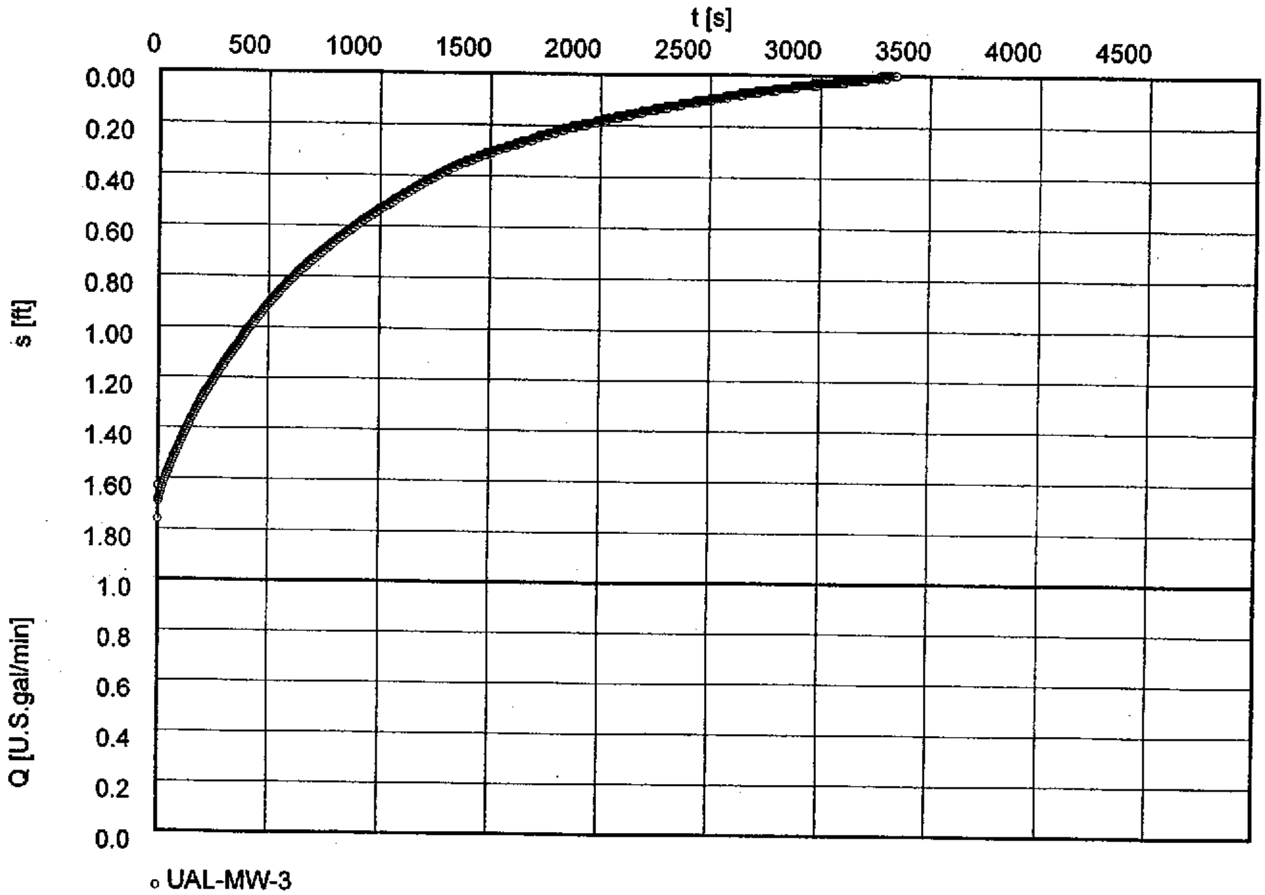
Slug Test No. 2	Test conducted on: 10/8/03
UAL-MW-3	



Hydraulic conductivity [ft/s]: 8.23×10^{-6}

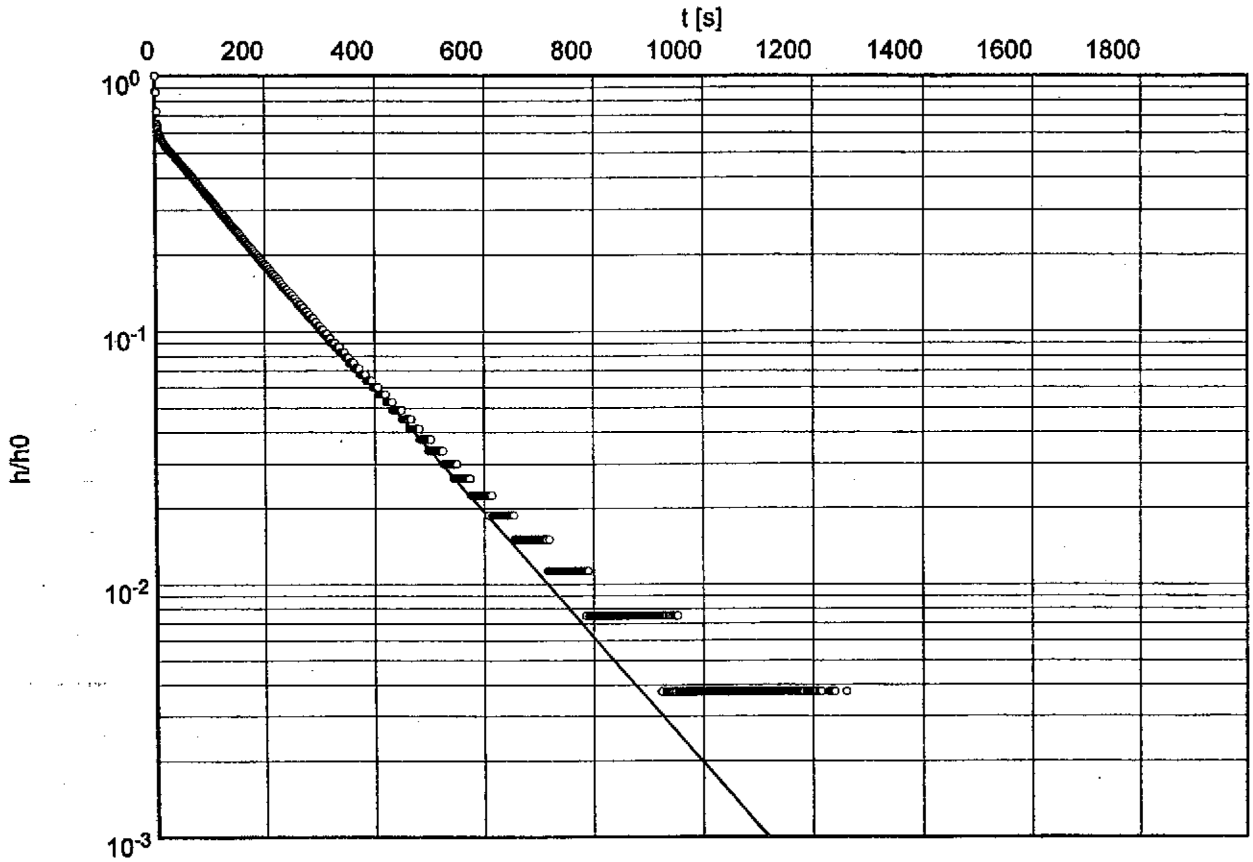
ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1 Project: OMC Slug Test Evaluated by: RLS · Date: 12/10/03

Pumping Test No. 2	Test conducted on: 10/8/03
UAL-MW-3	



ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1	
		Project: OMC Slug Test	
		Evaluated by: RLS	Date: 12/9/03

