PORT OF OAKLAND

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June 17, 2002

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Mr. Barney Chan
Alameda County Health Care Services Agency (HCSA)
Environmental Protection Division
1131 Harbor Bay Parkway, #250
Alameda, CA 94502-6577

SUBJECT: Site Closure Summary - Former USTs: MF08/09/10
South Field, Oakland International Airport, Oakland, CA 94621

Dear Mr. Chan:

Enclosed is a copy of the Weiss Associates report entitled "***Site Closure Summary for South Airport Self-Fueling Facility***", dated June 13, 2002. This report has been prepared in response to Alameda County HCSA and Regional Water Quality Control Board objectives for obtaining regulatory case closure.

Should you have any questions or need additional information, please contact me at 627-1118. Thank you for your on-going assistance and support on this project.

Sincerely,

Dale H. Klettke, CHMM
Associate Environmental Scientist
Environmental Health & Safety Compliance

enclosure

c: (w/encl): Chuck Headlee, RWQCB
c: (w/o encl.): Jeff Jones - EH & SC Files
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SITE CLOSURE SUMMARY

for

South Airport Self-Fueling Facility
Metropolitan Oakland International Airport

prepared for

Port of Oakland
530 Water Street
Oakland, CA 94607

June 13, 2002

Weiss Associates *Environmental Science, Engineering and Management*

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SITE CLOSURE SUMMARY

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South Airport Self-Fueling Facility
Metropolitan Oakland International Airport

prepared by

Weiss Associates
5801 Christie Avenue, Suite 600
Emeryville, CA 94608

Weiss Project No. 259-1541-7

L. Maile Smith
Project Manager

Weiss Associates work for the Port of Oakland was conducted under my supervision. To the best of my knowledge, the data contained herein are true and accurate and satisfy the scope of work prescribed by the client for this project. The data, findings, recommendations, specifications or professional opinions were prepared solely for the use of the Port of Oakland in accordance with generally accepted professional engineering and geologic practice. The Summary contained in this report serves as a complement to the entire report and should not be treated as a stand-alone document. The reader is referred to the detailed information provided within this report for additional data not contained in the Summary. We make no other warranty, either expressed or implied, and are not responsible for the interpretation by others of the contents herein.

Mary Stallard 6/13/02

Mary Stallard Date
Certified Engineering Geologist
No. EG1704

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SUMMARY

This Site Closure Summary has been prepared on behalf of the Port of Oakland (the Port) for the former South Airport Self-Fueling Facility (the Site) at the Metropolitan Oakland International Airport (MOIA). This report supplements the Site Underground Storage Tank (UST) Closure Report, submitted to Alameda County Environmental Health Services (ACEHS) in June 1999 (HLA, 1999a). This document summarizes all environmental investigations at the Site to date, and assesses the potential risks at the Site based on a comparison of soil and groundwater data to applicable risk-based screening levels (RBSLs) developed by the San Francisco Bay Regional Water Quality Control Board (RWQCB, 2001).

The former South Airport Self-Fueling Facility covers approximately one acre near Taxiway U at the MOIA. There were three former USTs at the Site: two USTs located in a common cavity (MF09 and MF10) each held 1,000 gallons of diesel fuel, and the third UST (MF08) held 5,000 gallons of gasoline. No releases were known or discovered during operation of the tanks, and no apparent causes or locations of fuel releases were noted in the UST Closure Report or Closure Plan (HLA, 1999a). All three USTs and ancillary piping were emptied of their contents, rendered inert, and removed from the Site between April 21 and 26, 1999.

During removal activities, groundwater and soil was sampled and analyzed for total petroleum hydrocarbons as diesel (TPH-D), total petroleum hydrocarbons as gasoline (TPH-G), benzene, toluene, ethylbenzene, total xylenes (BTEX), and methyl tertiary butyl ether (MTBE). All of these contaminants of concern (COCs) were detected in one or more samples. Additional soil and groundwater samples were collected and analyzed for the same COCs in August 1999. In April 2000, four monitoring wells were installed, and between May 2000 and April 2002, groundwater from the four wells was sampled and analyzed five times.

This document evaluates the potential risks associated with the remaining COCs at the Site by comparing data to RBSLs. Four exposure pathways for soil were considered: direct contact by construction worker, indoor air inhalation, nuisance odors, and impact to aquatic life resulting from leaching, migration, and transport to surface waters. Three exposure pathways were considered for groundwater: aquatic life exposure, indoor air inhalation, and nuisance odors.

Based on comparison of soil data to RBSLs, a small area adjacent to the MF08 excavation contained xylenes at concentrations above the construction worker/trench worker and indoor air RBSLs, and benzene at concentrations above the indoor air RBSL. This area and a small area adjacent to the MF09/MF10 excavation contained TPH-D, TPH-G, and/or xylenes concentrations exceeding the nuisance level RBSLs. Five soil samples (four from the UST excavations and a fifth from a nearby soil boring) exceeded the soil leaching/groundwater protection RBSL for TPH-D and/or TPH-G. However, groundwater geochemical data indicate that this impact has not occurred. Based on these results, soil at the Site does not present a significant risk to human health or the environment.

Groundwater geochemical data and elevation measurements show that no groundwater RBSLs have been exceeded in any of the four monitoring wells, and that the monitoring wells adequately define groundwater flow direction and potential COC impact areas. Only xylenes in one and MTBE in two of the eight grab groundwater samples exceeded RBSLs (for surface water protection and nuisance concerns, respectively). Based on all Site data, groundwater at the Site does not present a risk to human health or the environment, nor is it expected to in the future.

According to RWQCB's *Supplemental Instructions to State Water Board December 18, 1995 Interim Guidance* regarding required cleanup at low-risk fuel sites (RWQCB, 1996), the Site is considered "low risk" based on the analysis of all Site data and the following criteria:

- The Site has been adequately characterized;
- The leak and ongoing sources have been removed or adequately remediated;
- The dissolved hydrocarbon plume is not migrating (i.e. there is no groundwater plume);
- No water wells, deeper drinking water aquifers, surface water, or other sensitive receptors are likely to be impacted;
- The Site presents no significant risk to human health; and,
- The Site presents no significant risk to the environment.

Accordingly, the Port provides this additional Site characterization data and risk screening evaluation—on which the above conclusions are based—to the ACEHS and RWQCB for their consideration towards approval of Site closure. Additionally, because ongoing groundwater monitoring at the Site is not warranted, the four Site monitoring wells should be properly abandoned.

1 INTRODUCTION

This Site Closure Summary has been prepared on behalf of the Port of Oakland (the Port) for the former South Airport Self-Fueling Facility (the Site) at the Metropolitan Oakland International Airport (MOIA) (Figures 1 and 2). This report and information contained herein supplements the Site Underground Storage Tank (UST) Closure Report, submitted to Alameda County Environmental Health Services (ACEHS) in June 1999 (HLA, 1999a).

In their letter dated August 16, 2001, ACEHS requested additional Site characterization data prior to approving Site closure (ACEHS, 2001). Representatives from ACEHS, the Port, Weiss Associates (Weiss), and the San Francisco Bay Region of the California Regional Water Quality Control Board (RWQCB) met on September 20, 2001, to discuss and more specifically define what types of additional data and analysis were appropriate and necessary before Site closure could be granted. As agreed during the meeting, the Port would:

- Summarize the previous environmental investigations at the Site (Section 2);
- Conduct one additional groundwater sampling event at the Site, and analyze the samples for constituents of concern (COCs) (Section 3 and Appendix A);
- Compare the most recent soil and groundwater data to applicable risk-based screening levels (RBSLs) developed by the RWQCB (RWQCB, 2001) (Section 4); and,
- Provide the additional Site characterization information listed above (i.e. this document) to the ACEHS and RWQCB for their consideration towards approval of Site closure.

1.1 Site Use History

The former South Airport Self-Fueling Facility—now occupied by a heli-pad—covers approximately one acre near Taxiway U at the MOIA (Figure 2). Three USTs were installed (probably in 1985) in order to store fuel for Port and tenant-owned vehicles. Two USTs located in a common cavity (MF09 and MF10) each held 1,000 gallons of diesel fuel. The third UST (MF08) held 5,000 gallons of gasoline. All three tanks were constructed of single-wall steel and coated with tar, and were buried approximately three feet below ground surface (ft bgs). The tanks were pressure tested for leaks periodically, most recently in 1996, and were subject to an ongoing statistical inventory reconciliation, whereupon daily volume measurements in each tank were compared to volumes added during refilling. No releases were known or discovered during operation of the tanks, and no apparent causes or locations of fuel releases are noted in the UST Closure Report or Closure Plan (HLA, 1999a).

1.1.1 UST Removal

As mentioned above, a UST Closure Report was prepared in 1999 (HLA, 1999a). Included in the report were copies of the following documents submitted to and approved by the City of Oakland Fire Prevention Bureau:

1. An Application for Underground Tank Removal;
2. A UST Closure Plan;
3. An Application for Permit to Install, Remove, or Repair Tanks; and,
4. A Permit to Excavate and Remove Inflammable Liquid Tanks.

All three USTs and ancillary piping were emptied of their contents (approximately 411 gallons of residual fuels), rendered inert, and removed from the Site between April 21 and 26, 1999. No holes were observed in any of the three USTs. The UST Closure Report (HLA, 1999a) states that a thin layer of discolored soil was observed along the perimeter of the MF08 tank excavation and on the southwest sidewall of the MF09 excavation. The stained soil from the MF08 excavation was excavated and stockpiled onsite for later disposal.

Prior to removing the tanks, groundwater was sampled from each excavation pit and analyzed for total petroleum hydrocarbons as diesel (TPH-D), total petroleum hydrocarbons as gasoline (TPH-G), benzene, toluene, ethylbenzene, total xylenes (BTEX), and methyl tertiary butyl ether (MTBE). Following removal activities, groundwater and sidewall soil in each excavation were sampled and analyzed for this same list of analytes. It is significant to note that the impacted soil horizon and corresponding shallow soil samples in the UST excavations were collected from what appears to be the capillary fringe and not the vadose zone. Results of groundwater and soil analyses conducted as part of the UST removal are discussed further in Section 2.1.

Approximately 67 tons of fill material and stained soil were removed, stockpiled onsite, sampled, analyzed for COCs (listed above), and eventually disposed at an offsite landfill. Between the two groundwater sampling events, over 4,000 gallons of groundwater were pumped from the excavations and hauled offsite for disposal (HLA, 1999a). On April 30, 1999, the excavations were lined with geotextile fabric, and filled with clean pea gravel to 3 ft bgs and aggregate base to ground surface.

1.2 Local and Regional Hydrogeology

Regional geologic formations in the Site vicinity include the Merritt Sand and Young Bay Mud. Boring logs from the 2000 monitoring well installations indicate that light brown, poorly graded sand extends from the surface to approximately 5 ft bgs (HLA, 2000). Although not noted on the monitoring well boring logs, approximately 1 ft to 1.5 ft of asphalt, base rock, or fill material overlying the poorly graded sand was observed during the August 1999 subsurface investigation (HLA, 1999b). Around 5 ft bgs, the sand color changes to gray, and trace amounts of clay and shell fragments are observed. At approximately 8.5 ft bgs, sand color changes back to the same light brown observed near the surface. All monitoring well borings were terminated at 10 ft bgs.

It was noted during tank removal activities that the groundwater level in the excavation pits fluctuated up to a foot in elevation during the day (3.4 ft to 4.6 ft bgs). During a subsurface investigation in 1999 (Section 2.2), groundwater was encountered at approximately 5.5 ft to 6 ft bgs (HLA, 1999b). Shallow groundwater was reportedly encountered at 3.25 ft to 4.25 ft bgs after the four monitoring wells were installed (HLA, 2000). Historical groundwater elevations range from approximately 1.5 ft to 3.5 ft above mean sea level (msl), and flow is generally toward the southeast. A [redacted] is located approximately 300 ft southeast, and San Francisco Bay is located about 1,200 ft due east of monitoring well MW-1 (Figure 2).

Shallow groundwater in the Site vicinity is not considered a potential drinking water source based on its conductivity and proximity to the bay. Conductivity measurements as high as 5,750 microSiemens per centimeter (µS/cm) have been measured in groundwater from the Site, exceeding the 5,000 µS/cm limit for potential drinking water specified in State Water Resources Control Board (SWRCB) Resolution 88-63, Sources of Drinking Water Policy. In addition, pumping groundwater from this Site could result in saltwater intrusion issues because of its proximity to the bay.

2 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

Three environmental investigations have been conducted at the Site. Two investigations were conducted in 1999 (HLA, 1999a; HLA, 1999b), and a quarterly monitoring program was conducted from May 2000 through February 2001 (HLA, 2001). The extent and locations of soil and groundwater samples collected during these investigations are summarized below and on Figures 3 and 4 (respectively). COCs detected in soil and groundwater are also summarized on Figures 3 and 4, as well as Tables 1 and 2. The reader is directed to the original reports for a complete review of the rationale, methods, and results of the respective studies.

2.1 Harding Lawson Associates – April 1999

In April 1999, Harding Lawson Associates (HLA) oversaw the removal of the three USTs and sampled soil from the sidewalls of the excavation pits. Groundwater was also sampled and analyzed from each excavation, both prior to tank removal and after removing the tanks and purging approximately 4,000 gallons of water from the two excavation pits. Eight soil samples and four groundwater samples were collected and analyzed for TPH-D, TPH-G, BTEX, and MTBE. Additionally, two composite samples were collected from the stockpiled soil from the two excavations (the two diesel USTs were in a common cavity) and were analyzed for COCs and lead. The objective of this sampling event was to identify possible contaminants associated with the USTs and to characterize the extent of contamination, if any, in the soil and groundwater around the perimeters of the USTs (HLA, 1999a).

Results of soil samples taken at about 3.5 ft bgs from the sidewalls of the gasoline UST excavation ("T1" samples) show TPH-D and TPH-G concentrations of up to 6,200 mg/kg (sample T1-D) and 4,300 mg/kg (sample T1-C), respectively. Concentrations of BTEX constituents were highest in sample T1-C, which contained 1.4 mg/kg benzene, 87 mg/kg toluene, 65 mg/kg ethylbenzene, and 540 mg/kg of xylenes. MTBE was only identified in sample T1-D, at 5.5 mg/kg (Table 1).

Results of soil samples taken at about 3.5 ft bgs from the sidewalls of the diesel UST excavation ("T2" and "T3" samples) show sample T2-A had the highest TPH-D and TPH-G concentrations; 39,000 milligrams per kilogram (mg/kg) and 3,000 mg/kg, respectively. Samples T2-A and T2-B contained low concentrations of toluene (1.2 mg/kg to 1.5 mg/kg), ethylbenzene (2.3 mg/kg to 3.4 mg/kg), and xylenes (20 mg/kg to 38 mg/kg). No benzene or MTBE was detected above method detection limits (MDLs) in any sample from the diesel UST excavation. The only COC detected in sample T3-A was TPH-D at 3.9 mg/kg, and no analytes were detected at or above MDLs in sample T3-B (Table 1).

Soil sampled from the excavation stockpiles (samples 101 and 102) contained 110 mg/kg to 560 mg/kg TPH-D, 17 mg/kg to 41 mg/kg TPH-G, 0.025 mg/kg to 0.039 mg/kg toluene, 0.410

mg/kg ethylbenzene, 0.036 mg/kg xylenes, and 0.10 mg/kg to 10 mg/kg lead (Table 1). All excavated soil was transported offsite and disposed at the Altamont Landfill as Class II waste (HLA, 1999a).

Groundwater samples taken from the gasoline UST excavation (Gas Pit) yielded concentrations of up to 18,000 micrograms per liter (µg/L or parts per billion [ppb]) of TPH-D and 380,000 µg/L of TPH-G. The maximum concentrations of benzene, toluene, ethylbenzene, and xylenes were 1,500 µg/L, 11,000 µg/L, 37,000 µg/L, and 8,900 µg/L (respectively). MTBE was detected at a maximum concentration of 2,[illegible] µg/L (Table 2).

