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MCAS EL TORO
SSIC NO. 5090.3

SUMMARY REPORT
AERIAL PHOTOGRAPH ANOMALY, APHO 6
MARINE CORPS AIR STATION
EL TORO, CALIFORNIA

Environmental Remedial Action
Contract No. N62474-98-D-2076
Contract Task Order 0024

Document Control Number 3588
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March 19, 2002

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3/18/02
Date

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3/14/02

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San Diego, California 92132-5190

File: ETAPHO6ltrmarch2002.doc

Transmittal

Date: 22 March 2002

From: Lynn Marie Hornecker LMH

To: Triss Chesney
State of California Environmental Protection Agency
Department of Toxic Substances Control (DTSC), Region 4
Site Mitigation Branch, Base Closure Unit
5796 Corporate Avenue
Cypress, CA 90630

Subj: Aerial Photograph Anomaly APHO 6
Former Marine Corps Air Station, El Toro

Provided for your review as the attachment is the Summary Report for APHO 6 at the Former Marine Corps Air Station, El Toro. APHO 6 was identified on a photograph taken in 1946 and the anomaly was described as impoundments near Building 306. The historical records show that Building 306 was originally used as a water treatment plant for the Station's domestic water supply system and the impoundment area (APHO 6) is identified as an abandoned slurry bed on a facility plan dated 1959. The impoundment area encompassed an area approximately 60 feet wide by 60 feet long.

We conducted field sampling and geophysical surveying activities during February and March 2000, and the results of the field work, a screening risk evaluation, and the results of the visual inspection are included in the attached documentation. The screening risk evaluation does not identify a significant risk to human health at APHO 6. Consequently, we are recommending no further action status for APHO 6 and we propose to document no further action status in the next BRAC Business Plan update.

If we do not receive comments from your office within sixty (60) days of receipt of this transmittal, then we will assume that you concur with our findings and our recommendation to designate no further action status for APHO 6.

Please do not hesitate to call me at (619) 532-0783 if you have questions on the attachment. Thank you very much.

Attachment
Summary Report, APHO 6 (IT Corporation March 2002)

CF:
Dean Gould (MCAS El Toro BEC)
Project File (MCAS El Toro)

IT CORPORATION
A Member of The IT Group

IT TRANSMITTAL/DELIVERABLE RECEIPT

CONTRACT N62474-98-D-2076 **DOCUMENT CONTROL NUMBER** 3588.0

TO: Administrative Contract Officer
Southwest Division
Naval Facilities Engineering Command
Michelle Crook, 02R1.MC
1230 Columbia St., Suite 870
San Diego, CA 92101-5817

Date : March 20, 2002
CTO : 0024
Location: MCAS El Toro

FROM:

Dhananjay Rawal
Project Manager

DESCRIPTION OF ENCLOSURE : ***Summary Report, Aerial Photograph Anomaly, APHO 6, dated March 19, 2002.***

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1.0 Introduction

The purpose of this Summary Report is to present information pertaining to an aerial photograph anomaly, designated as aerial photograph anomaly (APHO) 6. APHO 6 is located in the vicinity of Building 306 in the western portion of the Marine Corps Air Station (MCAS), El Toro (herein after referred to as Station), California. OHM Remediation Services Corporation (OHM) performed an evaluation of historical records, site visit, site inspection, and field verification sampling activities, under Delivery Order (DO) 0070 for the Southwest Division Naval Facilities Engineering Command (SWDIV) under Remedial Action Contract No. N6811-93-D-1459.

This document was prepared by IT Corporation (IT) under Southwest Division Naval Facilities Engineering Command (SWDIV) under Remedial Action Contract No. N68711-98-D-2076, Contract Task Order (CTO) 0024.

1.1 Site Background

APHO 6 and APHO 11 were grouped together as Anomaly Area 4 in 1999 during the development strategies for management of anomalies in 1999. Anomaly Area 4 was intended to address both APHO 6 and APHO 11 because the anomalies were described as impoundments or trenches that were associated with or believed to be associated with the former water treatment plant located at Building 306. Historical station maps from the 1940s show a water treatment facility at Building 306 with adjacent slurry beds (Appendix A). APHO 11 (SAIC 81) was believed to represent the slurry beds several hundred feet away from Building 306.

A sampling strategy was implemented for both APHO 6 and APHO 11 (Appendix B), however, this report summarizes only the findings for the field investigation of APHO 6. APHO 6 (SAIC 39) was located in close proximity to Building 306 and the impoundments were identified as slurry beds on early facility maps. APHO 11 (SAIC 81) was believed to represent the slurry beds several hundred feet away from Building 306. The data for APHO 11 will be reported separately because a geophysical survey of APHO 11 identified the potential presence of subsurface debris and the future exploration of the geophysical anomaly will be conducted as a separate project.

During the 1940's and early 1950's, the Station operated several domestic water supply wells with the water treatment plant at Building 306. A 1954 facility map identifies Building 306 as a water treatment plant and a 1958 map identifies Building 306 as a public works shop area. The 1997 building guide also identifies Building 306 as a public works shop area. The water treatment operations appear to have ceased around the mid-1950's based upon the review of historical maps. Also, former Well AW-4, located west of Building 306 was one of the domestic water supply wells that were used in the 1940's and this well was destroyed with Orange County Health Care Agency oversight during March and April 1998 (OHM, 1998).

APHO 6 vicinity is included within the investigation boundary of Installation Restoration Program (IRP) Site 24 – the Volatile Organic Compound (VOC) Source Area and that shallow soil gas samples were collected in the general vicinity of Building 306 and APHO 6 during the survey of 1994. No significant concentrations of VOCs were detected during the soil gas survey (JEG, 1994).

An underground storage tank (UST 306) was removed from the west side of Building 306 in 1991 and the tank site was closed by the RWQCB in 1996 (BCP, 2001).

1.2 Site Location

The MCAS El Toro (Station) comprises of approximately 4,700 acres (Figure 1-1) and is located in eastern Orange County approximately 45 miles southeast of Los Angeles, California. APHO 6 is located in the southwest quadrant of the Station, and northeast of intersection "K" Street and "L" Street (Figure 1-2). APHO 6 includes one 60-by 60-foot former slurry bed located immediately northeast of Building 306, a former water treatment facility constructed in 1944.

This Summary Report includes a description of information collected during the investigation of nearby results from the field verification activities and visual inspection of the APHO 6 area. Laboratory analytical results indicate that no petroleum hydrocarbons and Volatile Organic Carbons (VOCs) were released to the ground surface at this site. Some metals were detected above the stated laboratory-reporting limit. The net carcinogenic risk is less than 10^{-6} for the potential future residential scenario. The non-cancer hazard index for detected chemicals is less than 1.0 for the potential future residential scenario. Based on the review of the field data it is recommended that *"no further action status"* designated for APHO 6.

2.0 Field Inspections

The Anomaly description was derived from the following source document; Final Report, Aerial Photograph Assessment (SAIC, 1993) are presented in italics:

APHO 6 (SAIC 39-date of photograph: 1946): *Two impoundments (IM) can be observed on the southwest side of Building 306, near S 11th Street and L Street. Investigation of the impoundments' uses is recommended.*

2.1 Field Inspections

OHM conducted a visual inspection, including taking photographs of APHO 6 area on December 1, 1999. Photographs of APHO 6 and the checklist form for the visual inspection are presented in Appendix C.

APHO 6 is relatively flat with most of the area is unpaved with gravel road. No significant stains or discolored areas were observed on the surface soil or near vicinity of APHO 6 during the inspection. The area northwest of Building 306 was observed to be grass covered. Surrounding area appears flat with little disturbance.

3.0 Environmental Setting

This section summarizes the general physiographic, geologic, and hydrogeologic setting in the vicinity of APHO 6.

3.1 Physiography and Topography

The Station is located on the southeastern edge of the Tustin Plain and extends into the Santa Ana Mountains. The Tustin Plain slopes gently toward the west-southwest with land surface elevations ranging from approximately 215 feet above mean sea level (msl) at the western corner to approximately 410 feet msl at the eastern edge of the Station. Elevations within the portion of the Station in the Santa Ana Mountains extend upward to 800 feet msl near the northeast corner of the Station. The topography in the area of APHO 6 gently slopes to the west, with elevations ranging from 269 to 270 feet above msl datum.

3.2 Geology

The Station is situated on alluvial materials derived mainly from the Santa Ana Mountains. These Holocene materials consist of coarse-grained stream channel deposits and fine-grained overbank deposits that are up to 300 feet thick (Herndon and Reilly, 1989).

The Holocene alluvial materials conformably overlie Pleistocene sediments predominantly composed of interlayered fine-grained lagoonal and near-shore marine deposits. These materials become increasingly mixed with beach sands, terrace deposits, and stream channel deposits in the eastern portion of the Tustin Plain and along the eastern plain edges. The Quaternary deposits form a heterogeneous mixture of silts and clays, with interbedded sands and fine gravels up to 500 feet thick in the western portion of the Tustin Plain (Singer, 1973).

Borings advanced in the APHO 6 area indicated that the site is underlain by a shallow silt (ML) extending from the surface to a depth of approximately 10 feet, and interbedded sand and silt to a depth of approximately 20 feet. To the west, in the vicinity of Building 307, the site is underlain by silty sand and sand to a depth of 25 feet. Generally the underlying sedimentary units appear to be composed of a sand channel sequence in the west, becoming interbedded sand, silty sand, and silt overbank deposits toward the east. These units appear typical of the channel and overbank deposits in comprising the Holocene deposits of the Tustin Plain.

3.3 Hydrogeology

The Station is situated within the Irvine Groundwater Subbasin, which comprises the southeast segment of the Main Orange County Groundwater Basin. Regional groundwater flow in the subbasin has been to the west and northwest since the 1940s and is controlled locally by large groundwater withdrawal depressions. From 1969 to 1982, an average gradient of 0.0046 foot per foot (ft/ft) to the northwest was reported in the principal aquifer zone of the Irvine area (Banks, 1984). Phase I remedial investigation data indicated a similar groundwater flow direction in the shallower groundwater zone, with a slightly higher gradient of 0.008 ft/ft (JEG, 1993).

The depth to groundwater beneath the Station ranges from approximately 45 feet below ground surface in the foothills to 240 feet below ground surface in the deepest portion of the Irvine Subbasin. The depth to groundwater in the vicinity of APHO 6 is estimated to be approximately 110 feet below ground surface, based on available water-level data from nearby monitoring wells 09_DGMW75 and 24_NEW1. These data are presented in the Groundwater Monitoring Report (Camp Dresser & McKee, Inc. [CDM] Federal Programs, 2000) and provided in Appendix D. The well locations are shown in Figure 1-2.

3.3.1 Groundwater Conditions

Groundwater conditions have been investigated in the vicinity of APHO 6 during the investigation of IRP Site 24. APHO 6 lies within the boundaries of IRP Site 24.

A total of 14 groundwater wells (24EX30B1, 24EX30B2, 24EX30B3, 24EX40B2, 24EX50B1, 24EX50B2, 24EX60B1, 24EX60B2, 24EX60B3, 24NEW1, 24NEW4, 24NEW6, 24NEW7 and 24NEW8) have been monitored at Installation Restoration Program (IRP) Site 24 during Round 8 groundwater monitoring activities at the Station (CDM, 2000). Excerpts from the CDM groundwater monitoring report (CDM, 2000). Additional information pertaining to groundwater conditions at APHO 6 is available in IRP Site 24 reports.

4.0 Field Verification Activities

OHM collected shallow soil samples on February 2, 2000 at five locations in the vicinity of APHO 6 in order to ascertain whether a release had occurred. Sampling activities were conducted in accordance with the strategy identified by the SWDIV Navy in the facsimile transmittal of June 1999, DTSC comments dated June 22, 1999 on the SWDIV Navy facsimile sampling strategy of May 1999, and Supplemental Sampling Strategy, Aerial Photograph Areas 4 and 5 issued by OHM in November 1999 (OHM, 1999). Copies of June and November 1999 Sampling Strategy are included in Appendix B. Field activities included: a geophysical survey; verification soil sampling; and a land survey.