Slug Test No. 1	Test conducted on: 12/8/03
UAL-MW-5	



o UAL-MW-5

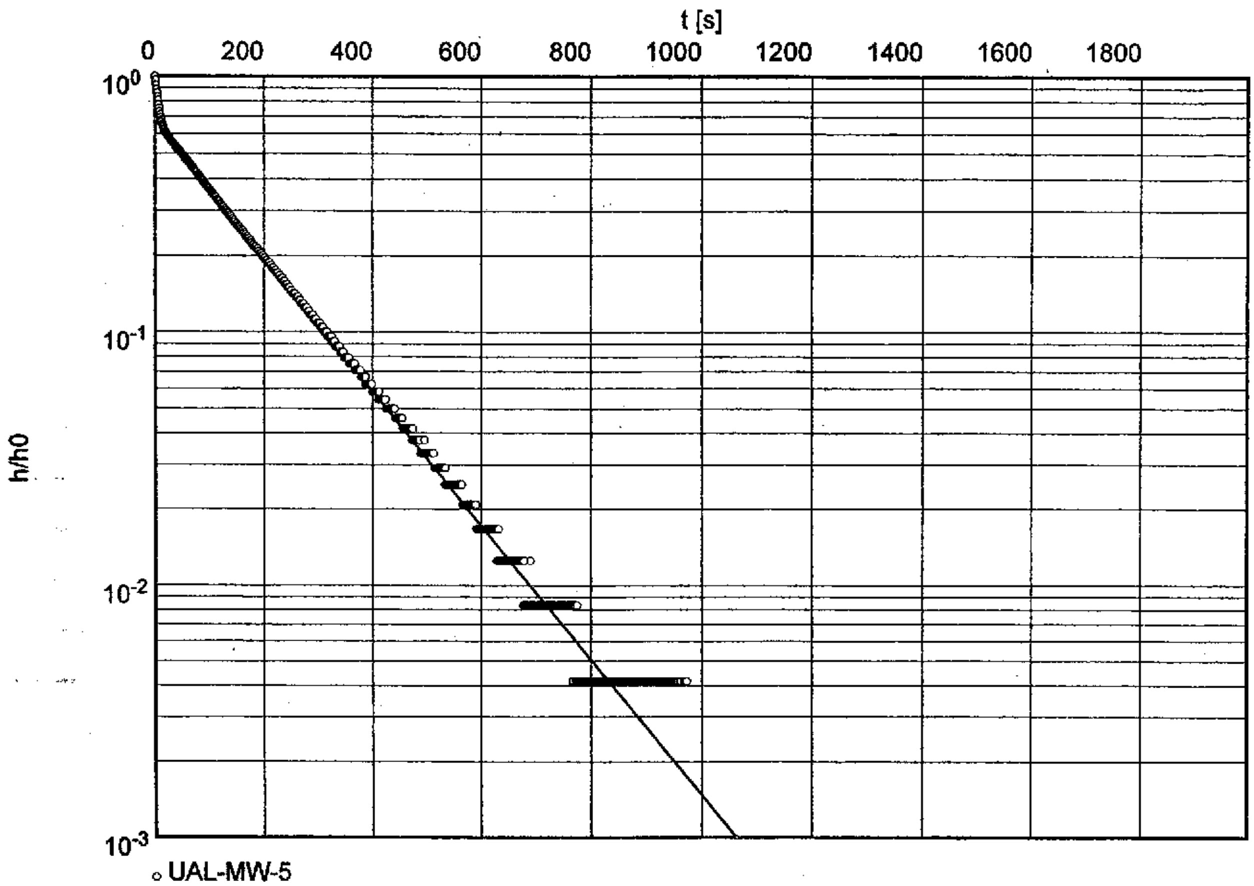
Hydraulic conductivity [ft/s]: 3.60×10^{-5}

ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1 Project: OMC Slug Test Evaluated by: RLS · Date: 12/9/03

Pumping Test No. 1	Test conducted on: 12/8/03
UAL-MW-5	

ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	slug/bail test analysis BOUWER-RICE's method	Page 1
		Project: OMC Slug Test
		Evaluated by: RLS — Date: 12/10/03

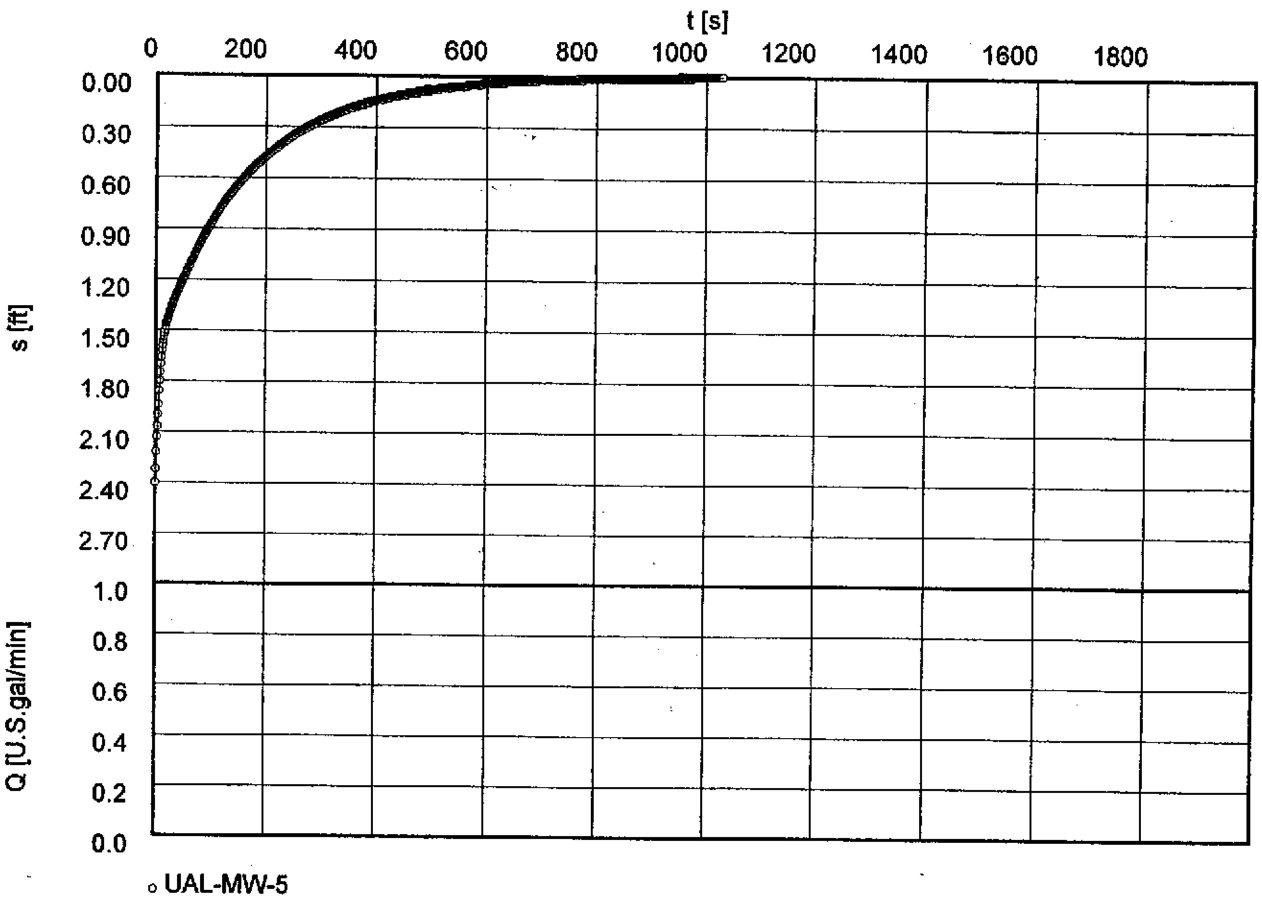
Slug Test No. 2	Test conducted on: 12/8/03
UAL-MW-5	



Hydraulic conductivity [ft/s]: 3.80×10^{-5}

ERM 1777 Botelho Drive Walnut Creek, CA 94596 ph.(925)946-0455	Pumping test analysis Time-Drawdown plot with discharge	Page 1 Project: OMC Slug Test Evaluated by: RLS / Date: 12/10/03

Pumping Test No. 2	Test conducted on: 12/8/03
UAL-MW-5	



Appendix H
Well Survey Methods and Beneficial Use Evaluation

APPENDIX H – WELL SURVEY AND BENEFICIAL USE EVALUATION SUMMARY

This subsection presents the results of a well survey and provides a summary of the Beneficial Use Evaluation.

WELL SURVEY RESULTS

ERM conducted a well survey of the area adjacent to the OMC to determine if water supply wells are present and, if so, document their location with respect to ground water flow and determine the distance from the site to the nearest water supply well(s). ERM reviewed the results of the Environmental Data Resources, Inc. (EDR) report, which reviews federal, state, and county databases to identify water supply wells within a 1-mile radius of the site. The EDR indicated that, based on the databases reviewed, there were no water supply wells located within 1 mile of the OMC.

In addition, ERM contacted the Alameda County Department of Health Services and Alameda County Public Works Agency, Water Resources Section, to confirm the EDR results. ERM spoke with Mr. James Yoo of Alameda County Public Works Agency, Water Resources Section on 14 July 2003. Mr. Yoo provided ERM with information on wells within 1.5 miles of the OMC. This information includes well locations, specific use, depth, diameter, and drill date, when available. Mr. Yoo indicated that the county database is derived from the California Department of Water Resources (DWR), which compiles the most comprehensive list of existing wells throughout California.