Groundwater samples taken from the diesel UST excavation pit yielded concentrations of up to 51,000 µg/L of TPH-D and 120,000 µg/L of TPH-G. Low levels of toluene (5.4 µg/L), ethylbenzene (97 µg/L), and xylenes (1.9 µg/L) were detected in groundwater from the diesel UST excavation, but neither benzene nor MTBE was detected at or above MDLs (Table 2).

2.2 Harding Lawson Associates – August 1999

In August 1999, HLA drilled eight borings to 8 ft bgs and collected one soil sample and one groundwater sample from each (Figures 3 and 4). Soil sample depths ranged from 5.5 ft to 6.0 ft bgs. Groundwater samples were recovered via bailers lowered into polyvinylchloride (PVC) casings set in the open boreholes. All samples were analyzed for TPH-D, TPH-G, BTEX, and MTBE. One soil sample (SB-4) was analyzed for polynuclear aromatic hydrocarbons (PAHs), although the laboratory missed the holding time for the sample. Groundwater samples were also analyzed for natural attenuation parameters. The purpose of the investigation was to supplement the previous investigation results, to ascertain the lateral extent of product dispersion at the Site, to collect samples from areas not previously investigated (including areas adjacent to former UST dispensers and piping) and to evaluate the Site's candidacy for remediation by monitored natural attenuation (MNA). Analytic results are summarized below, on Figures 3 and 4, and in Tables 1 through 3 (HLA, 1999b).

TPH-D was detected in soil from boring SB-1 at a concentration of 8.7 mg/kg, and in soil from SB-4 at 680 mg/kg. TPH-G, MTBE, and xylenes were only detected in boring SB-4 at 4.8 mg/kg, 0.043 mg/kg, and 0.036 mg/kg (respectively). No other analytes were detected in soil from boreholes SB-1 through SB-8 at or above MDLs (Table 1). The soil sample from boring SB-4 also yielded detections of several PAHs ranging from 0.30 mg/kg to 8.8 mg/kg, however, the sample was analyzed past its hold time (HLA, 1999b).

TPH-D was detected in groundwater from borings SB-2, SB-4, and SB-8 at concentrations of 80 µg/L, 380 µg/L, and 72 µg/L (respectively). TPH-G was detected in groundwater from borings SB-1, SB-2, and SB-8, at concentrations of 59 µg/L, 300 µg/L, and 33 µg/L (respectively). MTBE was detected in groundwater from four borings, with the highest concentration in boring SB-4 (1,500 µg/L). Benzene and ethylbenzene were only detected in groundwater sampled from boring SB-2 (63 µg/L and 43 µg/L, respectively). Xylenes were detected in groundwater from SB-1 (3.5 µg/L) and SB-4 (440 µg/L). Groundwater from boring SB-4 also contained benzene compounds 1,3,5-

trimethylbenzene (1,3,5-TMB) and 1,2,4-TMB, at 75 µg/L and 150 µg/L (respectively). No other analytes were detected at or above MDLs (Table 2).

The natural attenuation results for groundwater from these borings indicated dissolved oxygen concentrations generally greater than one mg/L, ranging from 0.8 mg/L to 5.0 mg/L (Table 3). These values are within the range considered favorable for aerobic biodegradation (Mobil, 1995). As discussed in Section 2.3, several other natural attenuation parameters measured in groundwater from these borings suggested increased aerobic biodegradation in this near-source area as compared to the more distal areas monitored by the wells.

2.3 Harding ESE – 2000-2001

In April 2000, HLA installed four groundwater monitoring wells at the Site (HLA, 2000). During installation activities, a soil sample was collected from each borehole at the approximate depth of the water table, and analyzed for COCs and lead. A quarterly groundwater monitoring program was initiated in May 2000 and continued through February 2001. Groundwater elevations were measured and samples were collected each quarter and analyzed for TPH-D, TPH-G, BTEX, MTBE, and natural attenuation parameters (HLA, 2001). This investigation was conducted in order to monitor the trend of groundwater chemistry and elevations over the course of a year. Analytic results are summarized on Figure 4 and in Tables 2 and 3. Groundwater elevations are shown on Figures 5 through 8. Groundwater elevation data and well construction details are summarized in Table 4 (HLA; 2000, 2001).

The only COC detected in soil from the monitoring well borings was TPH-D at 1.2 mg/kg in soil from MW-1. Lead was detected in three of the four soil samples, at values ranging from 1.0 mg/kg to 3.2 mg/kg. No other analytes were detected above MDLs (Table 1).

Over the course of the monitoring program, TPH-D was detected in groundwater sampled from all four wells. Detected concentrations ranged from 51 µg/L (MW-2 in May 2000) to 210 µg/L (MW-4 in May 2000). TPH-G was not detected in any of the groundwater samples collected during the year-long monitoring program. MTBE was detected once in groundwater sampled from well MW-3 (at 2.6 µg/L and 7.5 µg/L in the primary and duplicate sample collected in May 2000), and was detected all four quarters in groundwater sampled from MW-4 (ranging from 2.3 µg/L to 44 µg/L). No other analytes were detected at or above MDLs (Table 2).

The natural attenuation results for groundwater from these wells indicate dissolved oxygen concentrations ranging from 0.8 mg/L to 4.4 mg/L, which is within the range considered favorable for aerobic biodegradation (Mobil, 1995). In addition, the following trends of natural attenuation parameters are indicative of increased aerobic biodegradation in the near-source area:

- Lower oxidation-reduction (redox) potential in near-source borings than in distal monitoring wells;
- Lower nitrate concentrations in near-source borings than in distal wells;
- Lower sulfate concentrations in near-source borings than in distal wells; and,
- Higher pH in near-source borings than in distal wells (Table 3).

Groundwater elevation maps for the May 2000 through February 2001 monitoring period showed that groundwater beneath the Site generally flowed to the southeast (Figures 5, 6, and 7), toward downgradient monitoring well MW-4 and a retention pond at the southeast corner of the MOIA property (Figure 1). Figure 8 shows that shallow groundwater flowed toward the east in February 2001 (HLA, 2001). The water level measurement from upgradient well MW-1, however, may be anomalous. Data collected by HLA in February 2001 indicate that groundwater elevations in wells MW-2, MW-3, and MW-4 increased by roughly 1.5 ft compared to November 2000 levels, but the groundwater elevation in well MW-1 increased by only a foot (Table 4).

3 ADDITIONAL SITE CHARACTERIZATION

On April 12, 2002, Weiss measured water levels and well depths, and collected groundwater samples from Site monitoring wells MW-1, MW-2, MW-3, and MW-4. Monitoring and sampling procedures, measurement and analytic results, and quality assurance and quality control (QA/QC) parameters are discussed below.

3.1 Groundwater Elevation and Flow Direction

Depth to water from the top of the well casing (TOC) was measured to the nearest 0.01 ft in each well (Table 4). Water level probes were decontaminated with Alconox and rinsed with distilled water between each measurement to reduce the risk of cross-contamination between wells. Depth to the bottom of each well was also measured to the nearest 0.01 ft, as a standard confirmation of well integrity. All water level and well depth measurements were within the range of expected (i.e. historical) results.

As shown in Figure 9, groundwater elevations at the Site range from 2.14 ft to 3.41 ft above msl. Groundwater flows towards the southeast, in the general direction of the retention pond located approximately 300 ft southeast of monitoring well MW-4. San Francisco Bay is located about 850 ft due east of monitoring well MW-4. Groundwater elevation and flow direction are similar to historical observations at the Site.

3.2 Groundwater Sampling and Analysis

3.2.1 Field Procedures

Groundwater was sampled from each of the four Site monitoring wells and a duplicate sample was collected from well MW-1. Prior to sampling, at least two well-casing volumes of groundwater were purged from each well using a sterile, disposable bailer. Purging continued until pH, temperature, and electrical conductivity readings had stabilized. Each water quality parameter is considered stabilized when three successive readings are within ± 10% of their mean. Purge water was stored in a properly labeled and sealed 55-gallon drum, and following receipt of analytic results, the Port's waste contractor properly disposed of the contents.

Groundwater samples were collected by decanting the samples from the disposable bailers into clean 40-ml volatile organic analysis vials (VOAs) and 1-liter amber glass jars. Samples were labeled, packaged, and placed in a cooler with ice, and following completion of field work, the cooler was delivered under standard chain-of-custody procedures to STL San Francisco, a California state-

certified laboratory in Pleasanton, California. All groundwater samples were analyzed for TPH-D, TPH-G, BTEX, and MTBE.

3.2.2 Analytic Results

Analytic results indicate that groundwater sampled from monitoring wells MW-1, MW-2, and MW-3 contains no TPH-D, TPH-G, BTEX, or MTBE above MDLs (Table 2). Groundwater sampled from well MW-4 contained 8.4 µg/L MTBE, below the California Department of Health Services (DHS) maximum contaminant level for drinking water (MCL) of 13 µg/L. No TPH-D, TPH-G, or BTEX was detected in groundwater from well MW-4 above MDLs (Table 2).

The analytic report, chain-of-custody form, and tables summarizing sampling and analysis QA/QC parameters are included as Appendix A.

4 RISK SCREENING

This section evaluates the existing Site characterization data and presents a risk screening evaluation based on comparison with RBSLs.

4.1 Soil and Groundwater Data Evaluation

To date, a total of 24 soil and 33 groundwater samples have been collected and analyzed for COCs at the roughly one-acre Site (Figures 3 and 4). Of the soil samples, eight were collected at approximately 3.5 ft bgs, from what appeared to be the most impacted horizon of the UST excavation sidewalls. Eight were collected between 5.5 ft and 6 ft bgs, from boreholes drilled in the vicinity of the former USTs and their associated dispensers and piping. Four were collected from the borings drilled for monitoring wells MW-1 through MW-4, from the approximate elevation of the water table at 3 ft to 4.5 ft bgs. And, four were composite samples from stockpiled and drummed investigative-derived waste (IDW) soil that originated from the UST excavations (samples 101 and 102) and the well installations (samples Drum 4223 and Drum 4230). Of the water samples, four were grab samples collected from groundwater in the UST excavation pits, and eight were grab samples collected from boreholes drilled in the vicinity of the former USTs, their associated dispensers and piping. In addition, monitoring wells MW-1 through MW-4 were sampled five times each and a duplicate sample was collected from well MW-1 in April 2002.

The soil and groundwater samples collected to date are adequate to define the vertical and lateral extent of UST-related impact to the Site. In addition, groundwater samples from the four Site monitoring wells were collected and analyzed for COCs quarterly for one year after the UST removal, and once recently (approximately one year since quarterly sampling was discontinued). Based on the five rounds of groundwater elevation measurements collected to date, the four wells at the Site are adequately positioned to monitor source area, cross-gradient, and downgradient groundwater. The placement and monitoring of these wells adequately addresses the potential migration of residual COCs from soil left in place after the UST removal. Therefore, Site characterization is considered complete.

4.2 Exposure Pathway Evaluation and Risk Screening Criteria

The appropriate RBSLs developed by the RWQCB (RWQCB, 2001) were used to evaluate human health and ecological risks presented by constituents in soil and groundwater at the Site. The RWQCB provided guidance on the key RBSLs to use during the September 20, 2001 meeting. In addition to the RWQCB's recommendations, all the other pathways considered in RBSL development were evaluated, and RBSLs for several additional pathways were included in this risk screening (Figure 10). As shown on Figure 10, the only pathways not considered were the terrestrial ecosystem impacts and drinking water pathways. Terrestrial ecosystem impacts were not considered

because of the depth of the impacted soil (3 ft bgs and greater) and the low likelihood of significant ecosystems at the Site. Drinking water RBSLs were not considered because groundwater beneath the Site is not considered a potential drinking water source (see Section 1.2). Although several other exposure pathways are unlikely to be complete (e.g., indoor air and surface water impacts), these pathways were included in the screening evaluation as potential human health and ecological risk pathways. The specific RBSLs used in this risk screening evaluation are discussed below.

4.2.1 Soil Pathways and Risk Screening Criteria

For soil, human health risk was evaluated using direct exposure RBSLs for a construction/trench worker scenario (Table K-3 from RWQCB, 2001). Residential and industrial direct contact scenarios were not considered due to the Site's firm establishment as a paved site within an international port. Although no buildings currently overlie the impacted areas of the Site (nor does the Port plan any future building construction at the Site) human health risk was also evaluated for volatile constituents in soil using the occupational indoor air RBSLs (Table E-1 from RWQCB, 2001). For noncarcinogens, the human health RBSLs correspond to a hazard quotient (HQ) equal to 1.0. For carcinogens, the human health RBSLs correspond to an excess cancer risk of 1×10^{-6}.

Nuisance odor levels (i.e. ceiling levels) for TPH-D and TPH-G were also evaluated, as requested by the RWQCB during the September 20, 2001 meeting (Table H-2 from RWQCB, 2001). For completeness, nuisance levels for other detected constituents were also evaluated.

Potential leaching of constituents in soil into groundwater was evaluated. Since groundwater under the Site is not considered a source of drinking water (see Section 1.2), the RBSLs used were those based on the protection of groundwater that is *not* a current or potential source of drinking water from the impact of constituents leaching from soil (Table B-1 and G from RWQCB, 2001). In general, these RBSLs are based on potential impacts to marine aquatic receptors as a result of constituents leaching from the soil into groundwater, which subsequently enters the bay.

4.2.1.1 Appropriateness of Soil RBSLs

Although the groundwater protection RBSLs were included for completeness, it is noted that the soil samples from the UST excavations were collected at or slightly below the water table, i.e. from the capillary fringe or saturated zone. Therefore, comparison of actual groundwater concentrations to groundwater RBSLs (Section 4.2.2) is more indicative of the potential risks associated with COCs in groundwater. Although soil data (Table 1) were screened for COC leaching risks to groundwater, the following observations suggest that COCs detected in soil at the Site are relatively immobile and confined to the former UST areas, and/or are naturally degrading (also discussed in Sections 4.2.2.1 and 2.3, respectively):

- Monitoring well MW-1 is located at the northeast edge of the former UST MF08 excavation, yet the only COC detected in soil collected from the boring was 1.2 mg/kg TPH-D;

- Boring SB-1 was located only 10 ft downgradient (east-southeast) of the former gasoline UST, yet TPH-D (at 8.7 mg/kg, well below RBSLs) was the only COC detected above MDLs in soil sampled from the boring;
- TPH-G was detected in only one soil boring drilled at the Site—in boring SB-4 (15 ft southwest of the gasoline source area)—at concentrations significantly less than those in the samples collected from the UST MF08 excavation sidewalls, and well below the groundwater protection RBSL;
- No TPH-D was detected in groundwater sampled from borings SB-3, SB-5, or SB-6, each of which were located approximately 20 ft from the edge of the diesel UST excavation (to the southwest, northeast, and southeast, respectively);
- No TPH-G or BTEX was detected above MDLs in groundwater sampled from the four Site monitoring wells, and MTBE was only detected in wells MW-4 and MW-3 (once); and,
- TPH-D concentrations in groundwater sampled from the soil borings and monitoring wells, were several orders of magnitude less than those of the grab samples collected from the diesel source area.

It should also be noted that the TPH-D soil leaching RBSL was calculated based on criteria for highly mobile, lighter-fraction aromatic compounds, and the toluene and xylenes RBSLs were derived from surface freshwater criteria rather than saltwater (as cited in RWQCB, 2001). Given that Site data support the relative *im*mobility of COCs in soil, it is highly unlikely that any residual source area COCs would migrate from soil, to groundwater, to the shallow water retention pond an additional 300 ft downgradient of well MW-4. RBSLs based on surface freshwater criteria may also be inappropriate for the Site because any groundwater discharge would be to the brackish retention pond and/or the bay.