Sampling activities were conducted in accordance with the following documents: 1) Agency approved Preliminary Draft DO 0024 documents: Work Plan, Contractor Quality Control Plan Addendum, Waste Management Plan, Chemical Data Acquisition Plan (OHM, 1995a), and Site-Specific Health and Safety Plan (OHM, 1995b); 2) DO 0070 Draft Supplemental Work Plan, Closure of Various Temporary Accumulation Areas and RCRA Facility Assessment Sites, Marine corps Air Station (MCAS), El Toro (OHM 1997).

4.1 Geophysical Survey

In January 2000 and March 2001, GeoVision conducted a geophysical survey at Anomaly Area 4, which includes APHO 6 area, using magnetic and electromagnetic (EM) methods as part of the subsurface investigation. The purpose of the investigation was to screen the areas for buried metallic and/or construction debris. The investigation included two areas, Survey Area A and Survey Area B. Survey Area B, an area of about 0.25 acres in size, includes the former slurry bed near Building 306 described in this report (GeoVision, 2001).

The magnetometers used during the survey consisted of Geometrics G858 optically pumped cesium-vapor magnetometer (G858) and a GEM GSM-19 base station magnetometer. The instruments are used to detect buried ferromagnetic objects and record the earth's magnetic field in nanoteslas (nT). Magnetometers can often locate buried ferrous metallic objects to greater depths than other methods.

EM induction equipment used during the survey included the use of a Geonics EM-31 terrain conductivity meter (EM-31) and Geonics EM-61 digital metal detector (EM-61), in conjunction with a data logger. The instruments are used to detect both ferrous and nonferrous metallic objects with high-resolution.

The investigation indicates the presence of two buried pipes in the south portion of the survey area. The survey did not, however, find evidence indicative of buried metallic debris at Survey Area B, APHO 6 (GeoVision, 2001). A copy of the geophysical survey is provided in Appendix E.

4.2 Verification Drilling Activities

On February 2, 2000, OHM conducted verification drilling and sampling activities at APHO 6 to evaluate the sub surface conditions. A total of 5 soil borings were advanced (PHA4 SB-01 through PHA4SB-05) to approximate total depths of 20 feet below ground surface. Soil samples were collected at the approximate depths of 5, 10, 15 and 20 feet below ground surface for borings PHA4 SB-01 through PHA4 SB-03 and at the approximate depths of 5, 10 and 20 feet below ground surface for borings PHA4-SB-04 and PHA4 SB-05 and then submitted for laboratory analysis. These boring locations were selected based on field visit. The soil boring locations, and other historical information, are shown in Figure 1-3, Site Plan.

Drilling and Soil Sampling Techniques

BC^2 Environmental Corporation, an OHM subcontractor, advanced a total of five soil borings with a tractor mounted CME 75 mobile drilling rig using hollow-stem auger drilling techniques. A total of 10 soil samples including, a duplicate sample, were collected using a California-modified split-spoon sampler. Soil samples were collected from depths of 5 and 10 feet below ground surface and submitted for laboratory analyses. Following the completion of sampling activities, the soil borings were backfilled with a cement-bentonite grout.

To minimize the potential for cross-contamination, drilling and sampling equipment was decontaminated before initiating work at the site, between each soil boring, and at the completion of the work at the site. Decontamination was accomplished by using a pressure washer and/or scrubbing with a non-phosphate detergent and water solution, rinsing with tap water, and rinsing with deionized water.

Soil Lithology

Based on the soil samples collected from borings PHA4 SB-01 through SB-05, soil conditions appeared consistent throughout the investigated area. The boring logs indicate that the subsurface soil in the vicinity of APHO 6 consists primarily of silt, silty-sand, fine sand and medium sand. Also, visual observations of soil cuttings did not reveal the presence of non-native materials. The field boring logs, describing soils underlying the site and indicating soil sample collection intervals are presented in Appendix F.

Sample Tracking and Analytical Methods

Sample handling, documentation, and packaging, was conducted in accordance with the procedures described in the approved draft work plan (OHM, 1995a). The soil samples were analyzed for:

- Total petroleum hydrocarbons (TPH) as diesel and as gasoline using California Leaking Underground Fuel Tank (CA LUFT) Method 8015 Modified;
- Volatile organic compounds (VOCs), including methyl tert-butyl ether (MTBE) using EPA Method 8260A;
- Metals by EPA 6010A and EPA 7471A;
- Cynanide by EPA 9010;
- Organochlorine Pesticides and PCBs by EPA 8081 and EPA 8082;
- Semivolatile organics Base/Neutral Extractables by EPA 8270;
- Herbicides by EPA 8151

Analytical Results

TPH as diesel and gasoline, volatile organic carbons (VOC), PCBs, herbicides, SVOCs, mercury and cyanide were not detected in concentrations equal to or exceeding the laboratory reporting limits in the soil samples collected from borings PHA4-SB01 through PHA4-SB05.

Pesticides were not detected in concentrations equal to or exceeding the stated laboratory reporting limits, with the exception of heptachlor, detected below background levels for the station with a maximum concentration of 0.0016 mg/kg (18609-2754).

Metals that were detected above background levels for the station were the following: aluminum, antimony, barium, beryllium, cobalt, copper, iron, magnesium, manganese, potassium, selenium, silver, sodium, thallium, and zinc. All remaining metals were detected below background levels for the station.

- Laboratory analytical results of soil samples collected from the verification borings are summarized in Figure 1-3, and are listed with the background concentrations and PRGs in Table 4-1. Laboratory analytical reports with chain of custody are provided in Appendix G, Laboratory Analytical Reports.

Quality Assurance/Quality Control

Field quality assurance/quality control (QA/QC) samples were collected during sampling activities to evaluate the consistency and accuracy of the analytical data. Field QC samples for the APHO 6 consisted of equipment rinsate, soil sample duplicate, and trip blank samples as follows:

- Equipment rinsate samples were collected at a frequency of 1 per day.
- One duplicate soil sample was collected (sample number 18609-2753).
- Trip blank samples were collected at a frequency of 1 blank for each cooler containing samples for VOC analysis.

Analytical results of the trip blank and equipment rinsate samples are summarized in Table 4-2. Laboratory analytical reports with chain of custody are provided in Appendix G, Laboratory Analytical Reports.

4.3 Land Surveying

After completing the verification drilling, the soil boring locations were surveyed on December 14, 1999 by Cal Vada Surveying, Inc., a California-registered land surveyor. The surveyed locations were measured to ± 0.01 ft/ft horizontally and tied to the California State Plane Coordinate Systems, North American Datum 1983. The surveyed elevations were measured to ±0.01 foot vertically and tied to mean sea level datum. The surveyed plan for APHO 6 is presented as Appendix H, Land Survey Plan.

5.0 Risk Characterization

This section briefly describes the approach used to estimate risk and summarizes the baseline screening level risk assessment results for APHO 6. A screening level risk assessment for human health was conducted following the guidance provided in the EPA Region 9 PRGs Memorandum (EPA 2000). The physical characteristics of the sites described in this report and the results of verification soil sampling conducted at the sites were used to characterize and calculate the risks.

5.1 Exposure Assessment

For the purposes of this risk screening evaluation, the residential scenario is used as the worst case scenario. The current industrial use or future recreational use as a park would have lower exposures and the risk would be less. If the risk is acceptable for the residential land use scenario, the risk would also be acceptable for both the current and future land use scenarios.

5.2 Toxicity Assessment

The PRGs incorporate the toxicity values from the Integrated Risk Information System, the Health Effects Assessment Summary Tables, and the National Center for Environmental Assessment. Cancer PRGs incorporate cancer toxicity values and the non-cancer PRGs incorporate the toxicity values for chronic health effects other than cancer (EPA, 2000). Both cancer risk and non-cancer hazards were evaluated in this screening risk assessment.

5.3 Risk Characterization

As described the in EPA Region 9 PRGs Memorandum (EPA, 2000), risk screening was conducting by comparing maximum site concentrations for detected chemicals to PRGs. These comparisons were used to calculate cancer risk and non-cancer hazard estimates for the site.

The PRGs are concentrations calculated using standard exposure factors that are protective of humans, including sensitive groups, over a lifetime. These PRG concentrations pose acceptable cancer risk or non-cancer hazard under the exposure scenarios evaluated. Generally, a cancer risk of 10^{-6} to 10^{-4} and a non-cancer hazard index of 1 or less are considered acceptable levels of risk. Therefore, the PRG concentrations are calculated to the lower end of the acceptable cancer risk range of $1x10^{-6}$ and to a non-cancer hazard index of 1.

Cancer risk is calculated by dividing the site concentration by the PRG for each chemical. The ratios are added and the sum is then multiplied by 10^{-6}. The hazard index is calculated by dividing the site concentration by the PRG for each chemical and adding the resultant ratios.

Although maximum concentrations for chemicals detected at the site are used for this risk screening, comparisons are not made to maximum detected background concentrations. To maintain a conservative estimate of background risk, the 95th quantile background concentrations calculated for Marine Corps Air Station El Toro (Bechtel National, Inc., 1996) are used to calculate background contributions to cancer risk and the hazard index.

At APHO 6, the detected carcinogens in soil include heptachlor, 4,4'-DDE, arsenic, beryllium, and chromium. The maximum detected concentrations are listed along with their background concentrations in Table 5-1. None of the detected carcinogens were above background concentrations with the exception of heptachlor, where the background concentration was not available. Table 5-1 also shows the Cancer PRGs from the potential future residential exposure scenario, the ratio of the site concentration of each detected chemical to the PRG, and the background concentration of each detected chemical to the PRG.

If the background concentration is higher than the detected concentration, the background ratio is forced to equal the maximum ratio in the table so that when background is subtracted, there will not be a negative risk. The maximum ratios and background ratios are summed and subtotaled. Then the summed background ratio is subtracted from the summed maximum ratio resulting in a net cancer risk for APHO 6 of 9.87×10^{-10} for the future residential scenario. The cancer risk is acceptable since it is below the generally acceptable risk range of 10^{-6} to 10^{-4}. The potential future residential land use scenario is the worst-case scenario for the former APHO 6.

The non-cancer hazard index for soil at APHO 6 under the potential future residential scenario is less than 1.0. The detected chemicals with a potential non-cancer hazard are barium, cobalt, copper, lead, manganese, nickel, thallium, vanadium, and zinc. The detected chemicals and their background concentrations are listed in Table 5-1. The ratios of the maximum concentrations and their PRGs are shown in the table as well as the ratios of the background concentrations to the PRGs. The maximum ratios and background ratios are summed and subtotaled. The non-cancer hazard under potential future residential land scenario is acceptable because the hazard index is less than 1.0.

Summary

The site-related incremental cancer risk and non-cancer hazard index at APHO 6 are acceptable for the following reasons:

- The net carcinogenic risk is less than 10^{-6} for the potential future residential scenario.
- The non-cancer hazard index for detected chemicals is less than 1.0 for the potential future residential scenario.

6.0 Findings and Recommendations

The following findings are based upon information collected from existing records, visual inspections and soil sampling data and risk screening evaluation from verification soil borings at APHO 6:

6.1 Summary of Findings

- APHO 6 includes the location of former slurry beds identified on the 1946, SAIC 39 photograph (SWDIV, 1999).
- The depth to groundwater is estimated to be approximately 110 feet below ground surface based upon historical data from nearby groundwater monitoring wells 09_DGMW75 and 24_NEW1.
- APHO 6 lies within the boundaries of IRP Site 24. Additional information pertaining to groundwater conditions will be addressed under IRP Site 24, Record of Decision.
- OHM conducted verification sampling at APHO 6 to assess the potential release from the former slurry beds to the vadose zone. Five verification soil borings were advanced at the site to approximate total depths of 20 feet below ground surface. A total of 19 soil samples were collected at approximately 5, 10, 15 and 20 feet below ground surface for borings PHA4 SB-01 through PHA4 SB-03 and at the approximate depths of 5, 10 and 20 feet below ground surface for borings PHA4-SB-04 and PHA4 SB-05 per DTSC approved sampling strategy and submitted for laboratory analysis.
- TPH as diesel and as gasoline, VOCs, PCBs, herbicides, SVOCs, mercury and cyanide were not detected in concentrations equal to or exceeding the laboratory reporting limits in the soil samples collected from borings PHA4-SB01 through PHA4-SB05. Pesticides were not detected in concentrations equal to or exceeding the stated laboratory reporting limits, with the exception of heptachlor detected at a maximum concentration of an estimated 0.0016J mg/kg.
- Metals that were detected above background levels for the station were the following: aluminum, antimony, barium, beryllium, cobalt, copper, iron, magnesium, manganese, potassium, selenium, silver, sodium, thallium, and zinc. All remaining metals were detected below background levels for the Station.
- The calculated net carcinogenic risk for all detected compounds is less than 10^{-6} for the potential future residential scenario.
- The calculated non-cancer hazard index for all detected chemicals is less than 1.0 for the potential future residential scenario.