The results of the well survey are presented on Table G-1. In addition, Figure G-1 shows the location of wells identified in this survey. Table G-1 lists the wells found within 1.5 miles of the OMC. As seen in this table, 30 irrigation wells, 14 abandoned wells, eight domestic wells, and six industrial wells are found within 1.5 miles of the OMC. The exact location of seven irrigation, three abandoned, two domestic, and one industrial well could not be ascertained from the information obtained from Alameda County; however, the three wells that may be nearest to the OMC, identified in Table 3 as having an Oakland Airport address or associated with the nearby Metro Golf course located near the intersection of Doolittle and Airport Drives, are deep wells (350 to 634 feet bgs) most likely screened in the coarse grained intervals within the Alameda and Santa Clara Formations. Abandoned wells have been included in this survey because although these wells are no longer in operation, formal records of their destruction do not exist. Therefore, these wells may still exist. As seen on this figure, the nearest wells to the OMC are found approximately 1 mile to the east-northeast of the site, which given the regional ground water flow towards the San Francisco Bay, are in an upgradient direction. Given the distance of the nearest water wells from the OMC and hydrogeologic conditions, screen intervals, and chemical concentrations detected, it is highly unlikely that chemicals of concern at the OMC would migrate to water supply wells.

Beneficial Use Evaluation Summary

San Francisco Bay RWQCB conducted an evaluation of the beneficial uses of ground water within the East Bay Plain Ground Water Basin (Basin), within which the OMC lies. The results were summarized in the Beneficial Use Evaluation report. As specified in the report, the results of this evaluation provides context to evaluate site-specific cleanup issues within this Basin. The Basin is on the eastern side of the San Francisco Bay and stretches from Richmond to Hayward (Figure G-2). As shown on Figure G-2, the Basin has been divided into seven sub-areas. The OMC lies within the Central sub-area. The report indicates that the Central sub-area extends beneath the San Francisco Bay and is primarily filled with alluvial fan deposits of the Santa Clara and Alameda Formation. The Yerba Buena Mud member (formerly known as the Old Bay Mud) of the Alameda Formation overlies the Santa Clara Formation. The alluvial deposits of the Alameda Formation (San Antonio, Posey, and Merritt members) and the Young Bay Mud overlie the Yerba Buena Mud member. In the vicinity of the OMC, the Young Bay Mud is overlain by artificial fill derived from dredged sediment and local quarries.

Currently, there are no municipal water supply wells within the Central or adjacent San Leandro sub-area although historically ground water was produced from the alluvial fan deposits of the Alameda Formation between 1888 and 1930 at the Fitchburg Well Field, which was located near the present-day Oakland Coliseum. Saltwater intrusion was documented at the Fitchburg Well Field. The report indicates that the RWQCB reviewed the General Plans for cities within the Basin including Oakland, as well as those of Alameda County Resource Conservation District and Alameda County Flood Control and Water Conservation District, and none of these entities had any plans to develop local ground water for drinking water purposes. In addition, the report presents information regarding the development of the City of Oakland Urban Land Redevelopment (ULR) Program. During the development of the ULR Program, a community review panel report indicated that Oakland's shallow ground water is not currently, nor is expected to be, utilized as a source of drinking water for Oakland. It also acknowledged that due to historical contamination and alternative sources, ground water in the majority of the Oakland area is not a healthy or cost-effective source of drinking water.

The Beneficial Use Evaluation report proposes the division of the Basin into three zones:

- Zone A – Significant drinking water source;
- Zone B – Ground water unlikely to be used as drinking water; and
- Zone C – Shallow ground water proposed for dedesignation as municipal supply use.

The OMC area has been placed within Zone A. This is based on the presence of the alluvial members of the Alameda and Santa Clara Formations. However, the report indicates that ground water within the shallow artificial fill along the Bay-front is unlikely to be used as a source of drinking water due to high total dissolved solids (TDS), the potential for saltwater intrusion, elevated levels of coliform from leaking sewer pipes, low yield, and the requirement for a 50-foot well seal for new municipal wells. First encountered ground water beneath the OMC is contained in a low permeability silt and fine sand that does not yield sustainable ground water flow, even at low sampling rates. In addition, TDS in samples collected during the investigation ranges from 1,300 to 15,000 milligrams per liter (mg/L). The site specific data confirms the findings of the Beneficial Use Evaluation with regard to water quantity and quality within the artificial fill.

The report also states that in the extreme western shoreline area where artificial fill was emplaced after 1930, the Yerba Buena Mud member of the Alameda Formation is a continuous unit that should form a barrier to vertical migration. Based on this information, the report indicates that aggressive ground water remediation may not be warranted in the shallow ground water of Zone A and decisions should be made on a case-by-case basis.

Based on the findings of the Beneficial Use Evaluation, it is unlikely that shallow ground water at the OMC will be used as a potable water source and, therefore, any potential impact to shallow ground water will not require an aggressive remediation alternative.