4.2.2 Groundwater Pathways and Risk Screening Criteria

Although no buildings currently overlie the impacted groundwater at the Site, nor are any planned as part of future construction activities, potential human health risks due to volatilization from groundwater were considered using the occupational indoor air RBSLs (Table F-2 from RWQCB, 2001). Since groundwater under the Site is not considered a potential drinking water source (see above), potential human health risks associated with drinking water were not considered. For completeness, nuisance odor levels (i.e. ceiling levels) for constituents in groundwater were also considered (Table I-2 from RWQCB, 2001).

Ecological risks were estimated using RBSLs developed for groundwater that is not a current or potential source of drinking water and that may discharge to surface water bodies (Table F-4 from RWQCB, 2001). These RBSLs are based on aquatic life protection in freshwater and/or saltwater environments. Where available, RBSLs specific to saltwater aquatic life were used.

4.2.2.1 Appropriateness of Groundwater RBSLs

It is noted that the RBSLs discussed in Section 4.2.2 compare groundwater data (Table 2) to surface water protection criteria even though actual impact to surface water bodies appears to be highly unlikely. Evidence for sharp COC attenuation over distance at the Site includes:

- Soil boring SB-6 was located only 20 ft downgradient (southeast) of the former diesel USTs, yet no COCs were detected above MDLs in groundwater sampled from the boring;
- No COCs were detected above MDLs in soil boring SB-7, which was located 60 ft south (cross- to downgradient) of the former diesel USTs;
- TPH-D has been detected only twice in groundwater sampled from well MW-4 (160 ft southeast of the diesel source area), at concentrations significantly less than those in the grab samples collected from the diesel UST excavation pit and well below the surface water RBSL;
- TPH-G concentrations in groundwater sampled from SB-2—30 ft downgradient of the former gasoline UST—were far less than those of the grab samples collected from the gasoline source area;
- TPH-G was undetected in groundwater sampled from SB-5, just 50 ft downgradient of the former gasoline UST; and,
- MTBE concentrations detected in well MW-4 are several orders of magnitude lower than those detected in the gasoline UST excavation pit and nearby borings, and are also several orders of magnitude lower than the surface water RBSL for MTBE.

In addition to evidence supporting COC attenuation with distance at the Site, there has been slight attenuation over time. For example, TPH-D, TPH-G, and MTBE have all shown a general declining concentration trend over time in groundwater from downgradient well MW-4 (Table 2). As discussed in Sections 2.2 and 2.3, geochemical indicators suggest that at least some of this attenuation is due to ongoing biologic activity at the Site. Therefore, based on hydrogeologic data supporting COC attenuation with distance and time, it is unlikely that COCs in groundwater at the Site would impact the shallow water retention pond located an additional 300 ft to the southeast of well MW-4, or impact the bay, which is a minimum of 850 ft downgradient of well MW-4.

4.3 Risk Screening Results

4.3.1 Soil

Analytic results for soil samples are presented in Table 1, and sample locations and summarized results are shown on Figure 3.

4.3.1.1 Human Health Risk and Nuisance Concerns

Two soil samples—both collected at 3.5 ft bgs from the north and west sidewalls of the gasoline UST excavation (samples T1-C and T1-D)—exceeded the construction/trench worker direct-contact RBSL for total xylenes (RWQCB, 2001). It should be noted, however, that the construction/trench worker direct-contact RBSLs for xylenes (as well as ethylbenzene and toluene) are set at the constituent's theoretical soil saturation limit, and not at the level that would result in a hazard quotient of 1.0, which is 55,000 mg/kg in the case of xylenes (RWQCB, 2001). No other compounds exceeded the direct exposure RBSLs for the construction/trench worker scenario.

Xylenes and benzene concentrations in the same two samples (T1-C and T1-D) also exceeded the occupational indoor air RBSL. As with the construction/trench worker RBSL, this xylenes RBSL is based on the theoretical soil saturation limit rather than risk. No other compounds exceeded the indoor air RBSLs.

The industrial/commercial nuisance/ceiling levels for TPH-D, TPH-G, and xylenes were also exceeded in T1-C and T1-D. Additionally, the TPH-D and/or TPH-G nuisance levels were exceeded in two samples from the diesel tank excavation sidewalls (samples T2-A and T2-B).

4.3.1.2 Ecological Risk

Soil samples collected at 3.5 ft bgs from the north and west sidewalls of the UST MF08 excavation (gasoline), and from the north and south sidewalls of the UST MF09 (diesel) excavation, contained TPH-D, TPH-G, and xylenes at concentrations above the soil leaching RBSLs for the protection of surface water habitats (RWQCB, 2001). Soil from the UST MF08 excavation also contained MTBE, toluene, and ethylbenzene at concentrations slightly above the soil leaching RBSLs. The soil sample collected in boring SB-4 at 6.0 ft bgs (approximately 10 ft southwest of former UST MF08) slightly exceeded the TPH-D RBSL for soil leaching. No other COCs exceeded the soil leaching RBSLs in soil samples collected at the Site.

4.3.2 Groundwater

Analytic results for groundwater samples are presented in Table 2, and sample locations and summarized results are shown on Figure 4.

4.3.2.1 Human Health Risk and Nuisance Concerns

Groundwater beneath the Site is neither a current nor potential source of drinking water (RWQCB, 2000), therefore, the potential impacts to sources of drinking water and corresponding human health risks were not addressed in this risk screening evaluation. Only benzene in the two grab groundwater samples collected from the gas pit exceeded the indoor air RBSL. Nuisance levels for TPH-D, TPH-G, MTBE, toluene, ethylbenzene, and xylenes were exceeded in one or more groundwater samples in the immediate vicinity of the tank excavations.

4.3.2.2 Ecological Risk

Xylenes were the only COC detected above surface water protection RBSLs in groundwater sampled from borings or monitoring wells at the Site (RWQCB, 2001). However, the surface water protection RBSL for xylenes is based on the United States Department of Energy preliminary remediation goal for groundwater, which is derived from chronic exposure to freshwater aquatic receptors (as cited in RWQCB, 2001) and is therefore inappropriate for this site because any groundwater discharge would be into brackish or saline surface waters. In addition, this analyte was only detected once in groundwater sampled from soil boring SB-4, and has not been detected in any other groundwater samples collected from borings or monitoring wells at the Site.

Groundwater sampled from the two UST excavation pits contained all COCs at concentrations above surface water protection RBSLs and most COCs at concentrations above the nuisance levels (Table 2; RWQCB, 2001). TPH-D and TPH-G exceeded the respective RBSLs in water sampled from both the diesel and gasoline UST excavation pits. MTBE and BTEX exceeded the respective RBSLs in water sampled from the UST MF08 excavation only.

Although the UST Closure Report (HLA, 1999a) does not describe sampling methods or sample appearance, the water sampled from the two UST excavation pits likely contained a surface sheen of separate-phase hydrocarbons as well as hydrocarbons sorbed onto suspended soil particles. Consequently, the elevated concentrations of TPH-D and TPH-G detected in the excavation pit samples may be attributable to sampling-related artifacts. In point of fact, some of the TPH-D and TPH-G concentrations detected in the excavation pit samples exceed solubility limits for these constituents in water, which range from 3,000 µg/L to 5,000 µg/L for diesel and up to 100,000 µg/L for gasoline (WDE, 2001). Therefore, the UST excavation pit samples should not be considered representative of the dissolved phase of the constituents in groundwater. (FP?)

4.4 Estimated Extent of Soil and Groundwater Contamination

4.4.1 Soil

As requested by the RWQCB, the maximum lateral limits of potentially impacted soil at the Site have been estimated, and are outlined as isoconcentration contours on Figure 3. Figure 3 depicts the approximate lateral limits of TPH-D and TPH-G impacted soil above the 1,000 mg/kg ceiling level (Table H-2 from RWQCB, 2001). As discussed in the UST Closure Report (HLA, 1999a), the vertical extent of the impacted soils appeared to be limited to three ft (between 3.5 ft and 6.5 ft bgs), and the stained soil was excavated and replaced with pea gravel and aggregate base material. Based on these data, the following volumes of impacted soil remaining in place at a depth of 3.5 ft to 6.5 ft bgs were estimated:

1. [redacted]

2. Approximately 4 cu yds of soil impacted at concentrations above 1,000 mg/kg TPH-G remains in place near the western boundary of the UST MF08 excavation;
3. Approximately 9 cu yds of soil impacted at concentrations above 1,000 mg/kg TPH-D remains in place near the southwestern boundary of the UST MF09 excavation; and,
4. Approximately 4 cu yds of soil impacted at concentrations above 1,000 mg/kg TPH-G remains in place near the southwestern boundary of the UST MF09 excavation.

4.4.2 Groundwater

The evaluation of groundwater analytic results indicates that the only surface water protection RBSL exceeded in groundwater sampled from soil borings and monitoring wells at the Site was that for xylenes, which not only was developed for the protection of chronic exposure to freshwater receptors, but was only exceeded once in the 29 groundwater samples collected from borings or monitoring wells at the Site. As discussed in Section 4.3.2, the UST excavation pit samples are not considered representative of the dissolved phase of the constituents in groundwater, and there is no indication of groundwater impact from residual soil contamination.

5 CONCLUSIONS

Given the risk screening results presented in Section 4 and summarized below, neither soil nor groundwater present significant human health or ecological risk issues at the Site. Therefore, remedial measures to date are adequate.

Based on comparison of all available soil data for the Site and the conservative screening levels used in this report:

1. Only a small area adjacent to the UST MF08 excavation contained xylenes and/or benzene in soil at concentrations above the construction/trench worker and indoor air RBSLs. However, these xylenes RBSLs are based on the theoretical soil saturation limit rather than on risk. In addition, these samples were analyzed three years ago and xylenes and benzene are highly degradable. The concentrations in 1999 were only a few times higher than the RBSLs, and current concentrations are likely significantly lower.
2. Nuisance RBSLs for several COCs were exceeded in the immediate MF08 area and in a small area adjacent to the UST MF09/MF10 excavation.
3. Five soil samples, four from the two UST excavation areas and a fifth from a near-source area soil boring, exceeded the soil leaching/groundwater protection RBSL for TPH-D and/or TPH-G. However, COC-impacted horizons and soil samples in both UST excavations were located in the capillary fringe, i.e. the saturated zone, yet the Site groundwater samples collected to date show no apparent impact from residual soil contamination.

Comparison of RBSLs with Site groundwater data indicates:

1. Groundwater elevation data show that the four Site monitoring wells are adequate to define potential groundwater impacts from the two former UST areas.
2. No groundwater RBSLs have been exceeded in any of these wells.
3. The only surface water protection RBSL exceeded was for xylenes in only one of eight grab water samples from the near-source area borings.
4. The only nuisance RBSL exceeded was for MTBE in two grab water samples from the near-source area borings.
5. Although RBSLs were exceeded in grab water samples from the excavation pits, these samples probably contained free phase hydrocarbons and their results are not representative of dissolved phase concentrations.
6. Groundwater data from borings and wells do not indicate that COCs in soil are susceptible to leaching.

According to the RWQCB's *Supplemental Instructions to State Water Board December 18, 1995 Interim Guidance* regarding required cleanup at low-risk fuel sites (RWQCB, 1996), the Site is considered "low risk" based on the following criteria:

- The Site has been adequately characterized;
- The leak and ongoing sources have been removed or adequately remediated;
- The dissolved hydrocarbon plume is not migrating (i.e. there is no groundwater plume);
- No water wells, deeper drinking-water aquifers, surface water, or other sensitive receptors are likely to be impacted;
- The Site presents no significant risk to human health; and,
- The Site presents no significant risk to the environment.

Due to its location at the MOIA, the Port has no future construction projects planned for the Site, but would require a site-specific Health and Safety Plan if any future construction or trenching projects occurring in any of the potentially COC-impacted areas were to occur. Furthermore, the City of Oakland permit tracking program will ensure that future permit applications for work at the Site are routed to the City of Oakland Fire Department Hazardous Materials Management Program for special review.

Accordingly, the Port provides the additional Site characterization data and risk screening evaluation—on which these conclusions are based—to the ACEHS and RWQCB for their consideration towards approval of Site closure. Because ongoing groundwater monitoring is not warranted, destruction of the four Site monitoring wells is also requested as a component of Site closure.

6 REFERENCES

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Washington Department of Ecology (WDE), 1991, Workbook Tools, Cleanup Levels, and Risk Calculations under the Model Toxics Control Act Cleanup Regulation, http://www.ecy.wa.gov, updated November 19, 2001.

FIGURES

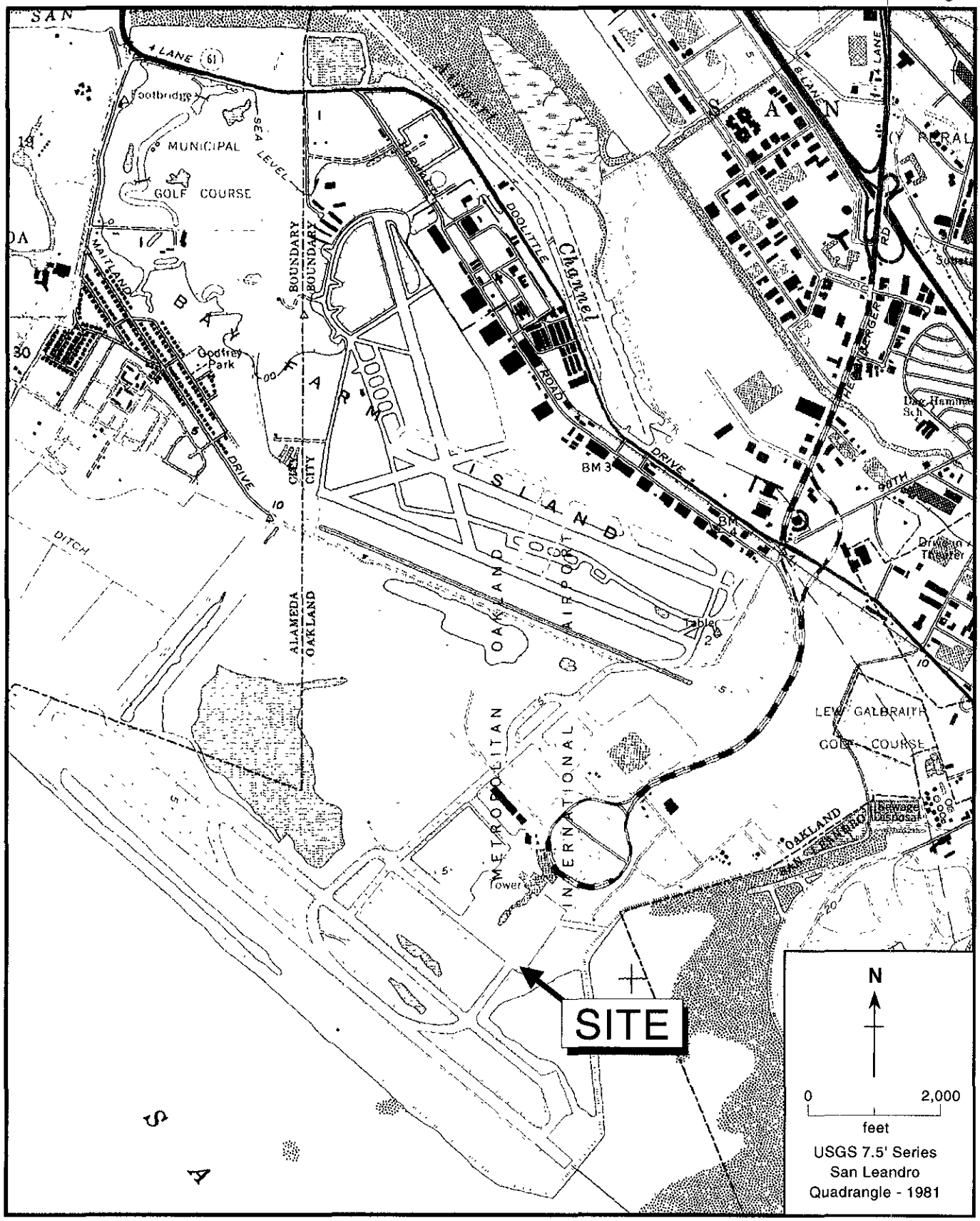

Figure 1. Site Vicinity Map, South Airport Self-Fueling Facility, Taxiway U, Metropolitan Oakland International Airport