6.2 Recommendations

Based on results of the soil sampling data, risk screening evaluation, the results of the record search activities, and the results of the visual inspection, it is recommended *that no further action (NFA)* status be designated for APHO6.

7.0 References

Bechtel National Inc, 1996, *Final Technical Memorandum Background and Reference Levels, Remedial Investigation, MCAS El Toro,* October.

BNI, see Bechtel National Inc.

Camp Dresser & McKee, Inc. Federal Programs Corporation, 2002, Final Groundwater Monitoring Report, September 2001 Monitoring Round 14 for Marine Corps Air Station El Toro, California, Appendix A.

CDM, see Camp Dresser & McKee, Inc.

Herndon, R.L., and J.F. Reilly, 1989, *Phase I Report - Investigation of TCE Contamination in the Vicinity of the Marine Corps Air Station El Toro,* Prepared for the Orange County Water District.

Jacobs Engineering Group Inc., 1993, Marine Corps Air Stations El Toro: Installation Restoration Program Phase 1 Remedial Investigation Draft Technical Memorandum, Volume IV, Appendices E, K.

JEG, see Jacobs Engineering Group Inc.

OHM Remediation Services Corp., 1997, *Draft Supplemental Work Plan, Closure of Various Temporary Accumulation Areas and RCRA Facility Assessment Sites, Marine Corps Air Station, El Toro, California,* [Navy Contract N68711-93-1459, Delivery Order 70].

OHM Remediation Services Corp., 1995a, *Final Work Plan, Remediation of Various Underground Storage Tanks at the Marine Corps Air Station El Toro, California.*

OHM Remediation Services Corp., 1995b, *Site-Specific Health and Safety Plan.*

OHM Remediation Services Corp., 1998, *Well Destruction Report, AW-4, Marine Corps Air Station El Toro, California* April.

OHM, see OHM Remediation Services Corp.

Southwest Division Naval Facilities Engineering Command, 2000, *Base Realignment and Closure (BRAC) Business Plan, Marine Corps Air Station El Toro, El Toro, California* March.

Southwest Division, Naval Facilities Engineering Command, 1999, Technical Memorandum, Aerial Photograph Anomalies, Marine Corps Air Station, El Toro, California, April.

SWDIV, see Southwest Division Naval Facilities Engineering Command.

U.S. Environmental Protection Agency 2000, Region 9 Preliminary Remediation Goals (PRGs) November.

FIGURES

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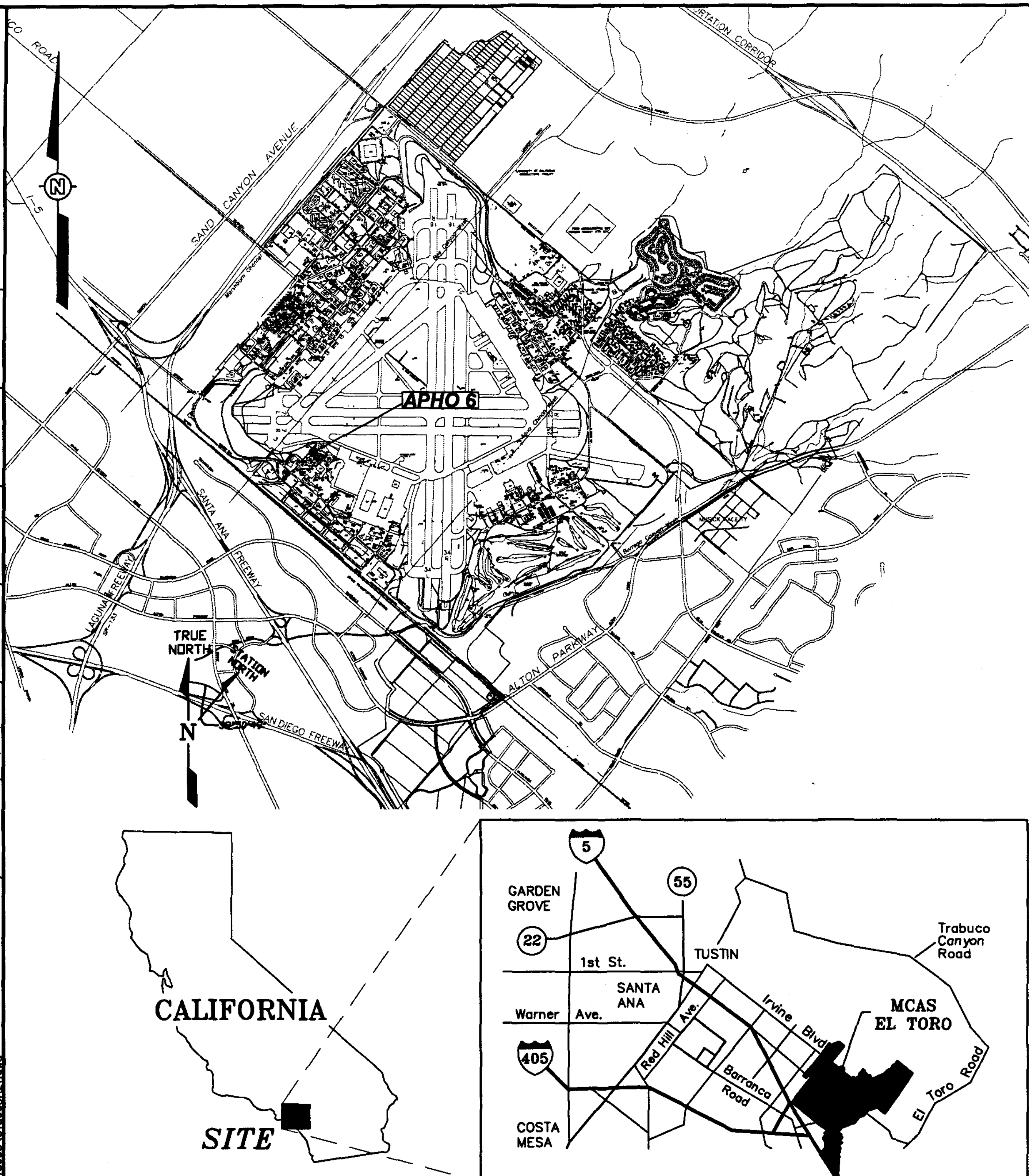
RP 3/..../02	--	--	81865...A21



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IT CORPORATION

EFA WEST
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CTO 24

FIGURE 1-1
FACILITY LOCATION MAP
APHO 6

MARINE CORPS AIR STATION
EL TORO, CALIFORNIA

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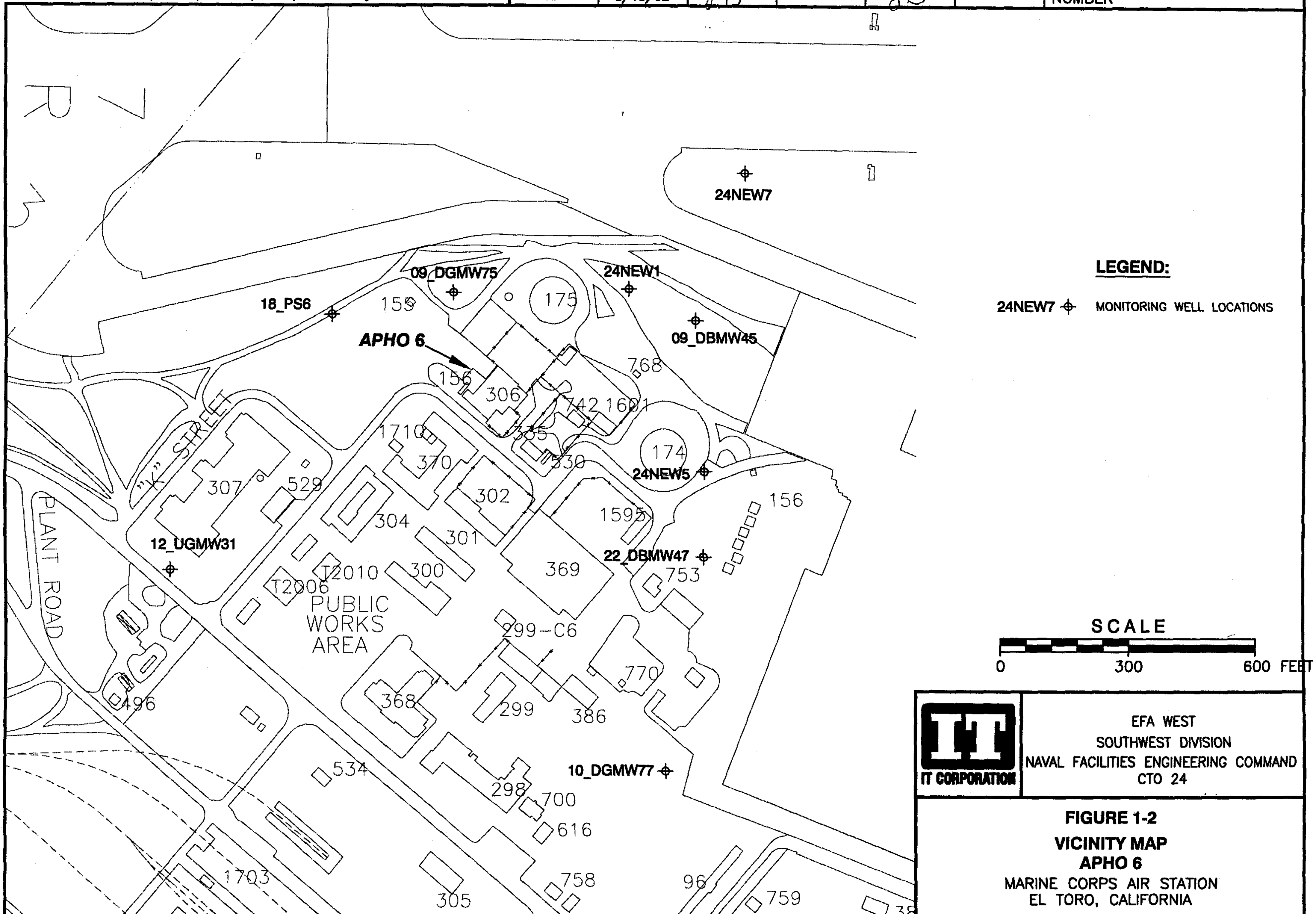
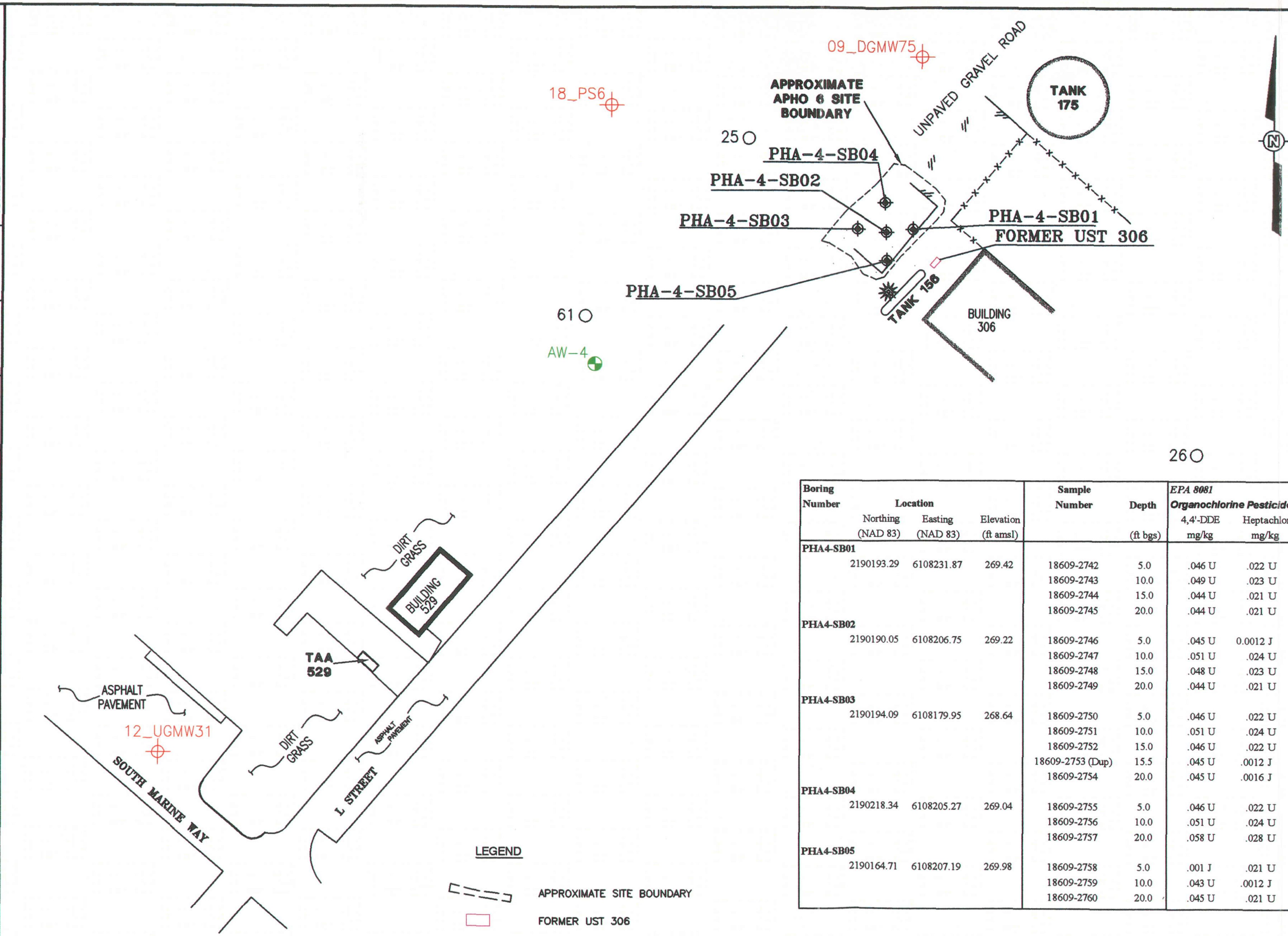