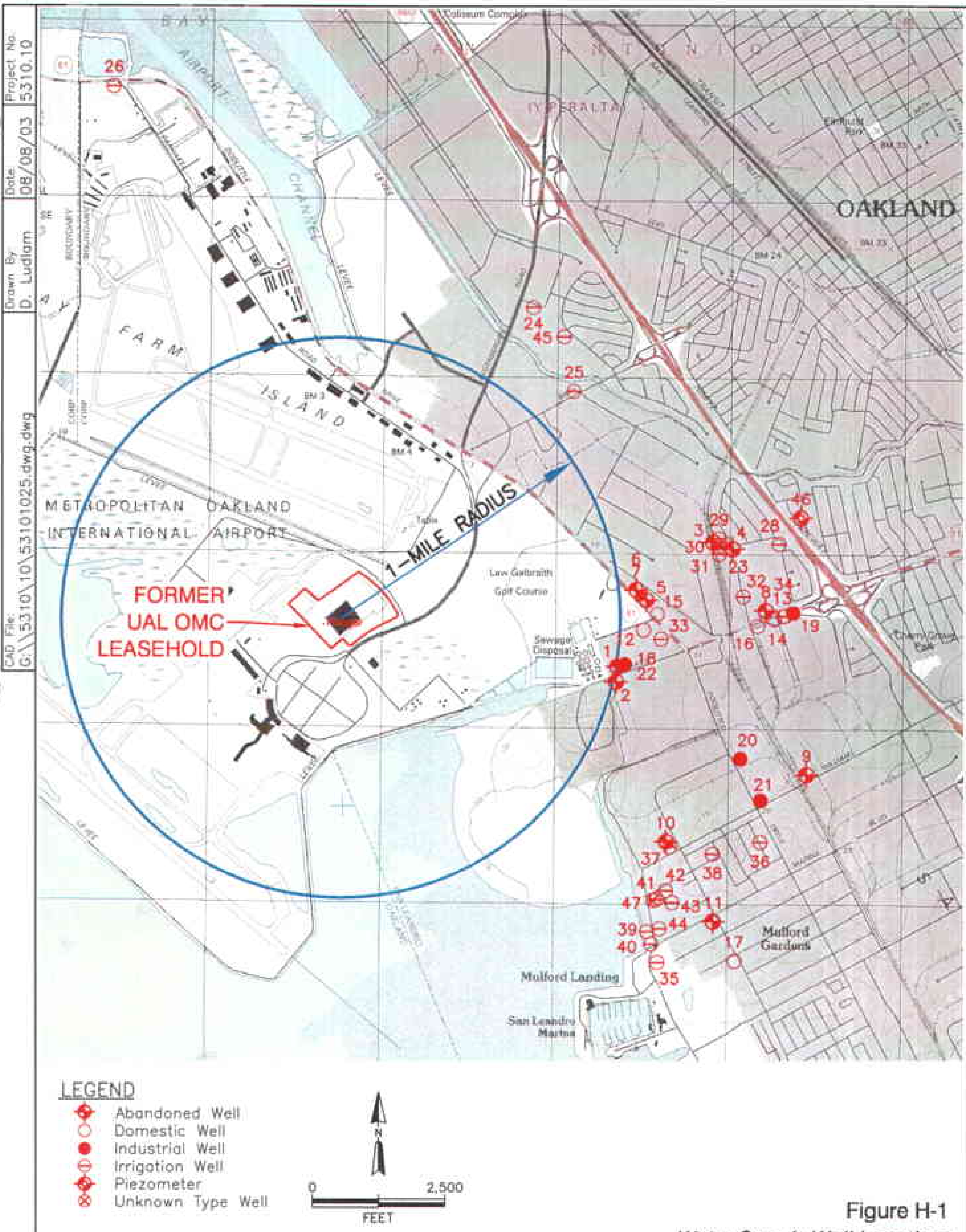


Figure H-1

Water Supply Well Locations

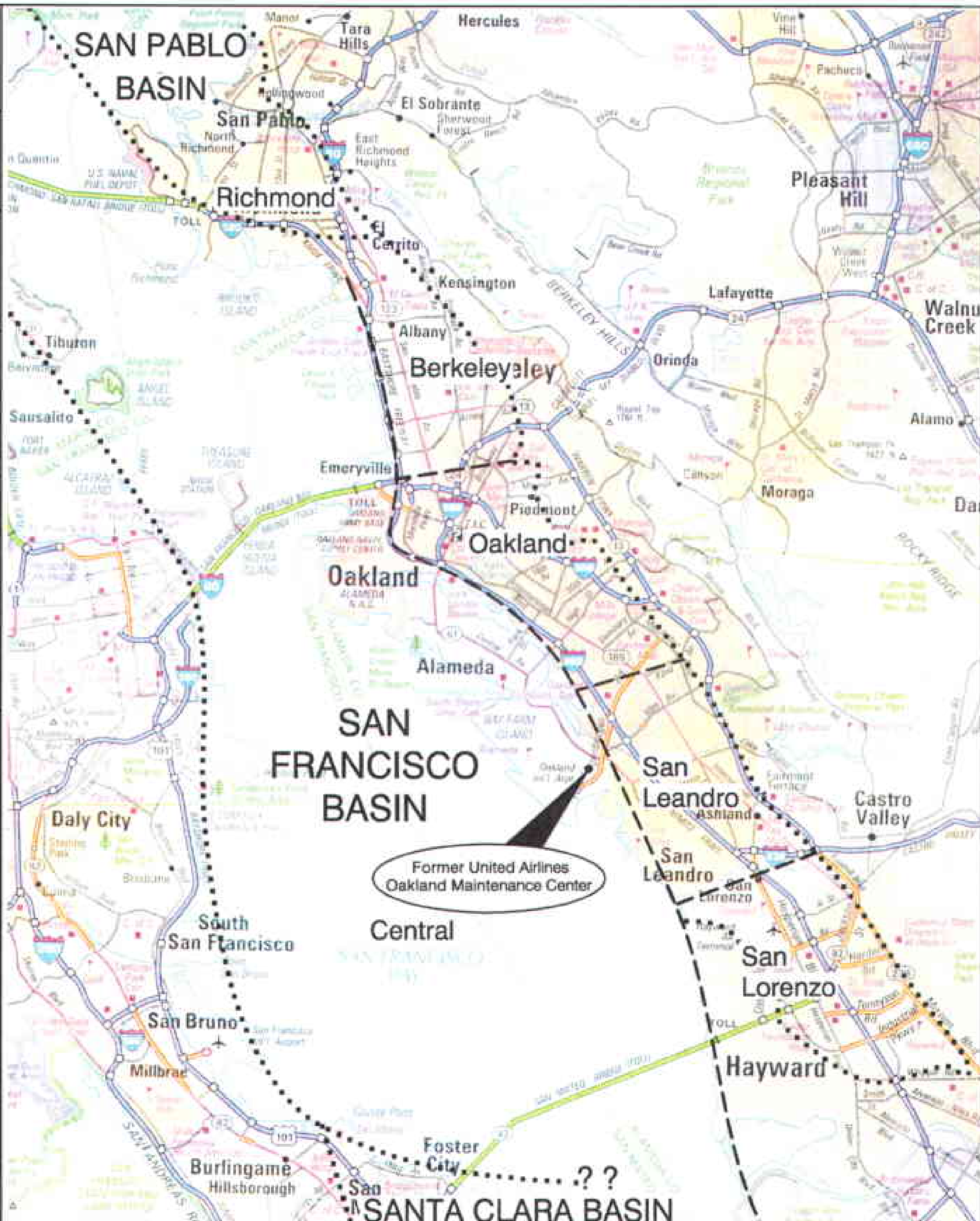
Former United Airlines Oakland Maintenance Center

Oakland International Airport, Oakland, California

References:
TOPO!®Version 2.6.8 (2001)

ERM 07/03

Project No. 5310.10
Date: 08/08/03
Drawn By: R. Olson
CAD File: G:\\5310\10\53101024.dwg



BASIN BOUNDARY

SUB-AREA BOUNDARY

Sources: Rand McNally Road Atlas 1999.
East Bay Plain Groundwater Basin Beneficial Use Evaluation Report, Final Report, May 27, 2003, San Francisco Bay Regional Water Quality Control Board Groundwater Committee.

Figure H-2

East Bay Plain Ground Water Basin Sub-Areas
Former United Airlines Oakland Maintenance Center
Oakland International Airport, Oakland, California

ERM 07/03

Table H-1
Water Supply Well Survey Results
Former United Airlines Oakland Maintenance Center
Oakland International Airport