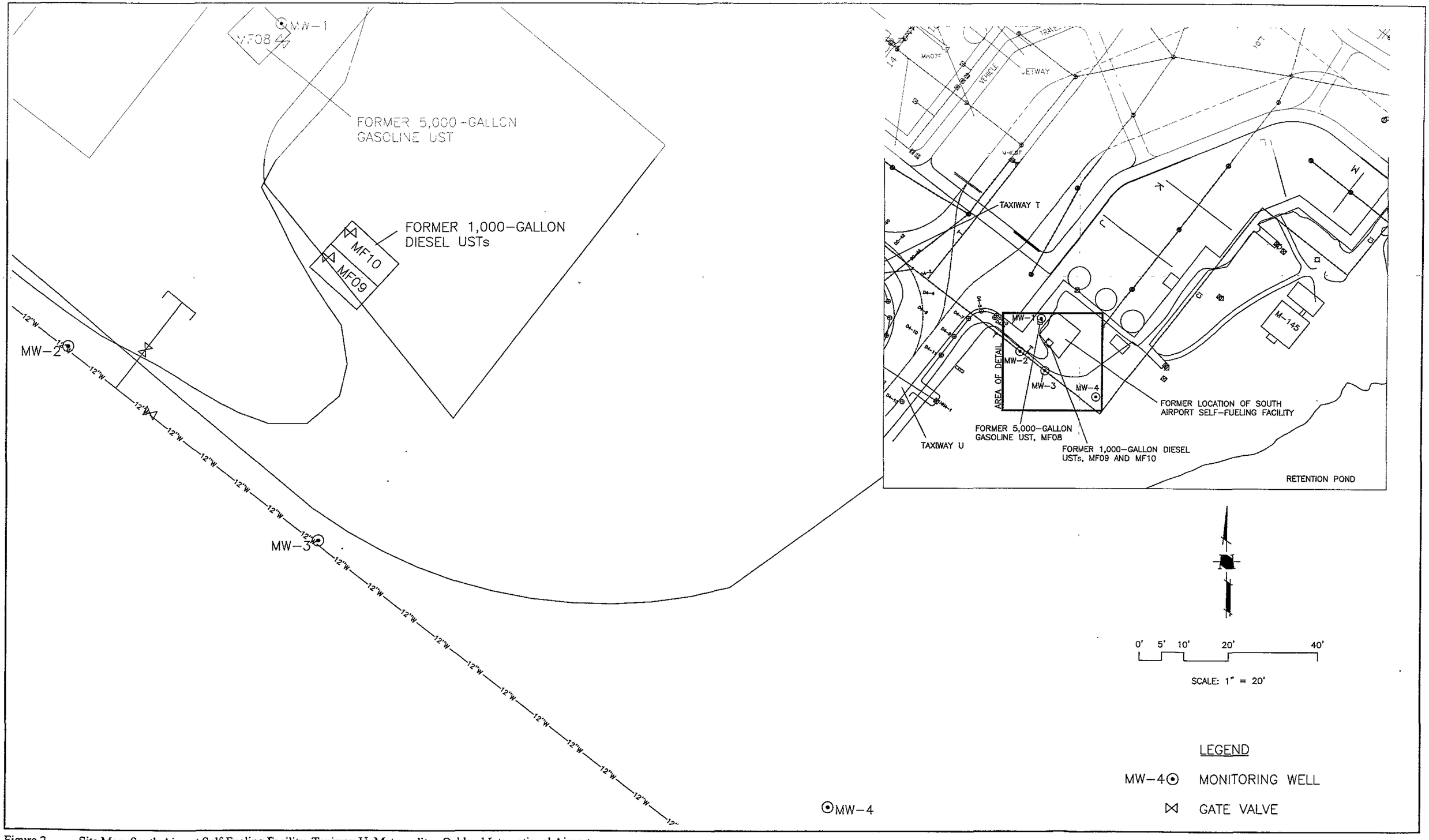

Figure 2. Site Map, South Airport Self-Fueling Facility, Taxiway U, Metropolitan Oakland International Airport

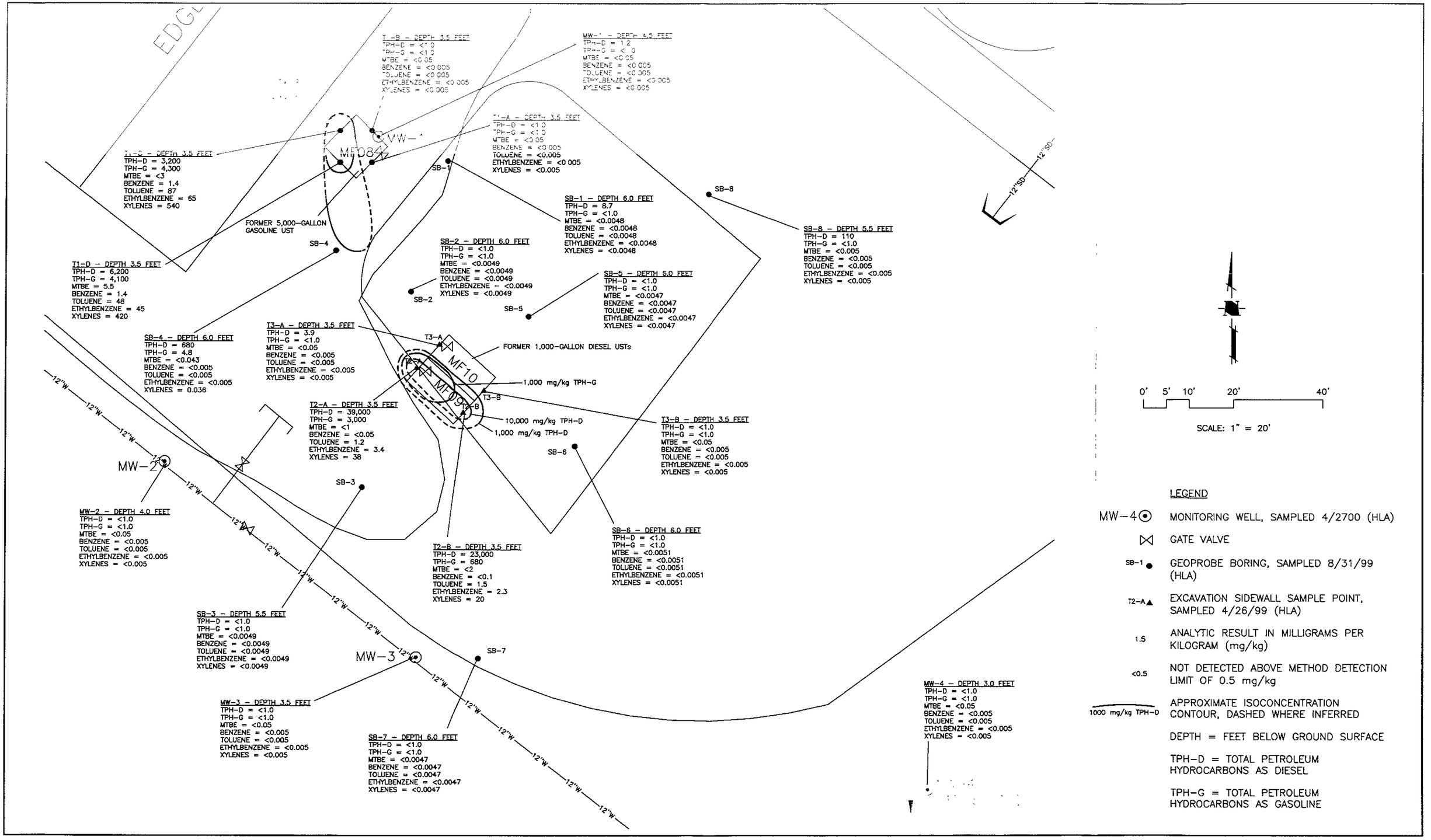

Figure 3. Soil Sample Locations and Summary of Analytic Results, South Airport Self-Fueling Facility, Taxiway U, Metropolitan Oakland International Airport

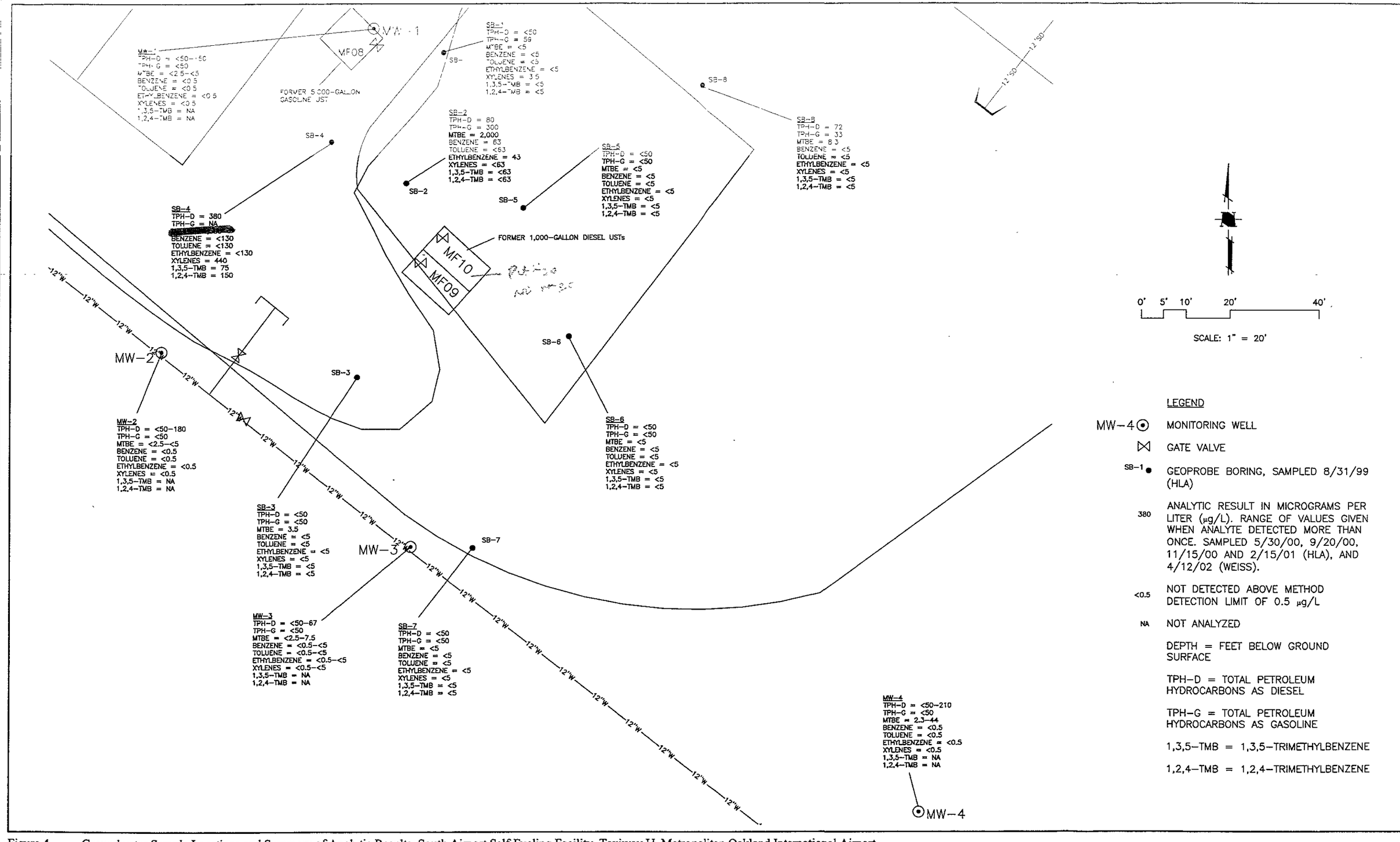

Figure 4. *Groundwater Sample Locations and Summary of Analytic Results, South Airport Self-Fueling Facility, Taxiway U, Metropolitan Oakland International Airport*

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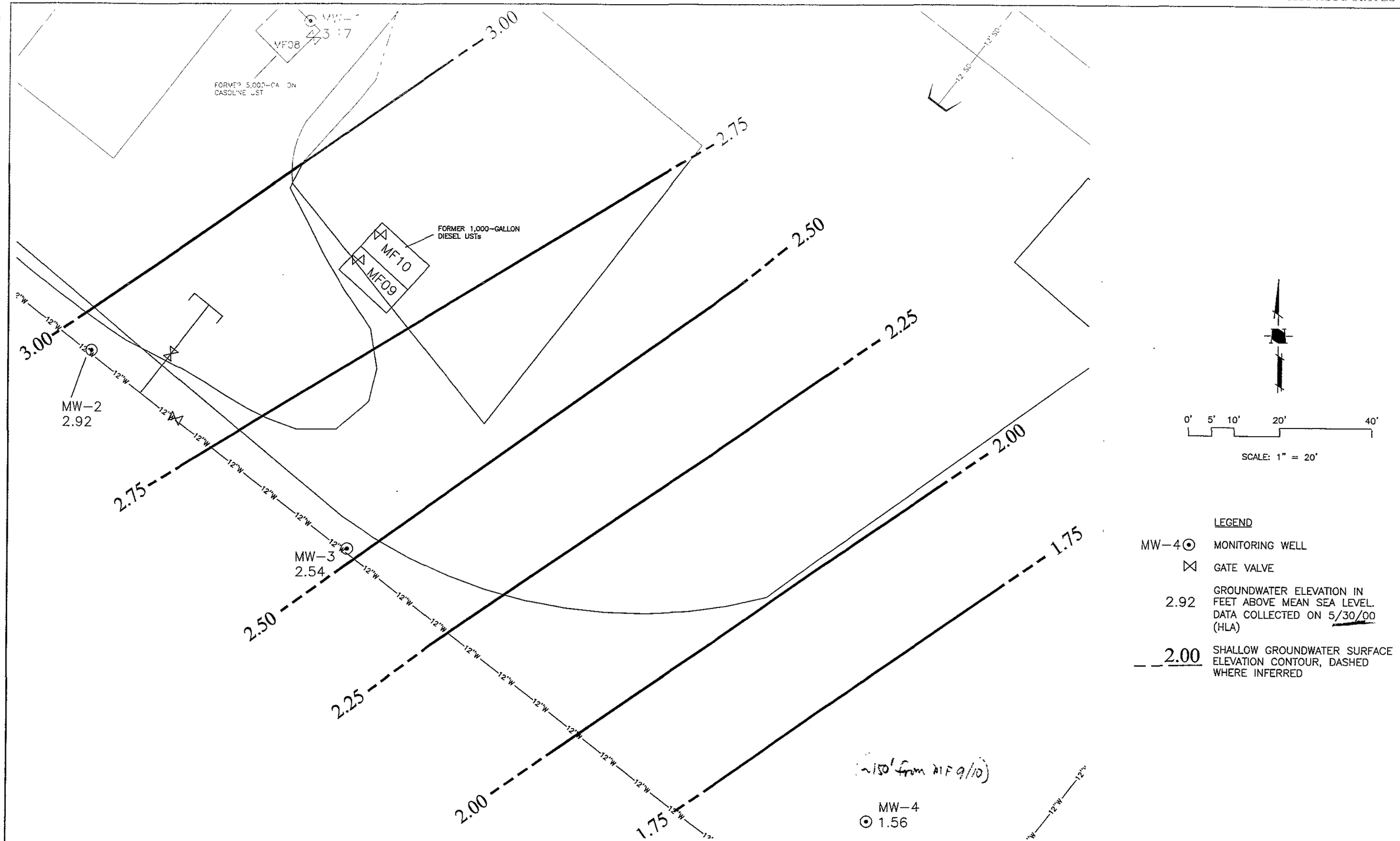