IT CORPORATION

EFA WEST
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CTO 24

FIGURE 1-2
VICINITY MAP
APHO 6
MARINE CORPS AIR STATION
EL TORO, CALIFORNIA



Explanation:
EPA - US Environmental Protection Agency
ft amsl - Feet above mean sea level datum
ft bgs - Feet below ground surface
J - Estimated Value
NAD 83 - North American Datum, 1983
ug/kg - Micrograms per kilogram
mg/kg - Milligrams per kilogram
U - Not detected at or above the stated reporting limit
Y - Results exceed Residential Preliminary Remediation Goal, EPA Region IX, November 2000.

Boring Number	Location Northing (NAD 83)	Easting (NAD 83)	Elevation (ft amsl)	Sample Number	Depth (ft bgs)	*EPA 8081* ***Organochlorine Pesticides and PCBs:*** 4,4'-DDE mg/kg	Heptachlor mg/kg	Methoxychlor mg/kg	*EPA 8260A, VOCs:* 2-Butanone (MEK) µg/kg	Acetone µg/kg	Methylene chloride µg/kg	Toluene µg/kg	Trichloroethene µg/kg
PHA4-SB01													
	2190193.29	6108231.87	269.42	18609-2742	5.0	.046 U	.022 U	.062 UJ	66 U	55 J	6.6 U	6.6 U	6.6 U
				18609-2743	10.0	.049 U	.023 U	.067 UJ	54 U	23 J	5.4 U	5.4 U	5.4 U
				18609-2744	15.0	.044 U	.021 U	.059 UJ	52 U	52 U	5.2 U	5.2 U	5.2 U
				18609-2745	20.0	.044 U	.021 U	.06 UJ	58 U	58 U	5.8 U	.76 J	5.8 U
PHA4-SB02													
	2190190.05	6108206.75	269.22	18609-2746	5.0	.045 U	0.0012 J	.062 UJ	54 U	32 J	5.4 U	5.4 U	5.4 U
				18609-2747	10.0	.051 U	.024 U	.069 UJ	67 U	23 J	6.7 U	6.7 U	6.7 U
				18609-2748	15.0	.048 U	.023 U	.065 UJ	57 U	17 J	5.7 U	5.7 U	5.7 U
				18609-2749	20.0	.044 U	.021 U	.059 UJ	68 U	68 J	6.8 U	6.8 U	6.8 U
PHA4-SB03													
	2190194.09	6108179.95	268.64	18609-2750	5.0	.046 U	.022 U	.062 UJ	71 U	43 J	7.1 U	7.1 U	7.1 U
				18609-2751	10.0	.051 U	.024 U	.069 UJ	67 U	29 J	6.7 U	6.7 U	6.7 U
				18609-2752	15.0	.046 U	.022 U	.063 UJ	55 U	11 J	5.5 U	5.5 U	5.5 U
				18609-2753 (Dup)	15.5	.045 U	.0012 J	.061 UJ	70 U	16 J	7 U	7 U	7 U
				18609-2754	20.0	.045 U	.0016 J	.062 UJ	70 U	70 U	7 U	7 U	7 U
PHA4-SB04													
	2190218.34	6108205.27	269.04	18609-2755	5.0	.046 U	.022 U	.063 UJ	15 J	59 J	6 U	6 U	6 U
				18609-2756	10.0	.051 U	.024 U	.069 UJ	56 U	56 U	5.6 U	5.6 U	5.6 U
				18609-2757	20.0	.058 U	.028 U	.079 UJ	76 U	76 U	7.1 U	7.6 U	7.6 U
PHA4-SB05													
	2190164.71	6108207.19	269.98	18609-2758	5.0	.001 J	.021 U	.061 UJ	53 U	53 U	5.3 U	5.3 U	5.3 U
				18609-2759	10.0	.043 U	.0012 J	.058 UJ	61 U	61 U	6.3 U	6.1 U	6.1 U
				18609-2760	20.0	.045 U	.021 U	.06 UJ	58 U	58 U	5.8 U	5.8 U	5.8 U

LEGEND

APPROXIMATE SITE BOUNDARY
FORMER UST 306
61 JEG, RFA SOIL GAS SAMPLE LOCATION
AW-4 WATER SUPPLY WELL
18_PS6 FORMER GROUNDWATER MONITORING WELL LOCATION
OHM VERIFICATION SOIL BORING
CHAIN LINK FENCE

SCALE
0 100 200 FEET

DATE OF SURVEY: 2-15-00

REFERENCE:

US MARINE CORPS AIR STATION, EL TORO, PUBLIC WORKS DEPARTMENT, 1949.
AREA D-8 (48) AND SLURRY PIT, MAY.

IT CORPORATION

EFA WEST
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CTO 24

FIGURE 1-3
Site Plan
APHO 6

MARINE CORPS AIR STATION
EL TORO, CALIFORNIA

DRAWING NUMBER 818655-B30
APPROVED BY --
CHECKED BY --
DRAWN BY RP 3/15/02

Mar 15, 2002 – 15:17:48 I:\IT CORP\EFA_West\818655\818655B30.dwg

TABLES

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2742	18609-2743	18609-2744	18609-2745	18609-2746
Location Code					PHA4-SB01	PHA4-SB01	PHA4-SB01	PHA4-SB01	PHA4-SB02
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					5.0	10.0	15.0	20.0	5.0
	Unit	**Background**	**Residential PRG**	**Industrial PRG**					
CA LUFT 8015M									
TPH as Diesel	mg/kg	NE	NE	NE	10.9 U	11.7 U	10.4 U	10.6 U	10.8 U
TPH as Gasoline	mg/kg	NE	NE	NE	9.38 U	11.6 U	10 U	11.8 U	10.6 U
EPA 8081									
4,4'-DDD	mg/kg	0.0361	2.4	17	.0033 U	.0035 U	.0031 U	.0032 U	.0032 U
4,4'-DDE	mg/kg	0.145	1.7	12	.046 U	.049 U	.044 U	.044 U	.045 U
4,4'-DDT	mg/kg	0.236	1.7	12	.0033 U	.0035 U	.0031 U	.0032 U	.0032 U
Aldrin	mg/kg	NE	0.029	0.15	.016 U	.018 U	.016 U	.016 U	.016 U
alpha-BHC	mg/kg	NE	0.09	0.59	.0021 U	.0022 U	.002 U	.002 U	.0021 U
alpha-Chlordane	mg/kg	0.00224	1.6	11	.016 U B	.018 U B	.016 U B	.016 U B	.016 U B
Beta-BHC	mg/kg	NE	0.32	2.1	.036 U	.039 U	.034 U	.035 U	.036 U
Delta-BHC	mg/kg	NE	NE	NE	.012 U	.013 U	.011 U	.012 U	.012 U
Dieldrin	mg/kg	0.0199	0.03	0.15	.038 U B Y	.041 U B Y	.037 U B Y	.037 U B Y	.038 U B Y
Endosulfan I	mg/kg	0.000179	370	5300	.023 U B	.025 U B	.022 U B	.022 U B	.023 U B
Endosulfan II	mg/kg	0.00222	370	5300	.026 U B	.028 U B	.025 U B	.025 U B	.026 U B
Endosulfan sulfate	mg/kg	0.0031	NE	NE	.039 U B	.042 U B	.038 U B	.038 U B	.039 U B
Endrin	mg/kg	0.00222	18	260	.039 U B	.042 U B	.038 U B	.038 U B	.039 U B
Endrin aldehyde	mg/kg	0.00222	NE	NE	.017 U B	.019 U B	.017 U B	.017 U B	.017 U B
gamma-BHC	mg/kg	NE	0.44	2.9	.022 U	.023 U	.021 U	.021 U	.022 U
gamma-Chlordane	mg/kg	0.0027	1.6	11	.016 U B	.018 U B	.016 U B	.016 U B	.016 U B
Heptachlor	mg/kg	NE	0.11	0.55	.022 U	.023 U	.021 U	.021 U	.0012 J
Heptachlor epoxide	mg/kg	NE	0.053	0.27	.023 U	.025 U	.022 U	.022 U	.023 U
Methoxychlor	mg/kg	NE	310	4400	.062 UJ	.067 UJ	.059 UJ	.06 UJ	.062 UJ
Toxaphene	mg/kg	NE	0.44	2.2	.76 U Y	.82 U Y	.73 U Y	.74 U Y	.76 U Y
EPA 8082									
Aroclor-1016	mg/kg	NE	3.9	29	.76 U	.82 U	.73 U	.74 U	.76 U
Aroclor-1221	mg/kg	NE	0.22	1	.76 U Y	.82 U Y	.73 U Y	.74 U Y	.76 U Y
Aroclor-1232	mg/kg	NE	0.22	1	.76 U Y	.82 U Y	.73 U Y	.74 U Y	.76 U Y
Aroclor-1242	mg/kg	NE	0.22	1	.76 U Y	.82 U Y	.73 U Y	.74 U Y	.76 U Y
Aroclor-1248	mg/kg	NE	0.22	1	.76 U Y	.82 U Y	.73 U Y	.74 U Y	.76 U Y
Aroclor-1254	mg/kg	NE	0.22	1	.76 U Y	.82 U Y	.73 U Y	.74 U Y	.76 U Y
Aroclor-1260	mg/kg	NE	0.22	1	.76 U Y	.82 U Y	.73 U Y	.74 U Y	.76 U Y