Map ID	Address	City	Owner	Update	Xcoord	Ycoord	Tsrqq	Drill Date	Elevation	Total Depth (feet)	Well Diameter (inches)	Use
	Abandoned Wells:											
1	2500 DAVIS ST	San Leandro	HOHENER PACKING CO.	8/1/1984	122188160	37715173	2S/3W 33H	/29	0	140	8	Abandoned
2	2615 DAVIS ST	San Leandro	BAY CITY PAPER STOCK CO.	8/1/1984	122188680	37714812	2S/3W 33J	?	0	0	15	Abandoned
3	669 TUDOR CT	San Leandro	ETHLY CORDAWAY	8/1/1984	122183000	37721059	2S/3W 34C	?	0	18	6	Abandoned
4	668 TUDOR CT	San Leandro	SCRIBNER REALTY	8/1/1984	122182800	37721059	2S/3W 34C	?	0	0	0	Abandoned
5	880 DOOLITTLE DR	San Leandro	KAISER AIRCRAFT & ELEC.	8/1/1984	122184945	37718781	2S/3W 34D	?	0	55	6	Abandoned
6	870 DOOLITTLE DR	San Leandro	JOHN JACKLICH	8/1/1984	122184945	37718781	2S/3W 34D	/10	0	38	6	Abandoned
7	870 DOOLITTLE DR	San Leandro	JOHN JACKLICK	8/1/1984	122184945	37718781	2S/3W 34D	5/34	0	120	12	Abandoned
8	1950 DAVIS ST	San Leandro	CHRYSLER CORP.	8/1/1984	122180781	37717444	2S/3W 34F	/39	0	285	10	Abandoned
9	2100 WILLIAMS ST	San Leandro	BETTS SPRING CO.	8/2/1984	122178798	37708542	2S/3W 34P	?	0	0	12	Abandoned
10	1717 AURORA DR	San Leandro	OREN THORKILDSEN	12/12/1984	122185009	37704351	3S/3W 3D	?	0	33	6	Abandoned
11	13205 AURORA DR	San Leandro	DICK WINSETT	8/15/1984	122183644	37702055	3S/3W 3E	?	2	7	0	Abandoned
	Domestic Wells:											
12	2650 EDEN RD	San Leandro	DOROTHY PELKEY	8/1/1984	122189482	37715111	2S/3W 33H	/41	0	54	12	Domestic
13	1889 DAVIS ST	San Leandro	MINNIE MELLO	8/1/1984	122178288	37717893	2S/3W 34C	?	0	0	0	Domestic
14	1887 DAVIS ST	San Leandro	CATHERINE NARANJO	8/1/1984	122178249	37717902	2S/3W 34C	?	0	0	0	Domestic
15	900 DOOLITTLE DR	San Leandro	SPEEDMASTER ENGINEERING	8/1/1984	122184945	37718781	2S/3W 34D	?	0	100	0	Domestic
16	1951 DAVIS ST	San Leandro	MAY CUNHA	8/1/1984	122181739	37716859	2S/3W 34F	/54	0	60	12	Domestic
17	SW COR. AURORA & 134 AV	San Leandro	V. B. HILL	9/24/1984	122185029	37700531	3S/3W 3E	?	0	0	0	Domestic
	Industrial Wells:											
18	2500 DAVIS ST	San Leandro	HOHENER MEAT CO.	8/1/1984	122188160	37715173	2S/3W 33H	4/78	0	173	0	Industrial
19	1883 DAVIS ST	San Leandro	CITY DRAYAGE CO.	8/1/1984	122178171	37717920	2S/3W 34C	/53	0	50	6	Industrial
20	1616 DOOLITTLE	San Leandro	MR. POLADIAN	7/30/1984	122182025	37709732	2S/3W 34P	/52	0	50	0	Industrial
21	2194 WILLIAM ST	San Leandro	INSURED TRANSPORTERS INC	8/2/1984	122180406	37707872	2S/3W 34P	?	0	90	0	Industrial
22	2500 DAVIS ST	San Leandro	HOHENER PACKING CO.	8/1/1984	122188160	37715173	2S/3W 33H	1/57	0	180	0	Industrial
	Irrigation Wells:											
23	692 TUDOR CT	San Leandro	RALPH BECKER	8/1/1984	122182800	37720940	2S/3W 27N	9/77	0	42	8	Irrigation
24	50 HEGENBURGER LOOP	Oakland	W.E. LYONS CONSTRUCTION	8/1/1984	122193938	37733121	2S/3W 28B	Oct-77	0	48	4	Irrigation
25	191 98TH AVE	Oakland	RATTO BROS INC.	12/16/1988	122193113	37728807	2S/3W 28G	Jun-88	0	305	10	Irrigation
26	EARHART & DOOLITTLE	Oakland	OAKLAND AIRPORT	8/1/1984	122218350	37739150	2S/3W 29H	4/42	5	350	12	Irrigation
27	ESTUDILLO	San Leandro	W. PAGANO	8/1/1984	122160900	37685250	2S/3W 31J	/46	28	375	0	Irrigation
28	741 WARDEN AVE	San Leandro	CHARLES TILDEN	8/1/1984	122179812	37721500	2S/3W 34C	/57	0	25	7	Irrigation
29	645 TUDOR CT	San Leandro	SPENCER REYNOLDS	8/1/1984	122183000	37721178	2S/3W 34C	/47	0	32	8	Irrigation
30	667 TUDOR CT	San Leandro	PRESTON GRIFFIN	8/1/1984	122183000	37721066	2S/3W 34C	/53	0	30	6	Irrigation
31	685 TUDOR CT	San Leandro	SAM ANGOTTI	8/1/1984	122183000	37720975	2S/3W 34C	/53	15	35	6	Irrigation
32	BEECHER ST	San Leandro	SIESTA CATERING	8/1/1984	122182050	37718400	2S/3W 34C	6/77	0	150	6	Irrigation
33	989 DOOLITTLE DR	San Leandro	PORT OF OAKLAND	8/1/1984	122184943	37715047	2S/3W 34E	?	0	26	7	Irrigation
34	1855 DAVIS ST	San Leandro	DOLORES TORRES	8/1/1984	122177638	37718043	2S/3W 34F	?	0	26	7	Irrigation
35	13060 NEPTUNE DR	San Leandro	LEO KIELMYR	8/15/1984	122187787	37702323	3S/3W 3E	/48	0	70	6	Irrigation
36	3072 JUNEAU ST	San Leandro	EARL SHAW	9/24/1984	122180491	37704343	3S/3W 3C	8/77	0	25	6	Irrigation
37	2505 WILLIAMS ST	San Leandro	MIKE COX	8/15/1984	122186181	37705347	3S/3W 3D	/55	0	33	5	Irrigation
38	2491 STATE ST	San Leandro	VAL VALENTINE	8/17/1984	122184682	37704477	3S/3W 3D	8/77	0	26	6	Irrigation
39	13145 NEPTUNE DR	San Leandro	J.B. LORD	8/15/1984	122187807	37701552	3S/3W 3E	/50	0	18	4	Irrigation
40	13165 NEPTUNE DR	San Leandro	JAMES THACKER	8/15/1984	122187765	37701377	3S/3W 3E	/55	0	25	6	Irrigation
41	2037 MARINE CT	San Leandro	ALBERS	8/15/1984	122185029	37700531	3S/3W 3E	/53	0	14	6	Irrigation
42	2034 MARINE CT	San Leandro	MERIAM JOHNSON	8/15/1984	122185029	37700531	3S/3W 3E	/57	0	25	4	Irrigation
43	2042 MARINE CT	San Leandro	MCKEE	8/15/1984	122185029	37700531	3S/3W 3E	/56	0	0	5	Irrigation
44	13120 NEPTUNE DR	San Leandro	G. BARRAGAN	8/15/1984	122187661	37701798	3S/3W 3E	/51	0	18	7	Irrigation

Map ID	Address	City	Owner	Update	Xcoord	Ycoord	Tsrqq	Drill Date	Elevation	Total Depth (feet)	Well Diameter (inches)	Use
45	190 TUNIS RD & 98TH AV	Oakland	RATTO BROTHER	7/30/1984	122193938	37729456	2S/3W 28G	Jul-56	10	250	12	Irrigation
	Piezometers:											
46	811 O'DONNELL AV	San Leandro	CATERPILLAR	12/26/1997	122178048	37722297	2S/3W 27P	Dec-96	0	66	1	Piezometer
	Unknown Use:											
47	13000 NEPTUNE DR	San Leandro	GOSSELIN	9/24/1984	122187913	37702848	3S/3W 3E	/49	0	32	0	?
	Exact Location Unknown:											
	OAKLAND AIRPORT	Oakland	PORT OF OAKLAND	8/1/1984	122221258	37729501	2S/3W 29E	27-Dec	0	352	0	Abandoned
	EARHART	Oakland	OAKLAND AIRPORT	8/1/1984	122218350	37739150	2S/3W 29M	?	0	350	0	Abandoned
	DAVIS ST	San Leandro	?	8/1/1984	122192400	37714500	2S/3W 34E	?	13	0	0	Abandoned
	?	San Leandro	J.A. JACKLICH	12/14/1984	122195300	37713650	2S/3W 33A	?	0	138	12	Domestic
	2675 W. 129 AV	San Leandro	BAY AREA GUN CLUB	9/24/1984	122189562	37704382	3S/3W 4A	/25	0	31	8	Domestic
	SAN LEANDRO CITY DUMP	San Leandro	K. PYATT	8/1/1984	122189482	37715111	2S/3W 33H	?	0	117	0	Industrial
	?	San Leandro	KNAPP	8/1/1984	122195300	37713650	2S/3W 31P	/41	22	85	0	Irrigation
	?	San Leandro	TWIN NURSERY	8/1/1984	122195300	37713650	2S/3W 31Q	?	22	325	0	Irrigation
	METRO GOLF LINKS	Oakland	METRO GOLF LINKS (PORT OF OAKLAND)	4/1/2003			2S/3W 33G	8/18/2002	0	634	12	Irrigation
	1111 JACKSON ST	San Leandro	SAN BREED JR.	8/1/1984	122189480	37711641	2S/3W 33J	?	13	118	14	Irrigation
	2524 W. 129 AV	San Leandro	PAIVA	8/15/1984	122185009	37704351	3S/3W 3D	?	0	0	0	Irrigation
	2552 W. 129 AV	San Leandro	G. JONES	8/15/1984	122185009	37704351	3S/3W 3D	?	0	86	7	Irrigation
	2566 W. 129 AV	San Leandro	BURKE	9/24/1984	122185009	37704351	3S/3W 3D	/50	0	30	12	Irrigation

Data obtained from the County of Alameda, Public Works Agency, Water Resources Section.
Tsrqq - Township, section, range

Appendix I
Metals in Soil Evaluation

APPENDIX I - INTRODUCTION

This appendix presents an evaluation of metals detected in soil at the OMC in comparison with background concentrations. Analytical results for soil are discussed by AOC in Section 4.5. Due to the fact that metals are naturally occurring in soil and that the shallow soil at the OMC is composed of imported fill from a number of sources, an evaluation of site-wide metals results was completed. The objective of the evaluation is to establish background concentrations and assess whether detected concentrations at the OMC are related to OMC operations, or are the result of naturally occurring conditions of the fill. In addition, two different analytical methods used for metals analysis are evaluated herein to select the most representative data set.

METALS IN SOIL EVALUATION

During the UAL investigation, eight metals were detected in greater than half of the 124 soil samples analyzed. These metals include arsenic, barium, chromium, cobalt, copper, nickel, vanadium, and zinc. No metals concentrations exceeded industrial PRGs, with the exception of a number of samples containing thallium concentrations in excess of its industrial PRG. These elevated thallium detections are due to iron interference during analysis and, therefore, not representative of site conditions. This is discussed in detail in subsequent paragraphs. Metals that were detected at concentrations exceeding the residential PRGs include arsenic, thallium, cadmium, and copper. Table H-1 presents the high and low detections and averages for the eight commonly detected metals.