Figure 5. Shallow Groundwater Elevation Contour Map, May 30, 2000, South Airport Self-Fueling Facility, Taxiway U, Metropolitan Oakland International Airport

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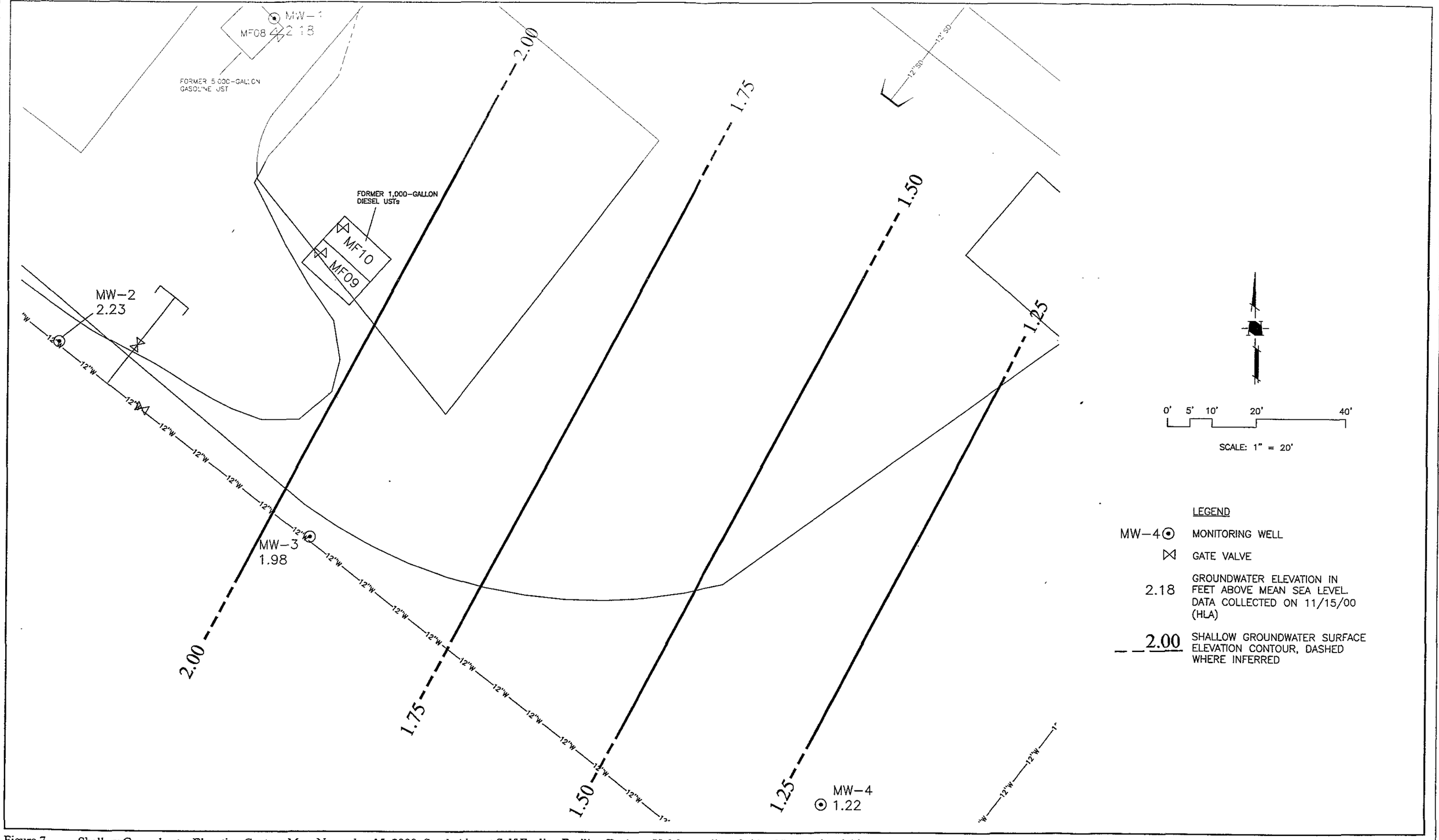

Figure 7. Shallow Groundwater Elevation Contour Map, November 15, 2000, South Airport Self-Fueling Facility, Taxiway U, Metropolitan Oakland International Airport

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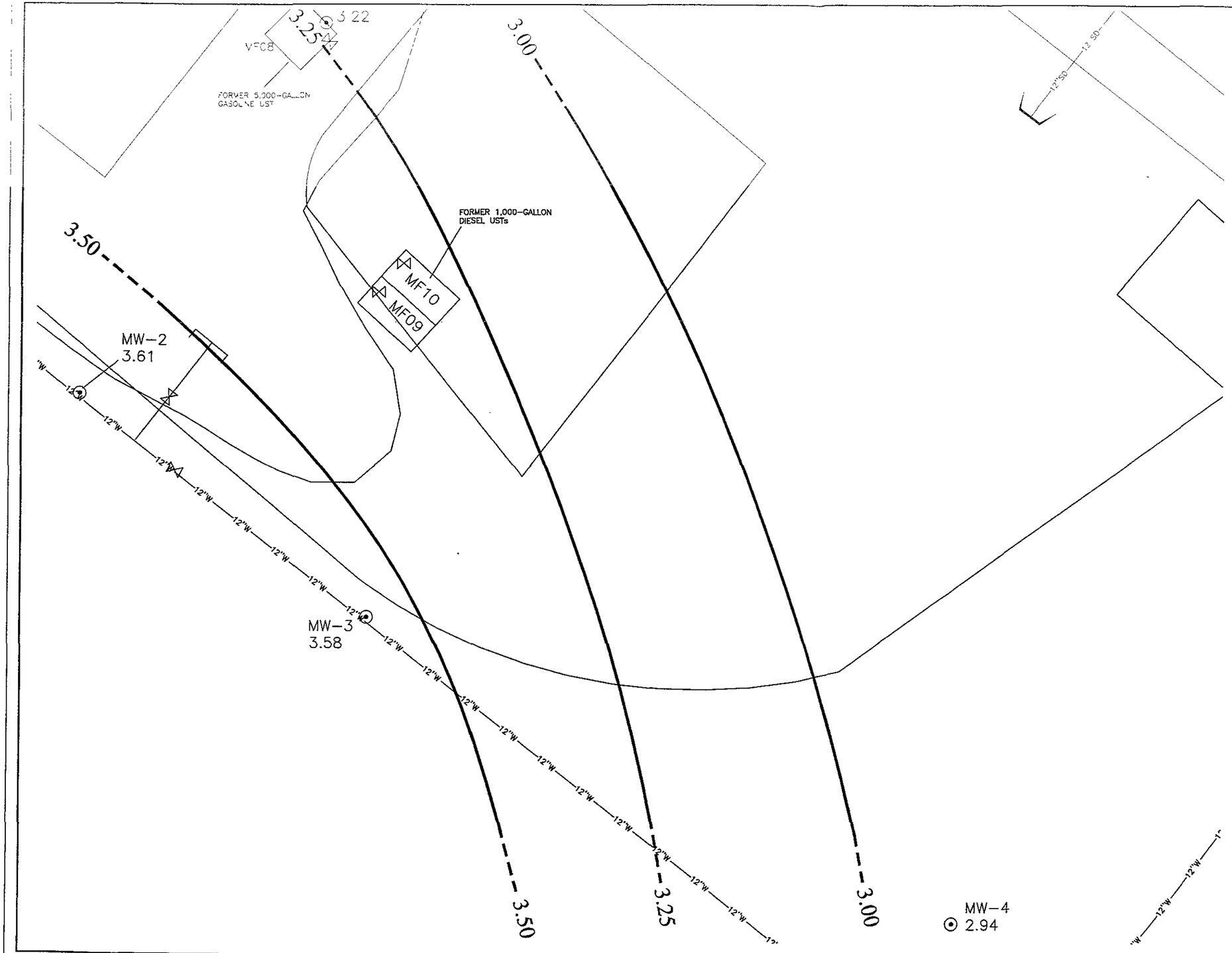

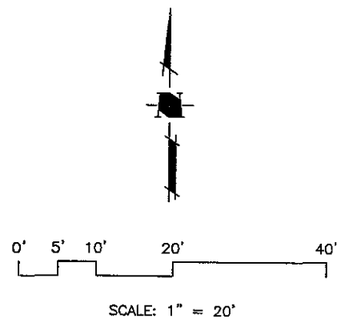

LEGEND

MW-4 ⊙	MONITORING WELL
⋈	GATE VALVE
3.22	GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL. DATA COLLECTED ON 2/15/01 (HLA)
3.00	SHALLOW GROUNDWATER SURFACE ELEVATION CONTOUR, DASHED WHERE INFERRED

Figure 8. Shallow Groundwater Elevation Contour Map, February 15, 2001, South Airport Self-Fueling Facility, Taxiway U, Metropolitan Oakland International Airport

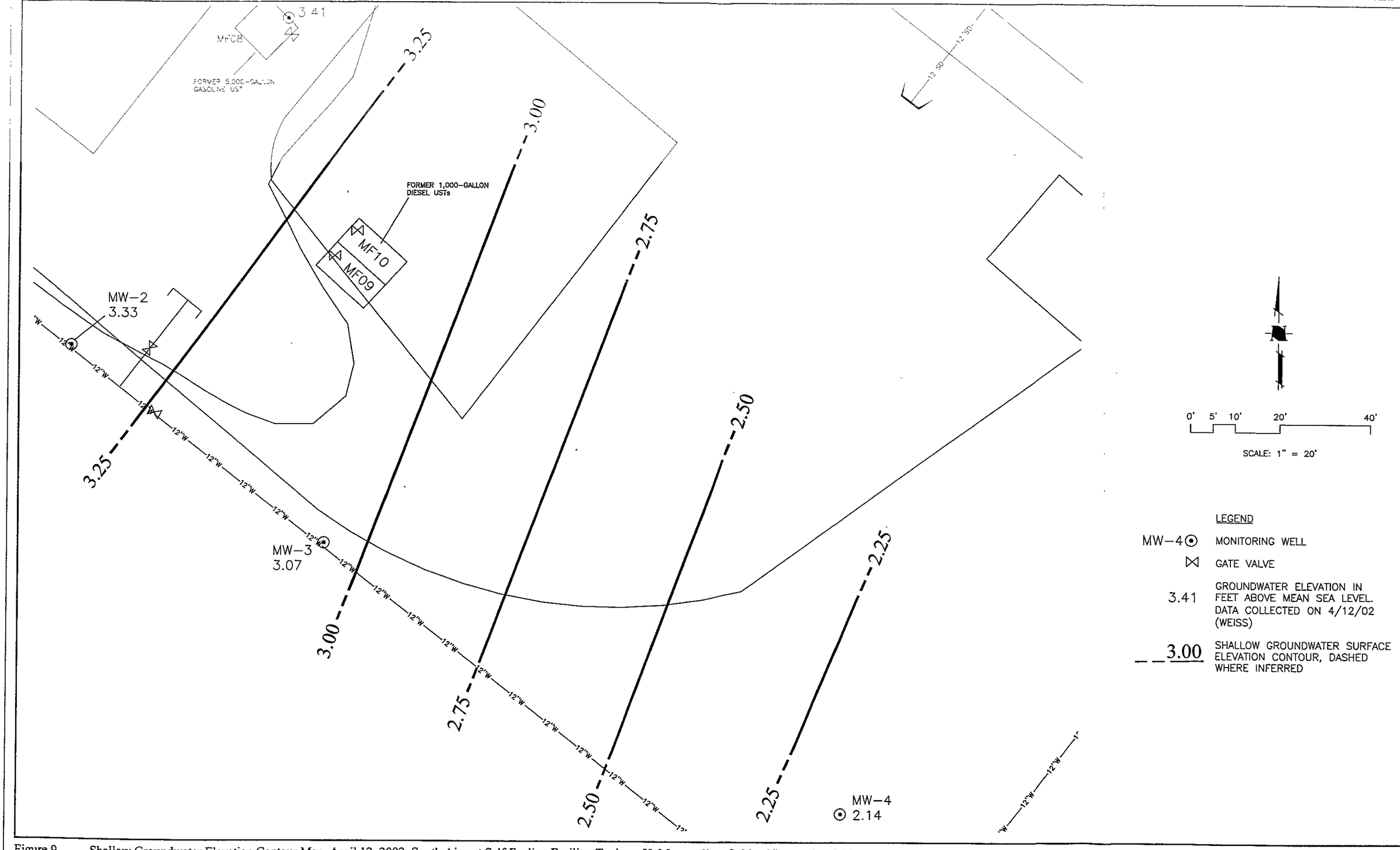

Figure 9. Shallow Groundwater Elevation Contour Map, April 12, 2002, South Airport Self-Fueling Facility, Taxiway U, Metropolitan Oakland International Airport

FILE: L:\Oakland.259\South Field\1541-SF-09.dwg

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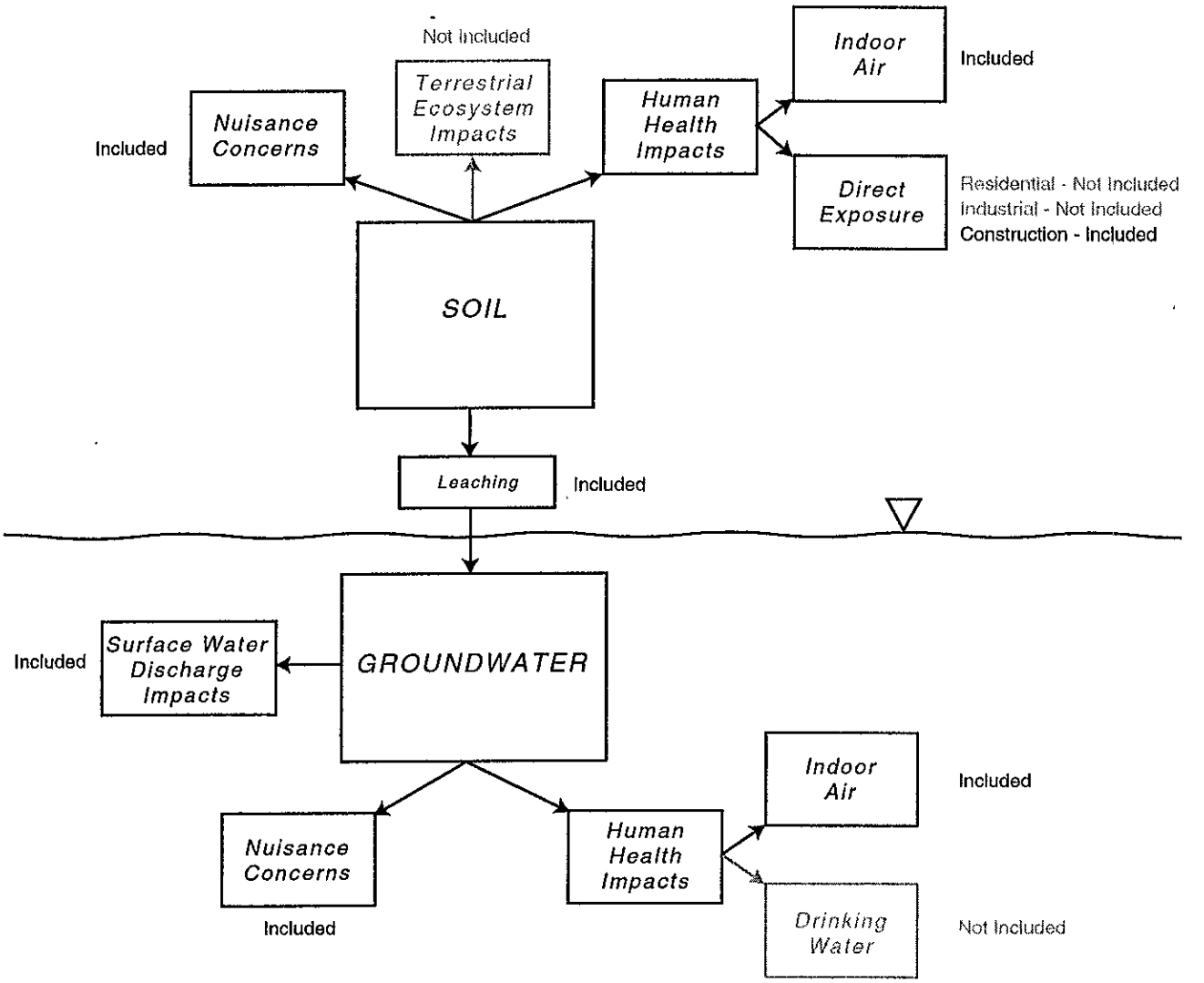