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2742	18609-2743	18609-2744	18609-2745	18609-2746
Location Code					PHA4-SB01	PHA4-SB01	PHA4-SB01	PHA4-SB01	PHA4-SB02
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					5.0	10.0	15.0	20.0	5.0
	Unit	Background	Residential PRG	Industrial PRG					
EPA 8151									
2,4,5-T	mg/kg	NE	NE	NE	.22 UJ	.23 U	.21 U	.21 U	.22 U
2,4,5-TP (Silvex)	mg/kg	NE	NE	NE	.22 UJ	.23 U	.21 U	.21 U	.22 U
2,4-D	mg/kg	NE	NE	NE	1.7 UJ	1.9 U	1.7 U	1.7 U	1.7 U
2,4-DB	mg/kg	NE	NE	NE	1.3 UJ	1.4 U	1.3 UJ	1.3 U	1.3 U
Dalapon	mg/kg	NE	1800	26000	8.7 UJ	9.3 U	8.4 U	8.4 U	8.6 U
Dicamba	mg/kg	NE	1800	26000	.44 UJ	.47 U	.42 U	.42 U	.43 U
Dichlorprop	mg/kg	NE	NE	NE	1.1 UJ	1.2 U	1 U	1.1 U	1.1 U
Dinoseb	mg/kg	NE	61	880	.11 UJ	.12 UJ	.1 R	.11 UJ	.11 UJ
MCPA	mg/kg	NE	NE	NE	370 UJ	400 U	350 U	360 U	370 U
MCPP	mg/kg	NE	NE	NE	280 UJ	300 U	270 U	270 U	280 U
EPA 8260									
1,1,1-Trichloroethane	µg/kg	NE	770000	1400000	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
1,1,2,2-Tetrachloroethane	µg/kg	NE	380	900	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
1,1,2-Trichloroethane	µg/kg	NE	840	1900	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
1,1-Dichloroethane	µg/kg	NE	3300	7100	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
1,1-Dichloroethene	µg/kg	NE	54	120	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
1,2-Dichloroethane	µg/kg	NE	350	760	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
1,2-Dichloropropane	µg/kg	NE	350	770	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
2-Butanone (MEK)	µg/kg	NE	7300000	28000000	66 U	54 U	52 U	58 U	54 U
2-Chloroethyl vinyl ether	µg/kg	NE	NE	NE	66 U	54 U	52 U	58 U	54 U
2-Hexanone	µg/kg	NE	NE	NE	66 U	54 U	52 U	58 U	54 U
4-Methyl-2-pentanone (MIBK)	µg/kg	NE	790000	2900000	66 U	54 U	52 U	58 U	54 U
Acetone	µg/kg	NE	1600000	6200000	55 J	23 J	52 U	58 U	32 J
Benzene	µg/kg	NE	650	1500	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
Bromodichloromethane	µg/kg	NE	1000	2400	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
Bromoform	µg/kg	NE	62000	310000	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
Bromomethane	µg/kg	NE	3900	13000	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
Carbon disulfide	µg/kg	NE	360000	720000	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
Carbon tetrachloride	µg/kg	NE	240	530	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
Chlorobenzene	µg/kg	NE	150000	540000	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
Chloroethane	µg/kg	NE	3000	6500	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2742	18609-2743	18609-2744	18609-2745	18609-2746
Location Code					PHA4-SB01	PHA4-SB01	PHA4-SB01	PHA4-SB01	PHA4-SB02
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					5.0	10.0	15.0	20.0	5.0
	Unit	**Background**	**Residential PRG**	**Industrial PRG**					
Chloroform	µg/kg	NE	240	520	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
Chloromethane	µg/kg	NE	1200	2700	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
cis-1,2-Dichloroethene	µg/kg	NE	43000	150000	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
cis-1,3-Dichloropropene	µg/kg	NE	82	180	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
Dibromochloromethane	µg/kg	NE	1100	2700	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
Ethylbenzene	µg/kg	NE	230000	230000	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
Methyl tert-butyl ether (MTBE)	µg/kg	NE	17	37	13 U	11 U	10 U	12 U	11 U
Methylene chloride	µg/kg	NE	8900	21000	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
Styrene	µg/kg	NE	1700000	1700000	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
Tetrachloroethene (PCE)	µg/kg	NE	5700	19000	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
Toluene	µg/kg	NE	520000	520000	6.6 U	5.4 U	5.2 U	.76 J	5.4 U
trans-1,2-Dichloroethene	µg/kg	NE	63000	210000	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
trans-1,3-Dichloropropene	µg/kg	NE	82	180	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
Trichloroethene (TCE)	µg/kg	NE	2800	6100	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
Vinyl acetate	µg/kg	NE	430000	1400000	66 U	54 U	52 U	58 U	54 U
Vinyl chloride	µg/kg	NE	150	830	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
Xylenes (total)	µg/kg	NE	210000	210000	6.6 U	5.4 U	5.2 U	5.8 U	5.4 U
EPA 8270									
1,2,4-Trichlorobenzene	µg/kg	NE	650000	3000000	360 U	390 U	340 U	350 U	360 U
1,2-Dichlorobenzene	µg/kg	NE	370000	370000	360 U	390 U	340 U	350 U	360 U
1,3-Dichlorobenzene	µg/kg	NE	13000	52000	360 U	390 U	340 U	350 U	360 U
1,4-Dichlorobenzene	µg/kg	NE	3400	8100	360 U	390 U	340 U	350 U	360 U
2,4,5-Trichlorophenol	µg/kg	NE	6100000	88000000	910 U	970 U	870 U	880 U	900 U
2,4,6-Trichlorophenol	µg/kg	NE	44000	220000	360 U	390 U	340 U	350 U	360 U
2,4-Dichlorophenol	µg/kg	NE	180000	2600000	360 U	390 U	340 U	350 U	360 U
2,4-Dimethylphenol	µg/kg	NE	1200000	18000000	360 U	390 U	340 U	350 U	360 U
2,4-Dinitrophenol	µg/kg	NE	120000	1800000	910 U	970 U	870 U	880 U	900 U
2,4-Dinitrotoluene	µg/kg	NE	120000	1800000	360 U	390 U	340 U	350 U	360 U
2,6-Dinitrotoluene	µg/kg	NE	61000	880000	360 U	390 U	340 U	350 U	360 U
2-Chloronaphthalene	µg/kg	NE	4900000	27000000	360 U	390 U	340 U	350 U	360 U
2-Chlorophenol	µg/kg	NE	63000	240000	360 U	390 U	340 U	350 U	360 U
2-Methyl-4,6-dinitrophenol	µg/kg	NE	NE	NE	910 U	970 U	870 U	880 U	900 U

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2742	18609-2743	18609-2744	18609-2745	18609-2746
Location Code					PHA4-SB01	PHA4-SB01	PHA4-SB01	PHA4-SB01	PHA4-SB02
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					5.0	10.0	15.0	20.0	5.0
	Unit	**Background**	**Residential PRG**	**Industrial PRG**					
2-Methylnaphthalene	µg/kg	NE	NE	NE	360 U	390 U	340 U	350 U	360 U
2-Methylphenol	µg/kg	NE	3100000	44000000	360 U	390 U	340 U	350 U	360 U
2-Nitroaniline	µg/kg	NE	3500	50000	910 U	970 U	870 U	880 U	900 U
2-Nitrophenol	µg/kg	NE	NE	NE	360 U	390 U	340 U	350 U	360 U
3,3'-Dichlorobenzidine	µg/kg	NE	1100	5500	360 U	390 U	340 U	350 U	360 U
3-Methyl-4-chlorophenol	µg/kg	NE	NE	NE	360 U	390 U	340 U	350 U	360 U
3-Nitroaniline	µg/kg	NE	NE	NE	910 U	970 U	870 U	880 U	900 U
4-Bromophenyl phenyl ether	µg/kg	NE	NE	NE	360 U	390 U	340 U	350 U	360 U
4-Chloroaniline	µg/kg	NE	240000	3500000	360 U	390 U	340 U	350 U	360 U
4-Chlorophenyl phenyl ether	µg/kg	NE	NE	NE	360 U	390 U	340 U	350 U	360 U
4-Methylphenol	µg/kg	NE	310000	4400000	360 U	390 U	340 U	350 U	360 U
4-Nitroaniline	µg/kg	NE	NE	NE	910 U	970 U	870 U	880 U	900 U
4-Nitrophenol	µg/kg	NE	490000	7000000	910 U	970 U	870 U	880 U	900 U
Acenaphthene	µg/kg	NE	3700000	38000000	360 U	390 U	340 U	350 U	360 U
Acenaphthylene	µg/kg	NE	NE	NE	360 U	390 U	340 U	350 U	360 U
Anthracene	µg/kg	NE	22000000	100000000	360 U	390 U	340 U	350 U	360 U
Benzo[a]anthracene	µg/kg	22	620	2900	360 U B	390 U B	340 U B	350 U B	360 U B
Benzo[a]pyrene	µg/kg	27	62	290	270 U B Y	290 U B Y X	260 U B Y	260 U B Y	270 U B Y
Benzo[b]fluoranthene	µg/kg	28	620	2900	360 U B	390 U B	340 U B	350 U B	360 U B
Benzo[ghi]perylene	µg/kg	NE	NE	NE	360 U	390 U	340 U	350 U	360 U
Benzo[k]fluoranthene	µg/kg	24	6200	29000	360 U B	390 U B	340 U B	350 U B	360 U B
Bis (2-chloroethoxy)methane	µg/kg	NE	NE	NE	360 U	390 U	340 U	350 U	360 U
Bis (2-chloroethyl)ether	µg/kg	NE	210	620	360 U Y	390 U Y	340 U Y	350 U Y	360 U Y
Bis (2-chloroisopropyl)ether	µg/kg	NE	2900	8100	360 U	390 U	340 U	350 U	360 U
Bis (2-ethylhexyl)phthalate	µg/kg	NE	35000	180000	360 U	390 U	340 U	350 U	360 U
Butyl benzyl phthalate	µg/kg	NE	12000000	100000000	360 U	390 U	340 U	350 U	360 U
Chrysene	µg/kg	31	6100	290000	360 U B	390 U B	340 U B	350 U B	360 U B
Di-n-butyl phthalate	µg/kg	NE	6100000	88000000	360 U	390 U	340 U	350 U	360 U
Di-n-octyl phthalate	µg/kg	NE	1200000	10000000	360 U	390 U	340 U	350 U	360 U
Dibenz[a,h]anthracene	µg/kg	8	62	290	270 U B Y	290 U B Y X	260 U B Y	260 U B Y	270 U B Y
Dibenzofuran	µg/kg	NE	290000	5100000	360 U	390 U	340 U	350 U	360 U
Diethyl phthalate	µg/kg	NE	49000000	100000000	360 U	390 U	340 U	350 U	360 U