For the purposes of establishing background levels of metals at the site, ERM compiled data from nine publicly available studies performed on Bay Area sites, representing over 850 background soil samples. From these studies, a range of typical background values was generated for each metal. These values are considered representative of background conditions in East Bay soil. Table H-1 provides a range of background values derived from the background studies completed throughout the Bay Area. Table H-2 summarizes the data from these studies.

The following subsections discuss each of the frequently detected metals, as well as a discussion of thallium. The less frequently detected metals are not discussed in the section due to their sporadic detections and the lack of concentrations above either residential or industrial PRGs. The background concentrations of these metals are presented in Table H-2. While industrial PRGs are appropriate for the site based on its current and historical usage, most metals at the site are detected at low concentrations that also meet the more conservative residential PRGs. For comparison, both sets of standards are used in the following discussion.

Thallium

Thallium concentrations at the OMC appear to have been artificially detected in soil and ground water samples analyzed by the inductively coupled plasma (ICP) method, as compared to results from graphite furnace (GF) analysis. Thallium was detected in every soil sample above its industrial PRG analyzed by ICP during this investigation, while it was not detected in a single GF sample analyzed by Weiss Associates (Weiss) during their investigation for the Port of Oakland. In addition, seven ground water samples analyzed for thallium by ICP also contained elevated concentrations. To evaluate this apparent discrepancy, a soil sample from W-B-25 at 1 to 2 feet bgs containing thallium at 380 mg/kg by ICP analysis was reanalyzed using GF, with a non-detect result (<0.42 mg/kg). The ground water sample with the highest thallium concentration (0.21 mg/L at ERM-B-2) was reanalyzed by GF and did not contain a detectable concentration of thallium.

ICP analyzes multiple elements at once, producing a rich spectral output with many lines for each element; consequently, spectral interference (particularly sodium, iron, and aluminum) can overlap neighboring peaks. This interference typically obscures the elements arsenic, antimony, selenium, and thallium, resulting in their misquantitation. GF analysis quantifies only one element at a time by using a dedicated lamp to produce a wavelength at which only the subject element's ions will resonate. While more costly and time-consuming, this procedure eliminates the matrix interference characteristic of ICP and produces a more precise quantitation of individual elements, especially those susceptible to interference.

Based on this known matrix interference issue, the sample reanalysis results, the results of samples collected as part of the concurrent Port of Oakland investigation (Weiss), and the lack of thallium use at the site, the elevated ICP results for thallium are considered to be false positives and were not considered in the AOC evaluations. The GF results are considered to be representative of actual thallium concentrations in site soils and ground water. However, since the iron interference is an additive interference, samples analyzed by ICP containing non-detectable concentrations of thallium are considered representative of site conditions.

Arsenic

The OMC area was created by the infilling of coastal wetlands and tidal marshes. Regional fill was obtained from several sources, including hydraulically dredged sand from the floor of San Francisco Bay, rock from quarries in Point Richmond and San Rafael, and topsoil from the Leona Quarry and another nearby source in the vicinity of Lake Temescal (Oakland, 1952). Both topsoil sources were composed of Leona Rhyolite, a Pliocene volcanic component of the Moraga Formation that comprises the western slope of the Oakland/Berkeley Hills. The Leona Rhyolite is known to contain pyrite, an iron sulfide mineral. Pyrite concentrations in the Leona Rhyolite are estimated to be 2 percent by weight (Tatlock and Berkland 1961). Arsenic can be incorporated into pyrite during its mineralization at concentrations ranging from non-detect to 10,000 mg/kg (Springer-Verlag, 1969). A study by the University of California-Berkeley at the Lawrence Berkeley National Laboratories (LBNL) indicated that the Moraga Formation as a whole contained arsenic at a 95 percent upper confidence level of 9.1 mg/kg (LBNL, 1995).

A review of the investigation data indicates that of 92 samples analyzed for arsenic by GF, only two samples have concentrations approaching those determined by ICP. This relationship is further supported by the differences in average arsenic concentrations produced by the two methods: 26 mg/kg for ICP versus 3 mg/kg for GF. Figure H-1 graphically depicts the discrepancy in average values returned by the two methods for seven representative AOCs, while Figure H-2 plots arsenic concentrations by depth for both analytical methods. Specific examples of the elevated arsenic in the samples analyzed by ICP versus those analyzed by GF are illustrated by soil samples collected from AOC 9 and AOC 14. Samples collected from W-B-22 at 2-3′, W-B-32 at 1-2′, and W-B-38 at 2-3′ during the UAL investigation and analyzed by ICP contained concentrations of 22, 22, and 21 mg/kg, respectively. Samples collected from W-B-22 at 0′ and 3′ by Weiss as part of the Port of Oakland investigation contained concentrations of 2.6 mg/kg and not detected (less than 2.5 mg/kg), respectively. Three other samples collected from W-B-32 at depths of 0′, 3′, and 8′ as part of the Port of Oakland investigation had concentrations ranging from non-detect to 4.1 mg/kg. In addition, three samples collected from W-B-38 at depths of 0′, 3′, and 8′ as part of the Port of Oakland investigation did not contain detectable concentrations of arsenic.

The observed correlation among ICP results between elevated thallium and elevated arsenic suggests matrix interference as the likely cause for the elevated arsenic results by ICP. Therefore, the arsenic results for soil samples analyzed by ICP are not considered representative of site conditions and only the soil results generated from GF analyses were used in the evaluations of AOCs provided in Section 4.5. Ground water ICP results for arsenic did not exhibit an iron interference problem and, as discussed above, since the iron interference is additive, these results are considered representative of site ground water conditions.

After eliminating the suspect ICP arsenic results from the soil dataset, the average arsenic concentration drops to 3 mg/kg, with a maximum detection of 32 mg/kg, which is below the industrial PRG for arsenic of 260 mg/kg. Sporadic arsenic detections at concentrations above the residential PRGs are common in the San Francisco Bay area due to the widespread use of fill materials with arsenic. Table H-2 presents background arsenic concentrations from numerous Bay Area sites; as shown on this table, average background arsenic concentrations as high as 31 mg/kg have been observed, while concentrations between 5 and 14 mg/kg are more typical. In general, concentrations detected in samples collected at the OMC fall within the ambient levels observed in East Bay soils, are widespread, and do not exhibit a "hotspot" distribution.

Copper

Copper appears elevated in one portion of the wastewater sump drainage area; soils characterized by sample W-B-12 contained concentrations up to 4,200 mg/kg indicating that soil in this area may have been impacted by industrial wastewater discharges from the sump (AOC 3). Surface soils in this area contain copper concentrations that appear to exceed background concentrations, but are below the industrial PRGs used as screening criteria. Based on the analytical data, it appears that this impact is isolated to the discharge ditch adjacent to the wastewater sump. Therefore, based on the presence of limited impact below the industrial PRG, no additional investigative work was proposed for this occurrence.

Removing the potentially impacted samples from boring W-B-12 from the dataset, the average copper concentration becomes 12.5 mg/kg. Copper detections are therefore within the range of background values determined for East Bay sites (Table H-2) with the exception of two sporadic outlier detections of 150 and 160 mg/kg (W-B-28 at 0 feet and W-B-8 at 0 feet, respectively). Although these concentrations are elevated compared to the average copper concentrations at the OMC and may be due to site operations, the detected concentrations are well below the residential and industrial PRGs.

Cadmium

Cadmium also appears to be slightly elevated in the sample collected from W-B-12 at 0.5 feet bgs near the wastewater sump drainage area of AOC 3. The cadmium concentration in this sample (44 mg/kg) exceeds the residential PRG of 37 mg/kg but is well below the industrial PRG of 450 mg/kg. Similar to the distribution pattern observed for copper, this cadmium impact appears to be limited to the discharge ditch adjacent to the wastewater sump. Therefore, based on the presence of limited impact below the industrial PRG, no additional investigative work was proposed for this occurrence. Removing this potentially impacted boring from the dataset, the average cadmium concentration is 1.1 mg/kg, with low and high values of <0.5 to 14 mg/kg. Remaining cadmium values all fall below the residential and industrial PRGs, and the majority of results lie within the observed background values shown in Table H-2.

Barium

Barium was detected in 123 of 124 soil samples. Analytical results ranged from non-detect (<0.5 mg/kg) to 150 mg/kg, with a mean of 43.7 mg/kg. All results are below the residential and industrial PRGs, and are within the range of background values observed in East Bay soils.