Modified from: RWQCB, 2001 *Application of Risk-Based Screening Levels and Decision Making to Sites With Impacted Soil and Groundwater*, Volume I, Figure 1

Figure 10. Potential Human Health and Environmental Exposure Pathways

TABLES

Table 1. Summary of Analytical Results for COCs in Soil, South Airport Self-Fueling Facility, Taxiway U, Metropolitan Oakland International Airport, Oakland, California

Sample Location	Sample Date[1]	Lab	Depth (ft bgs)	TPH-D	TPH-G	MTBE	Benzene	Toluene	Ethylbenzene	Total Xylenes	Lead
				mg/kg							
101	22-Apr-99	MOB	IDW	110	41	<0.005	<0.005	0.039	0.410	0.036[e]	0.10
102	22-Apr-99	MOB	IDW	560	17	<0.005	<0.005	0.025	<0.87	<0.005	10
T1-A	26-Apr-99	MCA	3.5	<1.0	<1.0	<0.05	<0.005	<0.005	<0.005	<0.005	---
T1-B	26-Apr-99	MCA	3.5	<1.0	<1.0	<0.05	<0.005	<0.005	<0.005	<0.005	---
T1-C	26-Apr-99	MCA	3.5	*3,200*	*4,300*	<3	*1.4*	*87*	*65*	*540*[e]	---
T1-D	26-Apr-99	MCA	3.5	*6,200*	*4,100*	*5.5*	*1.4*	*48*	*45*	*420*[e]	---
T2-A	26-Apr-99	MCA	3.5	*39,000*	*3,000*	<1	<0.05	1.2	3.4	*38*[e]	---
T2-B	26-Apr-99	MCA	3.5	*23,000*	*680*	<2	<0.1	1.5	2.3	*20*[e]	---
T3-A	26-Apr-99	MCA	3.5	3.9	<1.0	<0.05	<0.005	<0.005	<0.005	<0.005	---
T3-B	26-Apr-99	MCA	3.5	<1.0	<1.0	<0.05	<0.005	<0.005	<0.005	<0.005	---
SB-1	31-Aug-99	CT	6.0	8.7[a,c]	<1.0	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	---
SB-2	31-Aug-99	CT	6.0	<1.0	<1.0	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	---
SB-3	31-Aug-99	CT	5.5	<1.0	<1.0	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	---
SB-4	31-Aug-99	CT	6.0	*680*[a,b]	4.8[c]	0.043	<0.0050	<0.0050	<0.0050	0.036[f]	---
SB-5	31-Aug-99	CT	6.0	<1.0[d]	<1.0	<0.0047	<0.0047	<0.0047	<0.0047	<0.0047	---
SB-6	31-Aug-99	CT	6.0	<1.0	<1.0	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	---
SB-7	31-Aug-99	CT	6.0	<1.0	<1.0	<0.0047	<0.0047	<0.0047	<0.0047	<0.0047	---
SB-8	31-Aug-99	CT	5.5	<1.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	---
Drum 4223	27-Apr-00	SEQ	IDW	13	<1	<0.05	<0.005	<0.005	<0.005	<0.005	2.5
Drum 4230	27-Apr-00	SEQ	IDW	1.2	<1	<0.05	<0.005	<0.005	<0.005	<0.005	3.0
MW-1	27-Apr-00	SEQ	4.5	1.2	<1.0	<0.05	<0.005	<0.005	<0.005	<0.005	1.9
MW-2	27-Apr-00	SEQ	4.0	<1.0	<1.0	<0.05	<0.005	<0.005	<0.005	<0.005	1.0
MW-3	27-Apr-00	SEQ	3.5	<1.0	<1.0	<0.05	<0.005	<0.005	<0.005	<0.005	<1.0
MW-4	27-Apr-00	SEQ	3.0	<1.0	<1.0	<0.05	<0.005	<0.005	<0.005	<0.005	3.2
• Industrial/Commercial Ceiling Level RBSL[2]				1,000	1,000	500	1,000	520	230	210	2,500
• Groundwater Protection RBSL[3]				500	400	1.0	2.1	8.4	24	1.0	NA
Construction Worker Direct-Contact RBSL[4]				79,000[4]	79,000[4]	4,900	16	520	230	210	1,000
• Occupational Indoor Air RBSL[5]				NA	NA	69	0.39	89	220	210	NA
Analytic Method				8015M	8015M	8020	8020	8020	8020	8020	7420

Table 1. Summary of Analytical Results for COCs in Soil, South Airport Self-Fueling Facility, Taxiway U, Metropolitan Oakland International Airport, Oakland, California

Sample Location	Sample Date[1]	Lab	Depth (ft bgs)	TPH-D	TPH-G	MTBE	Benzene	Toluene	Ethylbenzene	Total Xylenes	Lead
				mg/kg							

Notes and Abbreviations:

1 = April 1999 data from HLA, 1999a; August 1999 data from HLA, 1999b; April 2000 data from HLA, 2000

2 = RBSLs from Table H-2 (RWQCB, 2001)

3 = RBSLs from Tables B-1 and G (RWQCB, 2001)

4 = RBSLs from Table K-3 for construction/trench worker direct-contact exposure (RWQCB, 2001); (4) for a non-carcinogenic hazard quotient of 1.0

5 = RBSLs from Table E-1 for occupational indoor air exposure (RWQCB, 2001)

3,200 = exceeds groundwater protection RBSL & ceiling level for nuisance concerns

680 = exceeds groundwater protection RBSL

3,000 = exceeds indoor air RBSL

420 = exceeds groundwater protection, construction worker, and indoor air RBSL

7420 = analysis by USEPA Method 7420 for lead

8015M = analysis by USEPA Method 8015M for TPH-D and TPH-G

8020 = analysis by USEPA Method 8020 for BTEX and MTBE

--- = not analyzed

<N = not detected at or above the laboratory detection limit of "N" mg/kg

a = sample exhibits fuel pattern which does not resemble standard

b = lighter hydrocarbons than indicated standard

c = heavier hydrocarbons than indicated standard

d = Did not meet QA/QC limits for surrogate recovery. The sample was re-extracted outside the hold time with the same results: <1.0

e = value is for total xylenes, constituent values not available

f = sum of m,p-xylene and o-xylene

CT = Curtis & Tompkins, Ltd., Berkeley, California

ft bgs = feet below ground surface

IDW = investigative-derived waste sample, depth not applicable

MCA = McCampbell Analytical, Inc., Pacheco, California

mg/kg = milligrams per kilogram

MOB = Mobile Chem Labs, Inc., Lafayette, California

MTBE = methyl tertiary butyl ether

NA = not available

NE = not evaluated

RBSL = risk based screening level

SEQ = Sequoia Analytical, Walnut Creek, California

TPH-D = total petroleum hydrocarbons as diesel; RBSL equivalent to pyrene's

TPH-G = total petroleum hydrocarbons as gasoline, RBSL equivalent to pyrene

Table 2. Summary of Analytical Results for COCs in Groundwater, South Airport Self-Fueling Facility, Taxiway U, Metropolitan Oakland International Airport, Oakland, California

Sample Location	Sample Date[1]	Lab	TPH-D	TPH-G	MTBE	Benzene	Toluene	Ethylbenzene	Total Xylenes	1,3,5-Trimethylbenzene	1,2,4-Trimethylbenzene
			mg/L								
Diesel Pit	22-Apr-99	MOB	640	NA	<0.5	<0.5	5.4	97	1.9[f]	---	---
Diesel Pit	30-Apr-99	SEQ	*4,000*	*120,000*	<2,500	<500	<500	<500	<500	---	---
Gas Pit	22-Apr-99	MOB	NA	*380,000*	*28,000*	*1,500*	*11,000*	*37,000*	*600*[f]	---	---
Gas Pit	30-Apr-99	SEQ	*1,700*	*42,000*	*15,000*	*620*	*3,100*	270	*8,900*[f]	---	---
SB-1	31-Aug-99	CT	<50	59	<5.0	<5.0	<5.0	<5.0	3.5[f]	<5.0	<5.0
SB-2	31-Aug-99	CT	80[ab]	300	*2,000*	63	<63	43[c]	<63	<63	<63
SB-3	31-Aug-99	CT	<50	<50	3.5[c]	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
SB-4	31-Aug-99	CT	380[ab]	---	*4,500*	<130	<130	<130	*440*[cf]	75[c]	150
SB-5	31-Aug-99	CT	<50	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
SB-6	31-Aug-99	CT	<50	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
SB-7	31-Aug-99	CT	<50	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
SB-8	31-Aug-99	CT	72[ab]	33	8.3	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-1	30-May-00	SEQ	60[d]	<50	<2.5/<2.5	<0.5	<0.5	<0.5	<0.5	---	---
MW-1	20-Sep-00	SEQ	<50	<50	<2.5	<0.5	<0.5	<0.5	<0.5	---	---
MW-1	15-Nov-00	SEQ	58[e]	<50	<2.5	<0.5	<0.5	<0.5	<0.5	---	---
MW-1	15-Feb-01	SEQ	150[e]	<50	<2.5	<0.5	<0.5	<0.5	<0.5	---	---
MW-1	12-Apr-02	STL	<50	<50	<5.0	<0.5	<0.5	<0.5	<0.5	---	---
MW-1 (dup)	12-Apr-02	STL	<50	<50	<5.0	<0.5	<0.5	<0.5	<0.5	---	---
MW-2	30-May-00	SEQ	51[d]	<50	<2.5/<2.5	<0.5	<0.5	<0.5	<0.5	---	---
MW-2	20-Sep-00	SEQ	<50	<50	<2.5	<0.5	<0.5	<0.5	<0.5	---	---
MW-2	15-Nov-00	SEQ	57[e]	<50	<2.5	<0.5	<0.5	<0.5	<0.5	---	---
MW-2	15-Feb-01	SEQ	180[e]	<50	<2.5	<0.5	<0.5	<0.5	<0.5	---	---
MW-2	12-Apr-02	STL	<50	<50	<5.0	<0.5	<0.5	<0.5	<0.5	---	---
MW-3	30-May-00	SEQ	60[d]	<50	7.5/2.6	<0.5	<0.5	<0.5	<0.5	---	---
MW-3	20-Sep-00	SEQ	<50	<50	<2.5	<0.5	<0.5	<0.5	<0.5	---	---
MW-3	15-Nov-00	SEQ	67[e]	<50	<2.5	<0.5	<0.5	<0.5	<0.5	---	---
MW-3	15-Feb-01	SEQ	<50	<50	<2.5	<0.5	<0.5	<0.5	<0.5	---	---
MW-3	12-Apr-02	STL	<50	<50	<5.0	<0.5	<0.5	<0.5	<0.5	---	---
MW-4	30-May-00	SEQ	210[d]	<50	19/17	<0.5	<0.5	<0.5	<0.5	---	---
MW-4	20-Sep-00	SEQ	<50	<50	32/42	<0.5	<0.5	<0.5	<0.5	---	---
MW-4	15-Nov-00	SEQ	70[e]	<50	32/44	<0.5	<0.5	<0.5	<0.5	---	---
MW-4	15-Feb-01	SEQ	<50	<50	2.6/2.3	<0.5	<0.5	<0.5	<0.5	---	---
MW-4	12-Apr-02	STL	<50	<50	8.4	<0.5	<0.5	<0.5	<0.5	---	---
Ceiling Level RBSL[2]			5,000	5,000	1,800	20,000	400	300	5,300	NA	NA
Surface Water Protection RBSL[3]			640	500/3,700	66,000/8,000	46/700	130/5,000	290/430	13	NA	NA
Occupational Indoor Air RBSL[4]			NA	NA	290,000	84	76,000	170,000	150,000	NA	NA
Analytic Method			8015M	8015M	8020/8260	8020/8260	8020/8260	8020/8260	8020/8260	8260	8260

Table 2. Summary of Analytical Results for COCs in Groundwater, South Airport Self-Fueling Facility, Taxiway U, Metropolitan Oakland International Airport, Oakland, California

Sample Location	Sample Date[1]	Lab	TPH-D	TPH-G	MTBE	Benzene	Toluene	Ethylbenzene	Total Xylenes	1,3,5-Trimethylbenzene	1,2,4-Trimethylbenzene
			mg/L								

Notes and Abbreviations:

1 = April 1999 data from HLA, 1999a, August 1999 data from HLA, 1999b, April 2000 data from HLA, 2000; April 2002 data reported in this document

2 = RBSLs from Table I-2 (RWQCB, 2001)

3 = RBSLs from Tables F-4a,b,c,d (RWQCB, 2001); where two values given, the first is freshwater and the second is saltwater

4 = RBSLs from Table F-2 (RWQCB, 2001)

2,000 = exceeds ceiling level RBSL

1,700 = exceeds surface water protection RBSL, saltwater value used if available

1,500 = exceeds ceiling level and surface water protection RBSLs (saltwater if avail.)

620 = exceeds indoor air RBSL

1,500 = exceeds surface water protection and indoor air RBSLs

8015M = analysis by USEPA Method 8015M for TPH-D and TPH-G

8020 = analysis by USEPA Method 8020 for BTEX or MTBE by gas chromatograph (GC); STL confirms detections by mass spectrometer (MS)

8260 = analysis by USEPA Method 8260 for BTEX or MTBE by GC/MS

--- = not analyzed

<N = not detected at or above the laboratory detection limit of "N" µg/L

a = sample exhibits fuel pattern which does not resemble standard

b = lighter hydrocarbons than indicated standard

c = estimated value

d = chromatograph pattern, unidentified hydrocarbons >C16

e = chromatograph pattern diesel C9-C24

f = sum of m,p-xylene and o-xylene

CT = Curtis & Tompkins, Ltd., Berkeley, California

dup = duplicate sample

µg/L = micrograms per liter

MOB = Mobile Chem Labs, Inc., Lafayette, California

MTBE = methyl tertiary butyl ether

NA = not available

RBSL = risk based screening level from Tables F-4a and F-4c of RWQCB, 2001

SEQ = Sequoia Analytical, Walnut Creek, California

STL = STL San Francisco, Pleasanton, California

TPH-D = total petroleum hydrocarbons as diesel

TPH-G = total petroleum hydrocarbons as gasoline

Table 3. Summary of Analytical Results for Natural Attenuation Parameters in Groundwater, South Airport Self-Fueling Facility, Taxiway U, Metropolitan Oakland International Airport, Oakland, California