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2742	18609-2743	18609-2744	18609-2745	18609-2746
Location Code					PHA4-SB01	PHA4-SB01	PHA4-SB01	PHA4-SB01	PHA4-SB02
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					5.0	10.0	15.0	20.0	5.0
	Unit	**Background**	**Residential PRG**	**Industrial PRG**					
Dimethyl phthalate	µg/kg	NE	100000000	100000000	360 U	390 U	340 U	350 U	360 U
Fluoranthene	µg/kg	45	2300000	30000000	360 U B	390 U B	340 U B	350 U B	360 U B
Fluorene	µg/kg	NE	2600000	33000000	360 U	390 U	340 U	350 U	360 U
Hexachlorobenzene	µg/kg	NE	300	1500	360 U Y	390 U Y	340 U Y	350 U Y	360 U Y
Hexachlorobutadiene	µg/kg	NE	6200	32000	360 U	390 U	340 U	350 U	360 U
Hexachlorocyclopentadiene	µg/kg	NE	420000	5900000	360 U	390 U	340 U	350 U	360 U
Hexachloroethane	µg/kg	NE	35000	180000	360 U	390 U	340 U	350 U	360 U
Indeno[1,2,3-cd]pyrene	µg/kg	21	620	2900	360 U B	390 U B	340 U B	350 U B	360 U B
N-Nitrosodi-n-propylamine	µg/kg	NE	69	350	270 U Y	290 U Y	260 U Y	260 U Y	270 U Y
N-Nitrosodiphenylamine	µg/kg	NE	99000	500000	360 U	390 U	340 U	350 U	360 U
Naphthalene	µg/kg	NE	56000	190000	360 U	390 U	340 U	350 U	360 U
Nitrobenzene	µg/kg	NE	20000	110000	360 U	390 U	340 U	350 U	360 U
Pentachlorophenol	µg/kg	NE	3000	11000	360 U	390 U	340 U	350 U	360 U
Phenanthrene	µg/kg	18	NE	NE	360 U B	390 U B	340 U B	350 U B	360 U B
Phenol	µg/kg	NE	37000000	100000000	360 U	390 U	340 U	350 U	360 U
Pyrene	µg/kg	41	2300000	54000000	360 U B	390 U B	340 U B	350 U B	360 U B
EPA 6010									
Aluminum	mg/kg	14800	76000	100000	10800	23100 B	18400 B	6700	9770
Antimony	mg/kg	3.06	31	820	10.9 U B	11.7 U B	10.4 U B	10.6 U B	10.8 U B
Arsenic	mg/kg	6.86	0.39	2.7	2.99 Y X	4.99 Y X	4.18 Y X	3.05 Y X	3.2 Y X
Barium	mg/kg	173	5400	100000	118	241 B	270 B	102	144
Beryllium	mg/kg	0.669	150	2200	.415 U	.817 B	.66	.264 U	.373 U
Cadmium	mg/kg	2.35	9.0	810	1.09 U	1.17 U	1.04 U	1.06 U	1.08 U
Calcium	mg/kg	46000	NE	NE	5210 J	13700 J	11300 J	6020 J	3960 J
Chromium	mg/kg	26.9	210	450	10.3 J	20 J	15.9 J	7.27 J	9.85 J
Cobalt	mg/kg	6.98	4700	100000	5.35 J	9.43 J B	7.77 J B	3.99 J	4.68 J
Copper	mg/kg	10.5	2900	76000	6.02	12 B	11 B	3.84	6.26
Iron	mg/kg	18400	23000	100000	13400 J	25400 J B Y	20500 J B	9730 J	12800 J
Lead	mg/kg	15.1	400	750	2.06	4.18	3.31	1.51	1.88
Magnesium	mg/kg	8370	NE	NE	5620 J	13900 J B	11500 J B	4250 J	5270 J
Manganese	mg/kg	291	1800	32000	217 J	364 J B	305 J B	189 J	230 J
Molybdenum	mg/kg	NE	390	10000	2.18 UJ	2.33 U	2.09 U	2.11 U	2.16 U

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2742	18609-2743	18609-2744	18609-2745	18609-2746
Location Code					PHA4-SB01	PHA4-SB01	PHA4-SB01	PHA4-SB01	PHA4-SB02
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					5.0	10.0	15.0	20.0	5.0
	Unit	**Background**	**Residential PRG**	**Industrial PRG**					
Nickel	mg/kg	15.3	150	41000	5.95 J	13 J	9.03 J	3.95 J	6.24 J
Potassium	mg/kg	4890	NE	NE	3760	6280 B	5610 B	2720	3450
Selenium	mg/kg	0.32	390	10000	1.09 U B	1.17 U B	1.04 U B	1.06 U B	1.08 U B
Silver	mg/kg	0.539	390	10000	2.18 U B	2.33 U B	2.09 U B	2.11 U B	2.16 U B
Sodium	mg/kg	405	NE	NE	546 U B	583 U B	522 U B	528 U B	540 U B
Thallium	mg/kg	0.42	5.2	130	1.38 B	1.17 U B	1.04 U B	1.06 U B	1.08 U B
Vanadium	mg/kg	71.8	550	14000	30.6 J	58.1 J	47.5 J	24.5 J	30.1 J
Zinc	mg/kg	77.9	23000	100000	39.8 J	78.4 J B	64 J	29.2 J	38.3 J
EPA 7471A									
Mercury	mg/kg	0.22	23	610	.109 U	.117 U	.104 U	.106 U	.108 U
EPA 9012									
Cyanide	mg/kg	NE	1200	18000	.546 U	.583 U	.522 U	.528 U	.54 U

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2747	18609-2748	18609-2749	18609-2750	18609-2751
Location Code					PHA4-SB02	PHA4-SB02	PHA4-SB02	PHA4-SB03	PHA4-SB03
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					10.0	15.0	20.0	5.0	10.0
	Unit	**Background**	**Residential PRG**	**Industrial PRG**					
CA LUFT 8015M									
TPH as Diesel	mg/kg	NE	NE	NE	12.2 U	11.4 U	10.4 U	10.9 U	12.2 U
TPH as Gasoline	mg/kg	NE	NE	NE	11.6 U	10.9 U	7.31 U	11.5 U	9.98 U
EPA 8081									
4,4'-DDD	mg/kg	0.0361	2.4	17	.0037 U	.0034 U	.0031 U	.0033 U	.0036 U
4,4'-DDE	mg/kg	0.145	1.7	12	.051 U	.048 U	.044 U	.046 U	.051 U
4,4'-DDT	mg/kg	0.236	1.7	12	.0037 U	.0034 U	.0031 U	.0033 U	.0036 U
Aldrin	mg/kg	NE	0.029	0.15	.018 U	.017 U	.016 U	.016 U	.018 U
alpha-BHC	mg/kg	NE	0.09	0.59	.0023 U	.0022 U	.002 U	.0021 U	.0023 U
alpha-Chlordane	mg/kg	0.00224	1.6	11	.018 U B	.017 U B	.016 U B	.016 U B	.018 U B
Beta-BHC	mg/kg	NE	0.32	2.1	.04 U	.038 U	.034 U	.036 U	.04 U
Delta-BHC	mg/kg	NE	NE	NE	.013 U	.013 U	.011 U	.012 U	.013 U
Dieldrin	mg/kg	0.0199	0.03	0.15	.043 U B Y	.04 U B Y	.037 U B Y	.038 U B Y	.043 U B Y
Endosulfan I	mg/kg	0.000179	370	5300	.026 U B	.024 U B	.022 U B	.023 U B	.026 U B
Endosulfan II	mg/kg	0.00222	370	5300	.029 U B	.027 U B	.025 U B	.026 U B	.029 U B
Endosulfan sulfate	mg/kg	0.0031	NE	NE	.044 U B	.041 U B	.038 U B	.039 U B	.044 U B
Endrin	mg/kg	0.00222	18	260	.044 U B	.041 U B	.038 U B	.039 U B	.044 U B
Endrin aldehyde	mg/kg	0.00222	NE	NE	.019 U B	.018 U B	.017 U B	.017 U B	.019 U B
gamma-BHC	mg/kg	NE	0.44	2.9	.024 U	.023 U	.021 U	.022 U	.024 U
gamma-Chlordane	mg/kg	0.0027	1.6	11	.018 U B	.017 U B	.016 U B	.016 U B	.018 U B
Heptachlor	mg/kg	NE	0.11	0.55	.024 U	.023 U	.021 U	.022 U	.024 U
Heptachlor epoxide	mg/kg	NE	0.053	0.27	.026 U	.024 U	.022 U	.023 U	.026 U
Methoxychlor	mg/kg	NE	310	4400	.069 UJ	.065 UJ	.059 UJ	.062 UJ	.069 UJ
Toxaphene	mg/kg	NE	0.44	2.2	.85 U Y	.8 U Y	.73 U Y	.76 U Y	.85 U Y
EPA 8082									
Aroclor-1016	mg/kg	NE	3.9	29	.85 U	.8 U	.73 U	.76 U	.85 U
Aroclor-1221	mg/kg	NE	0.22	1	.85 U Y	.8 U Y	.73 U Y	.76 U Y	.85 U Y
Aroclor-1232	mg/kg	NE	0.22	1	.85 U Y	.8 U Y	.73 U Y	.76 U Y	.85 U Y
Aroclor-1242	mg/kg	NE	0.22	1	.85 U Y	.8 U Y	.73 U Y	.76 U Y	.85 U Y
Aroclor-1248	mg/kg	NE	0.22	1	.85 U Y	.8 U Y	.73 U Y	.76 U Y	.85 U Y
Aroclor-1254	mg/kg	NE	0.22	1	.85 U Y	.8 U Y	.73 U Y	.76 U Y	.85 U Y
Aroclor-1260	mg/kg	NE	0.22	1	.85 U Y	.8 U Y	.73 U Y	.76 U Y	.85 U Y

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2747	18609-2748	18609-2749	18609-2750	18609-2751
Location Code					PHA4-SB02	PHA4-SB02	PHA4-SB02	PHA4-SB03	PHA4-SB03
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					10.0	15.0	20.0	5.0	10.0
	Unit	Background	Residential PRG	Industrial PRG					
EPA 8151									
2,4,5-T	mg/kg	NE	NE	NE	.24 U	.23 U	.21 U	.22 U	.24 U
2,4,5-TP (Silvex)	mg/kg	NE	NE	NE	.24 U	.23 U	.21 U	.22 U	.24 U
2,4-D	mg/kg	NE	NE	NE	1.9 U	1.8 U	1.7 U	1.7 U	1.9 U
2,4-DB	mg/kg	NE	NE	NE	1.5 U	1.4 U	1.3 U	1.3 U	1.5 U
Dalapon	mg/kg	NE	1800	26000	9.7 U	9.1 U	8.4 U	8.7 U	9.7 U
Dicamba	mg/kg	NE	1800	26000	.49 U	.46 U	.42 U	.43 U	.49 U
Dichlorprop	mg/kg	NE	NE	NE	1.2 U	1.1 U	1 U	1.1 U	1.2 U
Dinoseb	mg/kg	NE	61	880	.12 UJ	.11 UJ	.1 UJ	.11 UJ	.12 UJ
MCPA	mg/kg	NE	NE	NE	410 U	390 U	350 U	370 U	410 U
MCPP	mg/kg	NE	NE	NE	320 U	300 U	270 U	280 U	320 U
EPA 8260									
1,1,1-Trichloroethane	µg/kg	NE	770000	1400000	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
1,1,2,2-Tetrachloroethane	µg/kg	NE	380	900	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
1,1,2-Trichloroethane	µg/kg	NE	840	1900	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
1,1-Dichloroethane	µg/kg	NE	3300	7100	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
1,1-Dichloroethene	µg/kg	NE	54	120	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
1,2-Dichloroethane	µg/kg	NE	350	760	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
1,2-Dichloropropane	µg/kg	NE	350	770	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
2-Butanone (MEK)	µg/kg	NE	7300000	28000000	67 U	57 U	68 U	71 U	67 U
2-Chloroethyl vinyl ether	µg/kg	NE	NE	NE	67 U	57 U	68 U	71 U	67 U
2-Hexanone	µg/kg	NE	NE	NE	67 U	57 U	68 U	71 U	67 U
4-Methyl-2-pentanone (MIBK)	µg/kg	NE	790000	2900000	67 U	57 U	68 U	71 U	67 U
Acetone	µg/kg	NE	1600000	6200000	23 J	17 J	68 J	43 J	29 J
Benzene	µg/kg	NE	650	1500	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
Bromodichloromethane	µg/kg	NE	1000	2400	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
Bromoform	µg/kg	NE	62000	310000	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
Bromomethane	µg/kg	NE	3900	13000	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
Carbon disulfide	µg/kg	NE	360000	720000	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
Carbon tetrachloride	µg/kg	NE	240	530	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
Chlorobenzene	µg/kg	NE	150000	540000	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
Chloroethane	µg/kg	NE	3000	6500	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2747	18609-2748	18609-2749	18609-2750	18609-2751
Location Code					PHA4-SB02	PHA4-SB02	PHA4-SB02	PHA4-SB03	PHA4-SB03
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					10.0	15.0	20.0	5.0	10.0
	Unit	Background	Residential PRG	Industrial PRG					
Chloroform	µg/kg	NE	240	520	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
Chloromethane	µg/kg	NE	1200	2700	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
cis-1,2-Dichloroethene	µg/kg	NE	43000	150000	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
cis-1,3-Dichloropropene	µg/kg	NE	82	180	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
Dibromochloromethane	µg/kg	NE	1100	2700	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
Ethylbenzene	µg/kg	NE	230000	230000	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
Methyl tert-butyl ether (MTBE)	µg/kg	NE	17	37	13 U	11 U	14 U	14 U	13 U
Methylene chloride	µg/kg	NE	8900	21000	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
Styrene	µg/kg	NE	1700000	1700000	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
Tetrachloroethene (PCE)	µg/kg	NE	5700	19000	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
Toluene	µg/kg	NE	520000	520000	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
trans-1,2-Dichloroethene	µg/kg	NE	63000	210000	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
trans-1,3-Dichloropropene	µg/kg	NE	82	180	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
Trichloroethene (TCE)	µg/kg	NE	2800	6100	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
Vinyl acetate	µg/kg	NE	430000	1400000	67 U	57 U	68 U	71 U	67 U
Vinyl chloride	µg/kg	NE	150	830	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
Xylenes (total)	µg/kg	NE	210000	210000	6.7 U	5.7 U	6.8 U	7.1 U	6.7 U
EPA 8270									
1,2,4-Trichlorobenzene	µg/kg	NE	650000	3000000	400 U	380 U	340 U	360 U	400 U
1,2-Dichlorobenzene	µg/kg	NE	370000	370000	400 U	380 U	340 U	360 U	400 U
1,3-Dichlorobenzene	µg/kg	NE	13000	52000	400 U	380 U	340 U	360 U	400 U
1,4-Dichlorobenzene	µg/kg	NE	3400	8100	400 U	380 U	340 U	360 U	400 U
2,4,5-Trichlorophenol	µg/kg	NE	6100000	88000000	1000 U	950 U	870 U	900 U	1000 U
2,4,6-Trichlorophenol	µg/kg	NE	44000	220000	400 U	380 U	340 U	360 U	400 U
2,4-Dichlorophenol	µg/kg	NE	180000	2600000	400 U	380 U	340 U	360 U	400 U
2,4-Dimethylphenol	µg/kg	NE	1200000	18000000	400 U	380 U	340 U	360 U	400 U
2,4-Dinitrophenol	µg/kg	NE	120000	1800000	1000 U	950 U	870 U	900 U	1000 U
2,4-Dinitrotoluene	µg/kg	NE	120000	1800000	400 U	380 U	340 U	360 U	400 U
2,6-Dinitrotoluene	µg/kg	NE	61000	880000	400 U	380 U	340 U	360 U	400 U
2-Chloronaphthalene	µg/kg	NE	4900000	27000000	400 U	380 U	340 U	360 U	400 U
2-Chlorophenol	µg/kg	NE	63000	240000	400 U	380 U	340 U	360 U	400 U
2-Methyl-4,6-dinitrophenol	µg/kg	NE	NE	NE	1000 U	950 U	870 U	900 U	1000 U