Chromium

Chromium is a common constituent in Bay Area soils due to the presence of chromite ($FeCr_2O_4$) associated with serpentinite bodies in the Franciscan Formation (Davis, 1966). Chromium was detected in all 124 soil samples at concentrations ranging from 2.8 to 190 mg/kg. The average value was 29.3 mg/kg. The distribution of chromium in OMC soils appears to be random with no relation to site operations. All concentrations are below the residential and industrial PRGs, and the majority are within the range of background concentrations typical of East Bay soils.

Cobalt

Cobalt was detected in 105 of 124 soil samples at concentrations ranging from 2.5 to 12 mg/kg, with a mean of 4.2 mg/kg. All results are below residential and industrial PRGs, and are within the range of background values observed in East Bay soils.

Nickel

As with chromium described above, nickel is a common constituent in Bay Area soils due to the presence of ultramafic rocks within the Franciscan Formation (Davis, 1966). The ultramafic rocks include serpentinite, which can contain appreciable amounts of nickel either substituted for magnesium in serpentine or as an accessory mineral (pentlandite, an iron-nickel sulfide). Nickel was detected in all 124 soil samples analyzed at concentrations ranging from 14 to 340 mg/kg and an average of 32 mg/kg. All of the detected concentrations are below the residential and industrial PRGs. With the exception of the 340 mg/kg concentration detected in sample W-B-12 adjacent to the wastewater sump in AOC 3, all nickel values are consistent with Bay Area background levels.

Vanadium

Vanadium was detected in all soil samples analyzed. All concentrations were below the residential and industrial PRGs; concentrations were observed between 7.6 to 54 mg/kg with an average value of 16.3 mg/kg. These levels are similar to typical background values for the East Bay soil.

Zinc

Zinc was observed in 120 out of 124 soil samples, with an average concentration of 30.4 mg/kg. All values were below the residential and industrial PRGs, with a minimum and maximum detection of 8.6 and 190 mg/kg, respectively. These values are consistent with ambient zinc levels in East Bay soil.

Background Metals Summary

The background metals information provided in this section indicates that the metals concentrations detected in samples collected during the investigation, with noted exceptions, are within background levels for typical Bay Area soils. This conclusion is consistent with the use of fill obtained from various locations for the in-filling of the OMC property. The potential exceptions to background concentrations include:

- Copper, cadmium, and nickel in samples collected from W-B-12; and
- Copper in surface samples collected from W-B-8 and W-B-28.

These exceptions are addressed in the risk assessment presented in Section 5.

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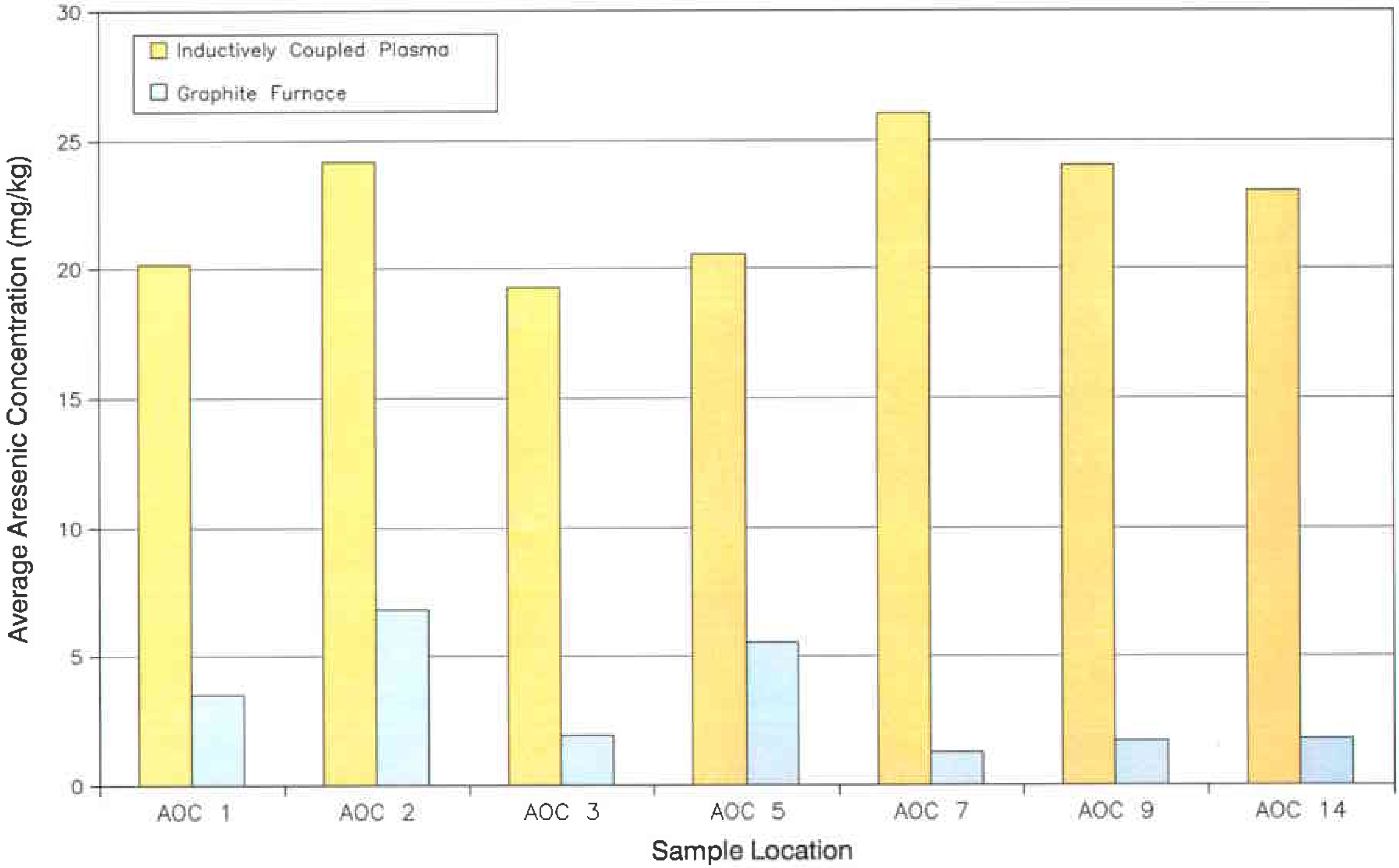

Figure I-1

Comparison of Average Arsenic Values by Analytical Method
Former United Airlines Oakland Maintenance Center
Oakland, California

ERM 07/03

CAD File:	Drawn By:	Date:	Project No.
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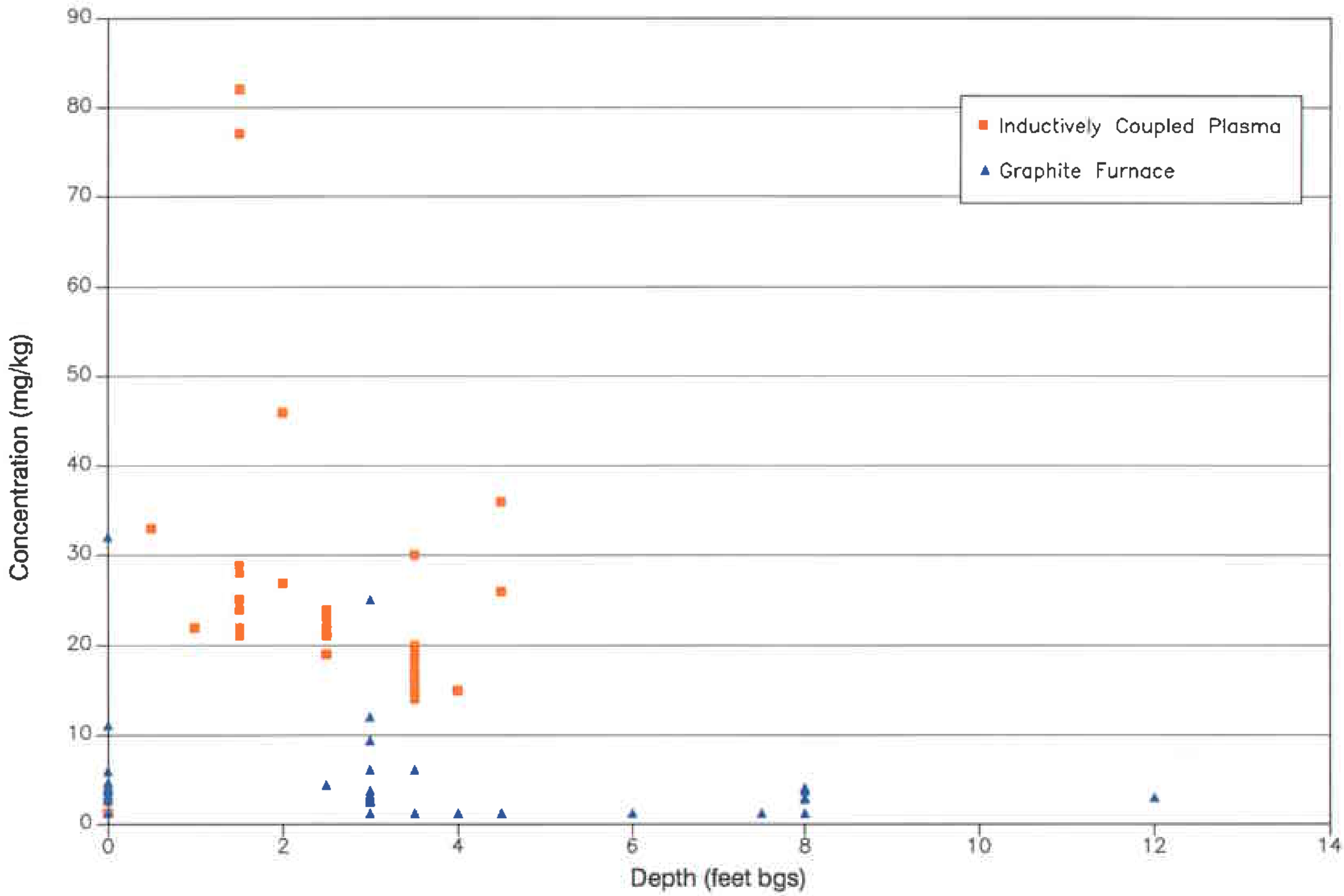