Sample Location	Sample Date[1]	Lab	Total Iron	Ferrous Iron	Nitrogen as Nitrate	Orthophosphate as Phosphorus	Sulfate	Total Organic Carbon	pH	Conductivity	Temperature	Redox Potential	Dissolved Oxygen
units			*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	---	*µS/cm*	*°F*	*mV*	*mg/L*
SB-1	31-Aug-99	CT	37	<0.1	<0.05	0.58	12	18	7.27	1,700	75.0	50	3.3
SB-2	31-Aug-99	CT	17	0.27	0.06	<0.2	10	17	7.69	5,750	79.6	-254	4.1
SB-3	31-Aug-99	CT	10	0.72	<0.05	<0.2	8.1	21	6.98	2,610	78.3	-24	7.8
SB-4	31-Aug-99	CT	29	1.5	0.05	<0.2	44	15	7.06	1,003	78.5	-440	2.6
SB-5	31-Aug-99	CT	3,200	<0.1	<0.05	0.23	10	3.1	8.12	1,220	73.6	177	5.0
SB-6	31-Aug-99	CT	21	<0.1	<0.05	0.65	7.8	1.9	8.90	2,590	79.9	-677	0.8
SB-7	31-Aug-99	CT	450	<0.1	<0.05	0.69	10	6.4	7.85	1,870	79.8	-413	2.2
SB-8	31-Aug-99	CT	23	0.78	<0.05	<0.2	23	11	7.46	4,510	73.6	157	3.4
MW-1	30-May-00	SEQ	0.75	1.0	5.5	<0.5	76	47.2	---	---	---	208	2.8
	20-Sep-00	SEQ	---	0.16	1.4	1.0	60	26.2	---	---	---	261	1.4
	15-Nov-00	SEQ	---	0.33	2	<0.5	87	1.73	---	---	---	321	3.6
	15-Feb-01	SEQ	---	0.20	2.2	1	89	13.1	6.82	1,431	57.5	333	3.6
MW-2	30-May-00	SEQ	2.9	0.1	1.3	<0.5	14	9.39	---	---	---	228	2.2
	20-Sep-00	SEQ	---	0.093	0.23	<0.5	8.9	1.56	---	---	---	252	2.2
	15-Nov-00	SEQ	---	0.68	0.4	<0.5	8.3	<1.0	---	---	---	317	4.4
	15-Feb-01	SEQ	---	0.18	2.7	<0.5	30	1.93	6.99	240	56.1	290	3.8
MW-3	30-May-00	SEQ	3.9	0.7	<0.1	<0.5	51	22.5	---	---	---	164	1.2
	20-Sep-00	SEQ	---	0.16	<0.1	<0.5	51	6.54	---	---	---	161	0.8
	15-Nov-00	SEQ	---	0.46	<0.2	<0.5	59	2.20	---	---	---	296	3.6
	15-Feb-01	SEQ	---	0.06	3.6	0.79	36	8.74	7.11	837	57.7	265	4
MW-4	30-May-00	SEQ	4.6	0.4	<0.1	0.94	38	21.4	---	---	---	184	1.0
	20-Sep-00	SEQ	---	0.33	<0.1	2.8	25	4.12	---	---	---	241	2.1
	15-Nov-00	SEQ	---	0.52	<0.2	3	22	2.65	---	---	---	321	3.0
	15-Feb-01	SEQ	---	0.06	<0.1	1.1	29	4.37	6.95	385	57.5	269	2.6
Analytic Method			6010B	6010B	300.0	300.0	300.0	415.1	field	field	field	field	field

Notes and Abbreviations:

1 = 1999 data from HLA, 1999b; 2000-2001 data from HLA, 2001

6010B = analysis by USEPA Method 6010B for metals

300.0 = analysis by USEPA Method 300.0

415.1 = analysis by USEPA Method 415.1

--- = not analyzed

CT = Curtis & Tompkins, Ltd., Berkeley, California

°F = degrees farenheit

field = field measurement

mg/L = milligrams per liter

mV = millivolts

µS/cm = microsiemens per centimeter

<N = not detected at or above the laboratory detection limit of "N" mg/L

NA = not available

SEQ = Sequoia Analytical, Walnut Creek, California

Table 4. Well Construction Details and Water Level Measurements, South Airport Self-Fueling Facility, Taxiway U, Metropolitan Oakland International Airport, Oakland, California

Well ID	Date	Well Diameter (inches)	TOC Elevation[1] (ft above msl)	Screened Interval[2] (ft below TOC)	Filter Interval[2] (ft below TOC)	Depth of Well[2] (ft below TOC)	Depth to Water[2] (ft below TOC)	Groundwater Elevation (ft above msl)
MW-1	27-Apr-00	2	8.28	3.0 - 10.0	2.0 - 10.0	10.00	4.91	3.37
	18-May-00						4.96	3.32
	30-May-00						5.11	3.17
	20-Sep-00						6.30	1.98
	15-Nov-00						6.10	2.18
	15-Feb-01					10.00	5.06	3.22
	12-Apr-02					9.42	4.87	3.41
MW-2	27-Apr-00	2	6.41	3.0 - 10.0	2.0 - 10.0	10.00	4.34	2.07
	18-May-00						3.21	3.20
	30-May-00						3.49	2.92
	20-Sep-00						4.63	1.78
	15-Nov-00						4.18	2.23
	15-Feb-01						2.80	3.61
	12-Apr-02					9.90	3.08	3.33
MW-3	27-Apr-00	2	5.24	3.0 - 10.0	2.0 - 10.0	10.00	2.38	2.86
	18-May-00						2.33	2.91
	30-May-00						2.70	2.54
	20-Sep-00						3.76	1.48
	15-Nov-00						3.26	1.98
	15-Feb-01					9.73	1.66	3.58
	12-Apr-02					9.42	2.17	3.07
MW-4	27-Apr-00	2	4.49	3.0 - 10.0	2.0 - 10.0	10.00	2.48	2.01
	18-May-00						2.47	2.02
	30-May-00						2.93	1.56
	20-Sep-00						4.11	0.38
	15-Nov-00						3.27	1.22
	15-Feb-01					9.75	1.55	2.94
	12-Apr-02					9.74	2.35	2.14

Table 4. Well Construction Details and Water Level Measurements, South Airport Self-Fueling Facility, Taxiway U, Metropolitan Oakland International Airport, Oakland, California

Well ID	Date	Well Diameter (inches)	TOC Elevation[1] (ft above msl)	Screened Interval[2] (ft below TOC)	Filter Interval[2] (ft below TOC)	Depth of Well[2] (ft below TOC)	Depth to Water[2] (ft below TOC)	Groundwater Elevation (ft above msl)

Notes and Abbreviations:

1 = Port of Oakland datum, surveyed on July 21, 2000 (HLA, 2000).

2 = Data from HLA, 2000 and HLA, 2001. Measurements on 4/27/00 and 5/18/00 taken prior to well development.

ft = feet

msl = mean sea level

TOC = top of casing

APPENDIX A

ANALYTIC REPORT, CHAIN-OF-CUSTODY
FORMS, AND QA/QC SUMMARY TABLES
APRIL 12, 2002

Table A-1. Summary of Sampling QA/QC, April 12, 2002, South Airport Self-Fueling Facility, Metropolitan Oakland International Airport, Oakland, California

Who performed sampling (Firm name/address/contact/phone):	Weiss Associates 5801 Christie Avenue, Suite 600, Emeryville, CA 94608 Mary Stallard (510) 450-6132
Chain of Custody forms completed for all samples?	YES
Field parameters stabilized prior to taking sample?	YES
Zero head space in sample containers (applicable to VOCs only)?	YES
Samples preserved according to analytical method?	YES
Required field QA/QC samples taken?	YES

*Explain any "NO" answers:

Table A-2. Summary of Analytical QA/QC, April 12, 2002, South Airport Self-Fueling Facility, Metropolitan Oakland International Airport, Oakland, California

Who performed analysis (Lab name/address/contact/phone):	STL San Francisco 1220 Quarry Lane Pleasanton, CA, 94566 Afsaneh Salimpour (925) 484-1919
Analytical methods (by method number and chemical category):	Five samples analyzed by USEPA 8015M – TPH as Diesel and Gasoline Five samples analyzed by USEPA 8020 – BTEX and MTBE
Is the lab state-certified for the above analytical methods?	YES
Analyses performed according to standard methods?	YES
Sample holding times met?	YES
Analytical results reported for all values above MDL?	YES
QA/QC analyses run consistent with analytical methods?	YES
QA/QC results meet all acceptance criteria?	YES
QA/QC results and acceptance criteria on file?	YES

*Explain any "NO" answers:

DATA REVIEW SUMMARY

Project Name: PORT OF OAKLAND SOUTH AIRPORT SFF, MCA

WA Project Number: 259-1541-7

Analyses: 8015, 8020

Lab Order Number: 2002-04-0241

Sample Dates: 4/12/02

Laboratory QC Criteria	Yes	No*	NA
Have all samples been analyzed within holding times?	✓		
Are all surrogate recoveries in all samples within QC limits?	✓		
Are all LCS recoveries within QC limits?	✓		
Are all MS/MSD recoveries and RPDs within QC limits?	✓		
Are method blanks free of contamination?	✓		
Are travel blanks free of contamination?			✓
Are field/equipment blanks free of contamination?			✓
Are all compounds present in either the sample or duplicate also present in the other?			✓
Are all RPDs between sample and duplicate acceptable (40% for water, 50% for soil)?			✓

*If the answer is "No" to any of the questions above, fill out a complete ***Data Review***, located at *M:\EIG\Data Review\Checklist-(analysis type).doc.*

Flags:

Sample ID	Compound	Flag	Detects	Non-Detects	Other

Comments:

Reviewed by: ATL

Date: 6/6/02

Submission #: 2002-04-0241

Date: April 19, 2002

SEVERN TRENT SERVICES

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com
CA DHS ELAP#1094

Weiss Associates
5801 Christie Avenue, Suite 600
Emeryville, CA 94608-1827

Attn: Maile Smith

Site: Port of Oakland, South Airport SFF,MOIA

Attached is our report for your samples received on Friday April 12, 2002
This report has been reviewed and approved for release. Reproduction of this report is permitted only in its entirety.

Please note that any unused portion of the samples will be discarded after May 27, 2002 unless you have requested otherwise.
We appreciate the opportunity to be of service to you. If you have any questions, please call me at (925) 484-1919.
You can also contact me via email. My email address is: asalimpour@chromalab.com

Sincerely,

Afsaneh Salimpour
Project Manager

Submission #: 2002-04-0241

Diesel

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#1094

Weiss Associates	✉ 5801 Christie Avenue, Suite 600 Emeryville, CA 94608-1827
Attn: Maile Smith	Phone: (510) 450-6000 Fax: (510) 547-5043
259-1541-7	Project:
Site Port of Oakland, South Airport SFF,MOIA	

Samples Reported

Sample ID	Matrix	Date Sampled	Lab #
MW-1	Water	04/12/2002 09:35	1
MW-2	Water	04/12/2002 10:21	2
MW-3	Water	04/12/2002 11:00	3
MW-4	Water	04/12/2002 11:35	4
MW-1D	Water	04/12/2002 09:35	5

Submission #: 2002-04-0241

SEVERN TRENT SERVICES

Diesel

Weiss Associates
Attn: Maile Smith

Test Method: 8015M
Prep Method: 3510/8015M

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#1094

Sample ID:	**MW-1**	Lab Sample ID:	2002-04-0241-001
Project:	259-1541-7	Received:	04/12/2002 18:20
Site:	Port of Oakland, South Airport SFF,MOIA	Extracted.	04/17/2002 08:57
Sampled:	04/12/2002 09:35	QC-Batch:	2002/04/17-01.10
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Diesel	ND	50	ug/L	1.00	04/18/2002 19:40	
Surrogate(s)						
o-Terphenyl	63.3	60-130	%	1.00	04/18/2002 19:40	

Submission #: 2002-04-0241

Diesel

Weiss Associates
Attn: Maile Smith

Test Method: 8015M
Prep Method: 3510/8015M

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#1094

Sample ID:	**MW-2**	Lab Sample ID:	2002-04-0241-002
Project:	259-1541-7	Received:	04/12/2002 18:20
Site:	Port of Oakland, South Airport SFF,MOIA	Extracted:	04/17/2002 08:57
Sampled:	04/12/2002 10:21	QC-Batch:	2002/04/17-01.10
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Diesel	ND	50	ug/L	1.00	04/18/2002 19:03	
Surrogate(s)						
o-Terphenyl	78.2	60-130	%	1.00	04/18/2002 19:03	

Submission #: 2002-04-0241

SEVERN TRENT SERVICES

Diesel

Weiss Associates
Attn: Maile Smith

Test Method: 8015M
Prep Method: 3510/8015M

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#1094

Sample ID:	**MW-3**	Lab Sample ID:	2002-04-0241-003
Project:	259-1541-7	Received:	04/12/2002 18:20
Site:	Port of Oakland, South Airport SFF,MOIA	Extracted:	04/17/2002 08:57
Sampled:	04/12/2002 11:00	QC-Batch:	2002/04/17-01.10
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Diesel	ND	50	ug/L	1.00	04/18/2002 18:25	
Surrogate(s)						
o-Terphenyl	88.3	60-130	%	1.00	04/18/2002 18:25	

Submission #: 2002-04-0241

Diesel

Weiss Associates
Attn: Maile Smith

Test Method: 8015M
Prep Method: 3510/8015M

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#1094

Sample ID:	**MW-4**	Lab Sample ID:	2002-04-0241-004
Project:	259-1541-7	Received:	04/12/2002 18:20
Site:	Port of Oakland, South Airport SFF,MOIA	Extracted:	04/17/2002 08:57
Sampled:	04/12/2002 11:35	QC-Batch:	2002/04/17-01.10
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Diesel	ND	50	ug/L	1.00	04/16/2002 20:17	
Surrogate(s)						
o-Terphenyl	78.9	60-130	%	1.00	04/16/2002 20:17	

Submission #: 2002-04-0241

Diesel

Weiss Associates
Attn: Maile Smith

Test Method: 8015M
Prep Method: 3510/8015M

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#1094

Sample ID:	**MW-1D**	Lab Sample ID:	2002-04-0241-005
Project:	259-1541-7	Received:	04/12/2002 18:20
Site:	Port of Oakland, South Airport SFF,MOIA	Extracted:	04/17/2002 08:57
Sampled:	04/12/2002 09:35	QC-Batch:	2002/04/17-01.10
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Diesel	ND	50	ug/L	1.00	04/18/2002 21:32	
Surrogate(s)						
o-Terphenyl	63.1	60-130	%	1.00	04/18/2002 21:32	

Submission #: 2002-04-0241

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www.chromalab.com

CA DHS ELAP#1094

Diesel

Batch QC report

Test Method: 8015M

Prep Method: 3510/8015 M

Method Blank | **Water** | **QC Batch # 2002/04/17-01.10**

MB: 2002/04/17-01.10-001

Date Extracted: 04/17/2002 08:57

Compound	Result	Rep.Limit	Unit	Analyzed	Flag
Diesel	ND	50	ug/L	04/18/2002 17:48	
Surrogate(s)					
o-Terphenyl	103.1	60-130	%	04/18/2002 17:48	

Submission #: 2002-04-0241

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CA DHS ELAP#1094

Diesel

Batch QC report

Test Method: 8015M Prep Method: 3510/8015M

Laboratory Control Spike (LCS/LCSD) **Water** **QC Batch # 2002/04/17-01.10**

LCS: 2002/04/17-01.10-002 Extracted: 04/17/2002 08:57 Analyzed: 04/18/2002 16:34

LCSD: 2002/04/17-01.10-003 Extracted: 04/17/2002 08:57 Analyzed: 04/18/2002 17:11

Compound	Conc. [ug/L]		Exp.Conc. [ug/L]		Recovery		RPD	Ctrl.Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recover	RPD	LCS	LCSD
Diesel	1100	1030	1250	1250	88.0	82.4	6.6	60-130	25		
Surrogate(s)											
o-Terphenyl	23.1	22.2	20.0	20.0	115.6	110.9		60-130	0		

Submission #: 2002-04-0241

Gas/BTEX Compounds by 8015M/8021

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CA DHS ELAP#1094

Weiss Associates	✉ 5801 Christie Avenue, Suite 600 Emeryville, CA 94608-1827
Attn: Maile Smith	Phone: (510) 450-6000 Fax: (510) 547-5043
259-1541-7	Project:
SitePort of Oakland, South Airport SFF,MOIA	

Samples Reported

Sample ID	Matrix	Date Sampled	Lab #
MW-1	Water	04/12/2002 09:35	1
MW-2	Water	04/12/2002 10:21	2
MW-3	Water	04/12/2002 11:00	3
MW-4	Water	04/12/2002 11:35	4
MW-1D	Water	04/12/2002 09:35	5