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2747	18609-2748	18609-2749	18609-2750	18609-2751
Location Code					PHA4-SB02	PHA4-SB02	PHA4-SB02	PHA4-SB03	PHA4-SB03
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					10.0	15.0	20.0	5.0	10.0
	Unit	Background	Residential PRG	Industrial PRG					
2-Methylnaphthalene	µg/kg	NE	NE	NE	400 U	380 U	340 U	360 U	400 U
2-Methylphenol	µg/kg	NE	3100000	44000000	400 U	380 U	340 U	360 U	400 U
2-Nitroaniline	µg/kg	NE	3500	50000	1000 U	950 U	870 U	900 U	1000 U
2-Nitrophenol	µg/kg	NE	NE	NE	400 U	380 U	340 U	360 U	400 U
3,3'-Dichlorobenzidine	µg/kg	NE	1100	5500	400 U	380 U	340 U	360 U	400 U
3-Methyl-4-chlorophenol	µg/kg	NE	NE	NE	400 U	380 U	340 U	360 U	400 U
3-Nitroaniline	µg/kg	NE	NE	NE	1000 U	950 U	870 U	900 U	1000 U
4-Bromophenyl phenyl ether	µg/kg	NE	NE	NE	400 U	380 U	340 U	360 U	400 U
4-Chloroaniline	µg/kg	NE	240000	3500000	400 U	380 U	340 U	360 U	400 U
4-Chlorophenyl phenyl ether	µg/kg	NE	NE	NE	400 U	380 U	340 U	360 U	400 U
4-Methylphenol	µg/kg	NE	310000	4400000	400 U	380 U	340 U	360 U	400 U
4-Nitroaniline	µg/kg	NE	NE	NE	1000 U	950 U	870 U	900 U	1000 U
4-Nitrophenol	µg/kg	NE	490000	7000000	1000 U	950 U	870 U	900 U	1000 U
Acenaphthene	µg/kg	NE	3700000	38000000	400 U	380 U	340 U	360 U	400 U
Acenaphthylene	µg/kg	NE	NE	NE	400 U	380 U	340 U	360 U	400 U
Anthracene	µg/kg	NE	22000000	100000000	400 U	380 U	340 U	360 U	400 U
Benzo[a]anthracene	µg/kg	22	620	2900	400 U B	380 U B	340 U B	360 U B	400 U B
Benzo[a]pyrene	µg/kg	27	62	290	300 U B Y X	280 U B Y	260 U B Y	270 U B Y	300 U B Y X
Benzo[b]fluoranthene	µg/kg	28	620	2900	400 U B	380 U B	340 U B	360 U B	400 U B
Benzo[ghi]perylene	µg/kg	NE	NE	NE	400 U	380 U	340 U	360 U	400 U
Benzo[k]fluoranthene	µg/kg	24	6200	29000	400 U B	380 U B	340 U B	360 U B	400 U B
Bis (2-chloroethoxy)methane	µg/kg	NE	NE	NE	400 U	380 U	340 U	360 U	400 U
Bis (2-chloroethyl)ether	µg/kg	NE	210	620	400 U Y	380 U Y	340 U Y	360 U Y	400 U Y
Bis (2-chloroisopropyl)ether	µg/kg	NE	2900	8100	400 U	380 U	340 U	360 U	400 U
Bis (2-ethylhexyl)phthalate	µg/kg	NE	35000	180000	400 U	380 U	340 U	360 U	400 U
Butyl benzyl phthalate	µg/kg	NE	12000000	100000000	400 U	380 U	340 U	360 U	400 U
Chrysene	µg/kg	31	6100	290000	400 U B	380 U B	340 U B	360 U B	400 U B
Di-n-butyl phthalate	µg/kg	NE	6100000	88000000	400 U	380 U	340 U	360 U	400 U
Di-n-octyl phthalate	µg/kg	NE	1200000	10000000	400 U	380 U	340 U	360 U	400 U
Dibenz[a,h]anthracene	µg/kg	8	62	290	300 U B Y X	280 U B Y	260 U B Y	270 U B Y	300 U B Y X
Dibenzofuran	µg/kg	NE	290000	5100000	400 U	380 U	340 U	360 U	400 U
Diethyl phthalate	µg/kg	NE	49000000	100000000	400 U	380 U	340 U	360 U	400 U

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2747	18609-2748	18609-2749	18609-2750	18609-2751
Location Code					PHA4-SB02	PHA4-SB02	PHA4-SB02	PHA4-SB03	PHA4-SB03
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					10.0	15.0	20.0	5.0	10.0
	Unit	**Background**	**Residential PRG**	**Industrial PRG**					
Dimethyl phthalate	µg/kg	NE	100000000	100000000	400 U	380 U	340 U	360 U	400 U
Fluoranthene	µg/kg	45	2300000	30000000	400 U B	380 U B	340 U B	360 U B	400 U B
Fluorene	µg/kg	NE	2600000	33000000	400 U	380 U	340 U	360 U	400 U
Hexachlorobenzene	µg/kg	NE	300	1500	400 U Y	380 U Y	340 U Y	360 U Y	400 U Y
Hexachlorobutadiene	µg/kg	NE	6200	32000	400 U	380 U	340 U	360 U	400 U
Hexachlorocyclopentadiene	µg/kg	NE	420000	5900000	400 U	380 U	340 U	360 U	400 U
Hexachloroethane	µg/kg	NE	35000	180000	400 U	380 U	340 U	360 U	400 U
Indeno[1,2,3-cd]pyrene	µg/kg	21	620	2900	400 U B	380 U B	340 U B	360 U B	400 U B
N-Nitrosodi-n-propylamine	µg/kg	NE	69	350	300 U Y	280 U Y	260 U Y	270 U Y	300 U Y
N-Nitrosodiphenylamine	µg/kg	NE	99000	500000	400 U	380 U	340 U	360 U	400 U
Naphthalene	µg/kg	NE	56000	190000	400 U	380 U	340 U	360 U	400 U
Nitrobenzene	µg/kg	NE	20000	110000	400 U	380 U	340 U	360 U	400 U
Pentachlorophenol	µg/kg	NE	3000	11000	400 U	380 U	340 U	360 U	400 U
Phenanthrene	µg/kg	18	NE	NE	400 U B	380 U B	340 U B	360 U B	400 U B
Phenol	µg/kg	NE	37000000	100000000	400 U	380 U	340 U	360 U	400 U
Pyrene	µg/kg	41	2300000	54000000	400 U B	380 U B	340 U B	360 U B	400 U B
EPA 6010									
Aluminum	mg/kg	14800	76000	100000	20800 B	18100 B	5880	8630	21300 B
Antimony	mg/kg	3.06	31	820	12.2 U B	11.4 U B	10.4 U B	10.9 U B	12.2 U B
Arsenic	mg/kg	6.86	0.39	2.7	5.19 Y X	4.62 Y X	1.91 U Y	2.73 Y X	4.72 Y X
Barium	mg/kg	173	5400	100000	243 J B	295 B	95.5	122	256 B
Beryllium	mg/kg	0.669	150	2200	.763 B	.644	.232 U	.332 U	.787 B
Cadmium	mg/kg	2.35	9.0	810	1.22 U	1.14 U	1.04 U	1.09 U	1.22 U
Calcium	mg/kg	46000	NE	NE	9100 J	14800 J	5260 J	7230 J	12800 J
Chromium	mg/kg	26.9	210	450	18.7 J	16.5 J	6.46 J	8.88 J	19 J
Cobalt	mg/kg	6.98	4700	100000	8.52 J B	7.8 J B	3.4 J	4.15 J	8.83 J B
Copper	mg/kg	10.5	2900	76000	11.2 B	10.4	3.79	5.08	13 B
Iron	mg/kg	18400	23000	100000	24000 J B Y	21300 J B	8540 J	11500 J	24300 J B Y
Lead	mg/kg	15.1	400	750	3.84	3.17	1.24	1.79	4
Magnesium	mg/kg	8370	NE	NE	12300 J B	11700 J B	3720 J	5100 J	13400 J B
Manganese	mg/kg	291	1800	32000	364 J B	329 J B	164 J	208 J	365 J B
Molybdenum	mg/kg	NE	390	10000	2.44 UJ	2.28 U	2.09 U	2.17 U	2.43 U

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2747	18609-2748	18609-2749	18609-2750	18609-2751
Location Code					PHA4-SB02	PHA4-SB02	PHA4-SB02	PHA4-SB03	PHA4-SB03
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					10.0	15.0	20.0	5.0	10.0
	Unit	Background	Residential PRG	Industrial PRG					
Nickel	mg/kg	15.3	150	41000	10.4 J	9.31 J	4.04 J	5.99 J	11.9 J
Potassium	mg/kg	4890	NE	NE	6210 B	6230 B	2450	2620	5680 B
Selenium	mg/kg	0.32	390	10000	1.22 U B	1.14 U B	1.04 U B	1.09 U B	1.22 U B
Silver	mg/kg	0.539	390	10000	2.44 U B	2.28 U B	2.09 U B	2.17 U B	2.43 U B
Sodium	mg/kg	405	NE	NE	609 U B	670 B	522 U B	543 U B	608 U B
Thallium	mg/kg	0.42	5.2	130	1.22 U B	1.14 U B	1.04 U B	1.09 U B	1.22 U B
Vanadium	mg/kg	71.8	550	14000	54.5 J	50.1 J	20.9 J	27.2 J	55.2 J
Zinc	mg/kg	77.9	23000	100000	74.2 J	68.2 J	27.7 J	34.8 J	79.4 J B
EPA 7471A									
Mercury	mg/kg	0.22	23	610	.122 U	.114 U	.104 U	.109 U	.122 U
EPA 9012									
Cyanide	mg/kg	NE	1200	18000	.609 U	.569 U	.522 U	.543 U	.608 U