Figure I-2

Comparison of Arsenic Detections vs. Depth by Analytical Method
Former United Airlines Oakland Maintenance Center
Oakland, California

ERM 07/03

Table I-1
Comparison of Concentrations of Commonly Detected Metals to Background Ranges
Former United Airlines Oakland Maintenance Center
Oakland International Airport

Metal	Low (mg/kg)	High (mg/kg)	Mean (mg/kg)	Background Range[1] (mg/kg)
Arsenic (Total)	< 2.5	82	15.1	1.2 - 31
Arsenic (ICP)	14	82	22	1.2 - 31
Arsenic (GF)	<2.5	32	5.6	1.2 - 31
Barium	< 0.5	150	44	40.6 - 411
Cadmium	< 0.5	44	5.2	0.27 - 3.3
Chromium	2.8	190	29.3	10 - 142
Cobalt	2.5	12	5	6.5 - 25.5
Copper	2.3	4,200	56.6	5.4 - 99.7
Nickel	14	340	31.9	16 - 144
Thallium (Total)	< 2.5	380	26.2	<0.25 - 42.5
Thallium (ICP)	50	380	101.1	<0.25 - 42.5
Thallium (GF)	<0.25	<0.25	NA	<0.25 - 42.5
Vanadium	7.6	54	16.3	22.2 - 90.1
Zinc	8.6	190	31.5	32.9 - 281

Notes:
[1]Refer to Table 5 for study details.
mg/kg - milligrams per kilogram
ICP – Inductively Coupled Plasma method
GF – Graphite Furnace method

Table I-2
Comparison of Background Concentrations of Metals in Bay Area Soils
Former United Airlines Oakland Maintenance Center
Oakland International Airport

Study	Number of Samples	Formation	Calculation	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
LBNL, 1995	498	--	95% UCL	5.5	19.1	323.6	1.0	2.7	99.6	22.2	69.4	16.1	0.4	7.4	119.8	5.6	1.8	27.1	74.3	106.1
	97	Colluvium & Fill	95% UCL	5.9	14	358.8	0.9	1.5	91.4	22	59.6	14.5	0.3	3.2	120.2	5.6	1.7	42.5	78.2	91.5
	97	Great Valley Group	95% UCL	6.3	31	248.5	1.0	3.2	59	25.5	99.7	21.5	0.6	3.8	69.7	4.8	2.2	8.7	69.3	135.9
	101	Moraga Formation	95% UCL	6.1	9.3	154.1	0.8	2.6	142.2	23.1	54.1	8.9	0.3	3.8	100.4	4.7	2.0	38.9	90.1	84.7
	184	Orinda Formation	95% UCL	5.2	17.8	411.2	1.1	3.3	95.2	20.6	66.9	14.8	0.3	11.4	144.3	7.0	1.9	19.8	69.3	98.3
	13	San Pablo Group	95% UCL	7.1	15.7	280	0.8	2.9	78.6	22	40.9	10.3	0.4	3.7	125.9	4.9	1.5	10.9	36.2	97.7
BMWC, 1994	< 150	Fill	Geometric mean	1.98	4.32	40.6	0.29	0.43	16.32	6.45	5.44	4.79	0.07	0.76	42.85	1.36	0.35	--	22.19	32.90
		Fill	Geometric std. dev.	1.74	1.83	1.62	1.47	2.05	9.38	1.71	6.62	2.93	1.76	1.98	1.50	2.93	1.57	--	1.54	1.54
Scott, 1991	~150	Alluvium	Arithmetic mean	--	2.86	--	0.88	--	51.28	--	35.63	11.43	--	--	73.53	--	--	--	--	65.27
			Std. dev.	--	2.61	--	0.55	--	20.77	--	11.85	4.66	--	--	27.15	--	--	--	--	17.55
MLH, 1991	--	Off-Site Background	Arithmetic mean	--	8.3	--	--	1.0	10.0	--	22	32.4	0.14	--	16	--	--	--	--	65
	23	(2 Rounds)		--	< 4.1	--	--	< 0.9	16.4	--	7.2	61	< 0.11	--	18	--	--	--	--	67.2
D&M, 1989a	4	Upgradient	Arithmetic mean	--	5.15	115	--	--	42.5	10	17.5	13.3	0.5	--	42.5	--	--	--	35	37.5
D&M, 1989b	26	Upgradient	Arithmetic mean	--	1.9	127.3	--	--	44.6	11.5	17.7	< 10	0.2	--	45.4	--	--	--	36.2	41.9
SECD, 1992	5	Clay / Loam	Arithmetic mean	2.5	8.48	228	0.5	0.83	72.6	9.53	37	65	0.14	1.74	43	< 0.25	< 0.25	< 0.25	46.9	281.6
PRC, 1996	20	Fill	95% UCL	1.5	8.4	145	0.72	0.27	95	16	72	59	0.6	0.33	96	--	0.2	--	70	152
Author Unknown	10	Background Soil	Arithmetic mean	--	1.2	125	0.35	--	33.4	8.8	22.7	7.4	--	--	22.5	--	--	--	27.8	39.9
			Std. dev.	--	1.8	145	0.17	--	6.5	3.1	16.7	2.1	--	--	15.7	--	--	--	6.3	16.4
Background Range	--	--	--	1.5 - 7.1	1.2 - 31	41 - 411	0.29 - 1.1	0.27 - 3.3	10 - 142	6.5 - 25.5	5.4 - 100	4.8 - 65	0.07 - 0.6	0.33 - 11.4	16 - 144	<0.25 - 7	0.2 - 2.2	<0.25 - 42.5	22 - 90	33 - 282

References:

LBNL = Lawrence Berkeley National Laboratory, University of California, Environmental Restoration Program. *Protocol for Determining Background Concentrations of Metals in Soil at Lawrence Berkeley National Laboratory.* August 1995.

BMWC = Burns and McDonnell Waste Consultants, Inc. *San Francisco International Airport Background Metals Concentrations in Soil.* December 1994.

Scott = Scott, Christina Marie. *Background Metals Concentrations in Northern Santa Clara County, California. Master's Thesis, University of San Francisco.* December 1991.

MLH = McLaren-Hart. *Remedial Investigation Report - Hercules Properties, Inc., Hercules, California.* 15 March 1991.

D&M = Dames and Moore, Inc. *Report - Phase II Remedial Investigation, 750 139th Avenue Site, San Leandro, California.* 13 October 1989.

D&M = Dames and Moore, Inc. *Report - Phase II Remedial Investigation, 1455 Factor Avenue Site, San Leandro, California.* 3 August 1989.

SECD = SEC Donahue Environment and Infrastructure. *Sitewide Remedial Investigation, Pacific States Steel Corporation, Union City, California.* 3 December 1992.

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Author Unknown. *Results of Chemical Testing on Background Soil Samples, Area 2 Investigation Completion Report, Roberts Landing Development Site, San Leandro, California.* 1994