Submission #: 2002-04-0241

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CA DHS ELAP#1094

Gas/BTEX Compounds by 8015M/8021

Weiss Associates

Attn: Maile Smith

Test Method: 8015M
8021B

Prep Method: 5030

Sample ID:	**MW-1**	Lab Sample ID:	2002-04-0241-001
Project:	259-1541-7	Received:	04/12/2002 18:20
Site:	Port of Oakland, South Airport SFF,MOIA	Extracted:	04/16/2002 14:14
Sampled:	04/12/2002 09:35	QC-Batch:	2002/04/16-01.02
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Gasoline	ND	50	ug/L	1.00	04/16/2002 14:14	
Benzene	ND	0.50	ug/L	1.00	04/16/2002 14:14	
Toluene	ND	0.50	ug/L	1.00	04/16/2002 14:14	
Ethyl benzene	ND	0.50	ug/L	1.00	04/16/2002 14:14	
Xylene(s)	ND	0.50	ug/L	1.00	04/16/2002 14:14	
MTBE	ND	5.0	ug/L	1.00	04/16/2002 14:14	
Surrogate(s)						
Trifluorotoluene	86.6	58-124	%	1.00	04/16/2002 14:14	
4-Bromofluorobenzene-FID	90.5	50-150	%	1.00	04/16/2002 14:14	

Submission #: 2002-04-0241

Gas/BTEX Compounds by 8015M/8021

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CA DHS ELAP#1094

Weiss Associates

Attn: Maile Smith

Test Method: 8015M
8021B

Prep Method: 5030

Sample ID:	**MW-2**	Lab Sample ID:	2002-04-0241-002
Project:	259-1541-7	Received:	04/12/2002 18:20
Site:	Port of Oakland, South Airport SFF,MOIA	Extracted:	04/17/2002 13:04
Sampled:	04/12/2002 10:21	QC-Batch:	2002/04/17-01.02
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Gasoline	ND	50	ug/L	1.00	04/17/2002 13:04	
Benzene	ND	0.50	ug/L	1.00	04/17/2002 13:04	
Toluene	ND	0.50	ug/L	1.00	04/17/2002 13:04	
Ethyl benzene	ND	0.50	ug/L	1.00	04/17/2002 13:04	
Xylene(s)	ND	0.50	ug/L	1.00	04/17/2002 13:04	
MTBE	ND	5.0	ug/L	1.00	04/17/2002 13:04	
Surrogate(s)						
Trifluorotoluene	75.8	58-124	%	1.00	04/17/2002 13:04	
4-Bromofluorobenzene-FID	86.2	50-150	%	1.00	04/17/2002 13:04	

Submission #: 2002-04-0241

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CA DHS ELAP#1094

Gas/BTEX Compounds by 8015M/8021

Weiss Associates

Test Method: 8015M
8021B

Attn: Maile Smith

Prep Method: 5030

Sample ID:	**MW-3**	Lab Sample ID:	2002-04-0241-003
Project:	259-1541-7	Received:	04/12/2002 18:20
Site:	Port of Oakland, South Airport SFF,MOIA	Extracted:	04/17/2002 13:38
Sampled:	04/12/2002 11:00	QC-Batch:	2002/04/17-01.02
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Gasoline	ND	50	ug/L	1.00	04/17/2002 13:38	
Benzene	ND	0.50	ug/L	1.00	04/17/2002 13:38	
Toluene	ND	0.50	ug/L	1.00	04/17/2002 13:38	
Ethyl benzene	ND	0.50	ug/L	1.00	04/17/2002 13:38	
Xylene(s)	ND	0.50	ug/L	1.00	04/17/2002 13:38	
MTBE	ND	5.0	ug/L	1.00	04/17/2002 13:38	
Surrogate(s)						
Trifluorotoluene	83.2	58-124	%	1.00	04/17/2002 13:38	
4-Bromofluorobenzene-FID	90.7	50-150	%	1.00	04/17/2002 13:38	

Submission #: 2002-04-0241

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Gas/BTEX Compounds by 8015M/8021

Weiss Associates

Attn: Maile Smith

Test Method: 8015M
8021B

Prep Method. 5030

Sample ID:	**MW-4**	Lab Sample ID:	2002-04-0241-004
Project:	259-1541-7	Received:	04/12/2002 18:20
Site:	Port of Oakland, South Airport SFF,MOIA	Extracted:	04/17/2002 14:13
Sampled:	04/12/2002 11:35	QC-Batch:	2002/04/17-01.02
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Gasoline	ND	50	ug/L	1.00	04/17/2002 14:13	
Benzene	ND	0.50	ug/L	1.00	04/17/2002 14:13	
Toluene	ND	0.50	ug/L	1.00	04/17/2002 14:13	
Ethyl benzene	ND	0.50	ug/L	1.00	04/17/2002 14:13	
Xylene(s)	ND	0.50	ug/L	1.00	04/17/2002 14:13	
MTBE	8.4	5.0	ug/L	1.00	04/17/2002 14:13	
Surrogate(s)						
Trifluorotoluene	84.3	58-124	%	1.00	04/17/2002 14:13	
4-Bromofluorobenzene-FID	91.8	50-150	%	1.00	04/17/2002 14:13	

Submission #: 2002-04-0241

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Gas/BTEX Compounds by 8015M/8021

Weiss Associates

Attn: Maile Smith

Test Method: 8015M
8021B

Prep Method: 5030

Sample ID:	**MW-1D**	Lab Sample ID:	2002-04-0241-005
Project:	259-1541-7	Received:	04/12/2002 18:20
Site:	Port of Oakland, South Airport SFF,MOIA	Extracted:	04/17/2002 14:48
Sampled:	04/12/2002 09:35	QC-Batch:	2002/04/17-01.02
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Gasoline	ND	50	ug/L	1.00	04/17/2002 14:48	
Benzene	ND	0.50	ug/L	1.00	04/17/2002 14:48	
Toluene	ND	0.50	ug/L	1.00	04/17/2002 14:48	
Ethyl benzene	ND	0.50	ug/L	1.00	04/17/2002 14:48	
Xylene(s)	ND	0.50	ug/L	1.00	04/17/2002 14:48	
MTBE	ND	5.0	ug/L	1.00	04/17/2002 14:48	
Surrogate(s)						
Trifluorotoluene	79.6	58-124	%	1.00	04/17/2002 14:48	
4-Bromofluorobenzene-FID	85.1	50-150	%	1.00	04/17/2002 14:48	

Submission #: 2002-04-0241

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Gas/BTEX Compounds by 8015M/8021

Batch QC report

Test Method: 8015M
8021B

Prep Method: 5030

Method Blank | **Water** | **QC Batch # 2002/04/16-01.02**

MB: 2002/04/16-01.02-003 | Date Extracted: 04/16/2002 08:26

Compound	Result	Rep.Limit	Unit	Analyzed	Flag
Gasoline	ND	50	ug/L	04/16/2002 08:26	
Benzene	ND	0.5	ug/L	04/16/2002 08:26	
Toluene	ND	0.5	ug/L	04/16/2002 08:26	
Ethyl benzene	ND	0.5	ug/L	04/16/2002 08:26	
Xylene(s)	ND	0.5	ug/L	04/16/2002 08:26	
MTBE	ND	5.0	ug/L	04/16/2002 08:26	
Surrogate(s)					
Trifluorotoluene	79.4	58-124	%	04/16/2002 08:26	
4-Bromofluorobenzene-FID	93.3	50-150	%	04/16/2002 08:26	

Submission #: 2002-04-0241

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Gas/BTEX Compounds by 8015M/8021

Batch QC report

Test Method: 8015M
8021B

Prep Method: 5030

Method Blank **Water** **QC Batch # 2002/04/17-01.02**

MB: 2002/04/17-01.02-003 Date Extracted: 04/17/2002 08:47

Compound	Result	Rep.Limit	Unit	Analyzed	Flag
Gasoline	ND	50	ug/L	04/17/2002 08:47	
Benzene	ND	0.5	ug/L	04/17/2002 08:47	
Toluene	ND	0.5	ug/L	04/17/2002 08:47	
Ethyl benzene	ND	0.5	ug/L	04/17/2002 08:47	
Xylene(s)	ND	0.5	ug/L	04/17/2002 08:47	
MTBE	ND	5.0	ug/L	04/17/2002 08:47	
Surrogate(s)					
Trifluorotoluene	80.9	58-124	%	04/17/2002 08:47	
4-Bromofluorobenzene-FID	94.8	50-150	%	04/17/2002 08:47	

Submission #: 2002-04-0241

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Gas/BTEX Compounds by 8015M/8021

Batch QC report

Test Method: 8021B Prep Method: 5030

Laboratory Control Spike (LCS/LCSD) **Water** **QC Batch # 2002/04/16-01.02**

LCS: 2002/04/16-01.02-004 Extracted: 04/16/2002 09:01 Analyzed: 04/16/2002 09:01

LCSD: 2002/04/16-01.02-005 Extracted: 04/16/2002 09:36 Analyzed: 04/16/2002 09:36

Compound	Conc. [ug/L]		Exp Conc. [ug/L]		Recovery		RPD	Ctrl.Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recover	RPD	LCS	LCSD
Benzene	89.7	86.3	100.0	100.0	89.7	86.3	3.9	77-123	20		
Toluene	90.1	86.0	100.0	100.0	90.1	86.0	4.7	78-122	20		
Ethyl benzene	92.7	90.0	100.0	100.0	92.7	90.0	3.0	70-130	20		
Xylene(s)	275	266	300	300	91.7	88.7	3.3	75-125	20		
Surrogate(s)											
Trifluorotoluene	409	384	500	500	81.8	76.8		58-124			

Submission #: 2002-04-0241

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Gas/BTEX Compounds by 8015M/8021

Batch QC report

Test Method: 8015M Prep Method: 5030

Laboratory Control Spike (LCS/LCSD) **Water** **QC Batch # 2002/04/16-01.02**

LCS: 2002/04/16-01.02-006 Extracted: 04/16/2002 10:11 Analyzed: 04/16/2002 10:11

LCSD: 2002/04/16-01.02-007 Extracted: 04/16/2002 10:46 Analyzed: 04/16/2002 10:46

Compound	Conc. [ug/L]		Exp.Conc. [ug/L]		Recovery		RPD	Ctrl.Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recover	RPD	LCS	LCSD
Gasoline	543	534	500	500	108.6	106.8	1.7	75-125	20		
Surrogate(s)											
4-Bromofluorobenzene	506	489	500	500	101.2	97.8		50-150			

Submission #: 2002-04-0241

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CA DHS ELAP#1094

Gas/BTEX Compounds by 8015M/8021

Batch QC report

Test Method: 8021B Prep Method: 5030

Laboratory Control Spike (LCS/LCSD) **Water** **QC Batch # 2002/04/17-01.02**

LCS: 2002/04/17-01.02-004 Extracted: 04/17/2002 09:22 Analyzed: 04/17/2002 09:22

LCSD: 2002/04/17-01.02-007 Extracted: 04/17/2002 11:19 Analyzed: 04/17/2002 11:19

Compound	Conc. [ug/L]		Exp.Conc. [ug/L]		Recovery		RPD	Ctrl.Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recover	RPD	LCS	LCSD
Benzene	89.8	90.2	100.0	100.0	89.8	90.2	0.4	77-123	20		
Toluene	89.8	89.5	100.0	100.0	89.8	89.5	0.3	78-122	20		
Ethyl benzene	94.9	93.0	100.0	100.0	94.9	93.0	2.0	70-130	20		
Xylene(s)	278	273	300	300	92.7	91.0	1.9	75-125	20		
Surrogate(s)											
Trifluorotoluene	409	402	500	500	81.8	80.4		58-124			

Submission #: 2002-04-0241

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CA DHS ELAP#1094

Gas/BTEX Compounds by 8015M/8021

Batch QC report

Test Method: 8015M Prep Method: 5030

Laboratory Control Spike (LCS/LCSD) **Water** **QC Batch # 2002/04/17-01.02**

LCS: 2002/04/17-01.02-008 Extracted: 04/17/2002 11:54 Analyzed: 04/17/2002 11:54

LCSD: 2002/04/17-01.02-009 Extracted: 04/17/2002 12:29 Analyzed: 04/17/2002 12:29

Compound	Conc. [ug/L]		Exp.Conc. [ug/L]		Recovery		RPD	Ctrl.Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recover	RPD	LCS	LCSD
Gasoline	500	532	500	500	100.0	106.4	6.2	75-125	20		
Surrogate(s)											
4-Bromofluorobenzene	471	481	500	500	94.2	96.2		50-150			

2002-04-0271

Weiss Associates

Environmental Science, Engineering and Management Services

5801 Christie Avenue, Suite 600, Emeryville, CA 94608
Phone: 510-450-6000 Fax: 510-547-5043

AguaTierra Associates Incorporated, DBA

Please send analytic results and a copy of the signed chain of custody form to:	LAB PERSONNEL:
	Please Include QA/QC Data.
	Specify analytic method and detection limit in report.
Maile Smith	Notify us of any anomalous peaks in GC or other scans.
Project ID: 259-1541-7	Notify us of any questions or problems.
Protocol No.: 1541_0203	65814

CHAIN-OF-CUSTODY RECORD AND ANALYTIC INSTRUCTIONS

Sampled by: ATL Laboratory Name: STL San Francisco Site Name: Port of Oakland, South Airport SFF, MOIA

Sample ID	Sample Date	Sample Time	# of Containers	Sample/ Container Type[1]	Volume	Preservative?	Filter? 2	Refrig? 3	Turn 4	Analyze for	Analytical Method	Special Instructions
MW-1	4/12/02	0935	3 & 2	W/V & A	40 ml & 1 L	HCl & none	N	Y	N	TPH-D, TPH-G, BTEX & MTBE	8015M & 8020	lowest detection limits MTBE: confirm by MS
MW-2		1021	3 & 2	W/V & A	40 ml & 1 L	HCl & none	N	Y	N	TPH-D, TPH-G, BTEX & MTBE	8015M & 8020	lowest detection limits MTBE: confirm by MS
MW-3		1100	3 & 2	W/V & A	40 ml & 1 L	HCl & none	N	Y	N	TPH-D, TPH-G, BTEX & MTBE	8015M & 8020	lowest detection limits MTBE: confirm by MS
MW-4		1135	3 & 2	W/V & A	40 ml & 1 L	HCl & none	N	Y	N	TPH-D, TPH-G, BTEX & MTBE	8015M & 8020	lowest detection limits MTBE: confirm by MS
MW-1D		0935	3 & 2	W/V & A	40 ml & 1 L	HCl & none	N	Y	N	TPH-D, TPH-G, BTEX & MTBE	8015M & 8020	lowest detection limits MTBE: confirm by MS
TB		0800	1	W/V	40 ml	HCl	N	Y	HOLD	VOCs	8260	HOLD
												5.2°C

1 Released by (Signature), Date, Time: Joyce Adams

1 (Affiliation): Weiss Associates 5115

2 Received by (Signature), Date, Time: Received By DYNAMEX 254 -1Fed

2 (Affiliation):

3 Released by (Signature), Date, Time: David #254 DYNAMEX 6-15-P.M.

3 (Affiliation):

4 Received by (Signature), Date, Time: Denise Harrington 4/12/02 @ 1820

4 (Affiliation): STL-SF

5 Released by (Signature), Date, Time:

5 (Affiliation):

6 Received by (Signature), Date, Time:

6 (Affiliation):

1 = Sample Type Codes: W = Water, S = Soil, Describe Other; Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B - Clear/Brown Glass, Describe Other;

Cap Codes: PT = Plastic, Teflon Lined 2 = Filtered (Y/N) 3 = Refrigerated (Y/N) 4 = Turnaround: N = Normal, W = 1 Week, R = 24 Hour, HOLD (write out)

ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS:

BILL TO PORT OF OAKLAND, C/O DALE KLETTKE (INCLUDE PROJECT ID/SITE NAME FOR REFERENCE)

J:\Clients\Port of Oakland\Bg009_FISCO\Protocols\1541_0203.xls\COC

attn: Dale Klettke