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2752	18609-2753 (Dup)	18609-2754	18609-2755	18609-2756
Location Code					PHA4-SB03	PHA4-SB03	PHA4-SB03	PHA4-SB04	PHA4-SB04
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					15.0	15.5	20.0	5.0	10.0
	Unit	**Background**	**Residential PRG**	**Industrial PRG**					
CA LUFT 8015M									
TPH as Diesel	mg/kg	NE	NE	NE	11 U	10.7 U	10.8 U	11 U	12.1 U
TPH as Gasoline	mg/kg	NE	NE	NE	10.5 U	8.91 U	9.42 U	10.1 U	11.8 U
EPA 8081									
4,4'-DDD	mg/kg	0.0361	2.4	17	.0033 U	.0032 U	.0032 U	.0033 U	.0036 U
4,4'-DDE	mg/kg	0.145	1.7	12	.046 U	.045 U	.045 U	.046 U	.051 U
4,4'-DDT	mg/kg	0.236	1.7	12	.0033 U	.0032 U	.0032 U	.0033 U	.0036 U
Aldrin	mg/kg	NE	0.029	0.15	.016 U	.016 U	.016 U	.016 U	.018 U
alpha-BHC	mg/kg	NE	0.09	0.59	.0021 U	.002 U	.0021 U	.0021 U	.0023 U
alpha-Chlordane	mg/kg	0.00224	1.6	11	.016 U B	.016 U B	.016 U B	.016 U B	.018 U B
Beta-BHC	mg/kg	NE	0.32	2.1	.036 U	.035 U	.036 U	.036 U	.04 U
Delta-BHC	mg/kg	NE	NE	NE	.012 U	.012 U	.012 U	.012 U	.013 U
Dieldrin	mg/kg	0.0199	0.03	0.15	.038 U B Y	.038 U B Y	.038 U B Y	.038 U B Y	.042 U B Y
Endosulfan I	mg/kg	0.000179	370	5300	.023 U B	.023 U B	.023 U B	.023 U B	.025 U B
Endosulfan II	mg/kg	0.00222	370	5300	.026 U B	.026 U B	.026 U B	.026 U B	.029 U B
Endosulfan sulfate	mg/kg	0.0031	NE	NE	.04 U B	.039 U B	.039 U B	.04 U B	.043 U B
Endrin	mg/kg	0.00222	18	260	.04 U B	.039 U B	.039 U B	.04 U B	.043 U B
Endrin aldehyde	mg/kg	0.00222	NE	NE	.018 U B	.017 U B	.017 U B	.018 U B	.019 U B
gamma-BHC	mg/kg	NE	0.44	2.9	.022 U	.021 U	.022 U	.022 U	.024 U
gamma-Chlordane	mg/kg	0.0027	1.6	11	.016 U B	.016 U B	.016 U B	.016 U B	.018 U B
Heptachlor	mg/kg	NE	0.11	0.55	.022 U	.0012 J	.0016 J	.022 U	.024 U
Heptachlor epoxide	mg/kg	NE	0.053	0.27	.023 U	.023 U	.023 U	.023 U	.025 U
Methoxychlor	mg/kg	NE	310	4400	.063 UJ	.061 UJ	.062 UJ	.063 UJ	.069 UJ
Toxaphene	mg/kg	NE	0.44	2.2	.77 U Y	.75 U Y	.76 U Y	.77 U Y	.85 U Y
EPA 8082									
Aroclor-1016	mg/kg	NE	3.9	29	.77 U	.75 U	.76 U	.77 U	.85 U
Aroclor-1221	mg/kg	NE	0.22	1	.77 U Y	.75 U Y	.76 U Y	.77 U Y	.85 U Y
Aroclor-1232	mg/kg	NE	0.22	1	.77 U Y	.75 U Y	.76 U Y	.77 U Y	.85 U Y
Aroclor-1242	mg/kg	NE	0.22	1	.77 U Y	.75 U Y	.76 U Y	.77 U Y	.85 U Y
Aroclor-1248	mg/kg	NE	0.22	1	.77 U Y	.75 U Y	.76 U Y	.77 U Y	.85 U Y
Aroclor-1254	mg/kg	NE	0.22	1	.77 U Y	.75 U Y	.76 U Y	.77 U Y	.85 U Y
Aroclor-1260	mg/kg	NE	0.22	1	.77 U Y	.75 U Y	.76 U Y	.77 U Y	.85 U Y

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2752	18609-2753 (Dup)	18609-2754	18609-2755	18609-2756
Location Code					PHA4-SB03	PHA4-SB03	PHA4-SB03	PHA4-SB04	PHA4-SB04
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					15.0	15.5	20.0	5.0	10.0
	Unit	Background	Residential PRG	Industrial PRG					
EPA 8151									
2,4,5-T	mg/kg	NE	NE	NE	.22 U	.21 U	.22 U	.22 U	.24 U
2,4,5-TP (Silvex)	mg/kg	NE	NE	NE	.22 U	.21 U	.22 U	.22 U	.24 U
2,4-D	mg/kg	NE	NE	NE	1.8 U	1.7 U	1.7 U	1.8 U	1.9 U
2,4-DB	mg/kg	NE	NE	NE	1.3 U	1.3 U	1.3 U	1.3 U	1.4 U
Dalapon	mg/kg	NE	1800	26000	8.8 U	8.6 U	8.7 U	8.8 U	9.7 U
Dicamba	mg/kg	NE	1800	26000	.44 U	.43 U	.43 U	.44 U	.48 U
Dichlorprop	mg/kg	NE	NE	NE	1.1 U	1.1 U	1.1 U	1.1 U	1.2 U
Dinoseb	mg/kg	NE	61	880	.11 UJ	.11 UJ	.11 UJ	.11 UJ	.12 UJ
MCPA	mg/kg	NE	NE	NE	370 U	360 U	370 U	370 U	410 U
MCPP	mg/kg	NE	NE	NE	290 U	280 U	280 U	290 U	310 U
EPA 8260									
1,1,1-Trichloroethane	µg/kg	NE	770000	1400000	5.5 U	7 U	7 U	6 U	5.6 U
1,1,2,2-Tetrachloroethane	µg/kg	NE	380	900	5.5 U	7 U	7 U	6 U	5.6 U
1,1,2-Trichloroethane	µg/kg	NE	840	1900	5.5 U	7 U	7 U	6 U	5.6 U
1,1-Dichloroethane	µg/kg	NE	3300	7100	5.5 U	7 U	7 U	6 U	5.6 U
1,1-Dichloroethene	µg/kg	NE	54	120	5.5 U	7 U	7 U	6 U	5.6 U
1,2-Dichloroethane	µg/kg	NE	350	760	5.5 U	7 U	7 U	6 U	5.6 U
1,2-Dichloropropane	µg/kg	NE	350	770	5.5 U	7 U	7 U	6 U	5.6 U
2-Butanone (MEK)	µg/kg	NE	7300000	28000000	55 U	70 U	70 U	15 J	56 U
2-Chloroethyl vinyl ether	µg/kg	NE	NE	NE	55 U	70 U	70 U	60 U	56 U
2-Hexanone	µg/kg	NE	NE	NE	55 U	70 U	70 U	60 U	56 U
4-Methyl-2-pentanone (MIBK)	µg/kg	NE	790000	2900000	55 U	70 U	70 U	60 U	56 U
Acetone	µg/kg	NE	1600000	6200000	11 J	16 J	70 U	59 J	56 U
Benzene	µg/kg	NE	650	1500	5.5 U	7 U	7 U	6 U	5.6 U
Bromodichloromethane	µg/kg	NE	1000	2400	5.5 U	7 U	7 U	6 U	5.6 U
Bromoform	µg/kg	NE	62000	310000	5.5 U	7 U	7 U	6 U	5.6 U
Bromomethane	µg/kg	NE	3900	13000	5.5 U	7 U	7 U	6 U	5.6 U
Carbon disulfide	µg/kg	NE	360000	720000	5.5 U	7 U	7 U	6 U	5.6 U
Carbon tetrachloride	µg/kg	NE	240	530	5.5 U	7 U	7 U	6 U	5.6 U
Chlorobenzene	µg/kg	NE	150000	540000	5.5 U	7 U	7 U	6 U	5.6 U
Chloroethane	µg/kg	NE	3000	6500	5.5 U	7 U	7 U	6 U	5.6 U

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2752	18609-2753 (Dup)	18609-2754	18609-2755	18609-2756
Location Code					PHA4-SB03	PHA4-SB03	PHA4-SB03	PHA4-SB04	PHA4-SB04
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					15.0	15.5	20.0	5.0	10.0
	Unit	**Background**	**Residential PRG**	**Industrial PRG**					
Chloroform	µg/kg	NE	240	520	5.5 U	7 U	7 U	6 U	5.6 U
Chloromethane	µg/kg	NE	1200	2700	5.5 U	7 U	7 U	6 U	5.6 U
cis-1,2-Dichloroethene	µg/kg	NE	43000	150000	5.5 U	7 U	7 U	6 U	5.6 U
cis-1,3-Dichloropropene	µg/kg	NE	82	180	5.5 U	7 U	7 U	6 U	5.6 U
Dibromochloromethane	µg/kg	NE	1100	2700	5.5 U	7 U	7 U	6 U	5.6 U
Ethylbenzene	µg/kg	NE	230000	230000	5.5 U	7 U	7 U	6 U	5.6 U
Methyl tert-butyl ether (MTBE)	µg/kg	NE	17	37	11 U	14 U	14 U	12 U	11 U
Methylene chloride	µg/kg	NE	8900	21000	5.5 U	7 U	7 U	6 U	5.6 U
Styrene	µg/kg	NE	1700000	1700000	5.5 U	7 U	7 U	6 U	5.6 U
Tetrachloroethene (PCE)	µg/kg	NE	5700	19000	5.5 U	7 U	7 U	6 U	5.6 U
Toluene	µg/kg	NE	520000	520000	5.5 U	7 U	7 U	6 U	5.6 U
trans-1,2-Dichloroethene	µg/kg	NE	63000	210000	5.5 U	7 U	7 U	6 U	5.6 U
trans-1,3-Dichloropropene	µg/kg	NE	82	180	5.5 U	7 U	7 U	6 U	5.6 U
Trichloroethene (TCE)	µg/kg	NE	2800	6100	5.5 U	7 U	7 U	6 U	5.6 U
Vinyl acetate	µg/kg	NE	430000	1400000	55 U	70 U	70 U	60 U	56 U
Vinyl chloride	µg/kg	NE	150	830	5.5 U	7 U	7 U	6 U	5.6 U
Xylenes (total)	µg/kg	NE	210000	210000	5.5 U	7 U	7 U	6 U	5.6 U
EPA 8270									
1,2,4-Trichlorobenzene	µg/kg	NE	650000	3000000	360 U	350 U	360 U	360 U	400 U
1,2-Dichlorobenzene	µg/kg	NE	370000	370000	360 U	350 U	360 U	360 U	400 U
1,3-Dichlorobenzene	µg/kg	NE	13000	52000	360 U	350 U	360 U	360 U	400 U
1,4-Dichlorobenzene	µg/kg	NE	3400	8100	360 U	350 U	360 U	360 U	400 U
2,4,5-Trichlorophenol	µg/kg	NE	6100000	88000000	910 U	890 U	900 U	910 U	1000 U
2,4,6-Trichlorophenol	µg/kg	NE	44000	220000	360 U	350 U	360 U	360 U	400 U
2,4-Dichlorophenol	µg/kg	NE	180000	2600000	360 U	350 U	360 U	360 U	400 U
2,4-Dimethylphenol	µg/kg	NE	1200000	18000000	360 U	350 U	360 U	360 U	400 U
2,4-Dinitrophenol	µg/kg	NE	120000	1800000	910 U	890 U	900 U	910 U	1000 U
2,4-Dinitrotoluene	µg/kg	NE	120000	1800000	360 U	350 U	360 U	360 U	400 U
2,6-Dinitrotoluene	µg/kg	NE	61000	880000	360 U	350 U	360 U	360 U	400 U
2-Chloronaphthalene	µg/kg	NE	4900000	27000000	360 U	350 U	360 U	360 U	400 U
2-Chlorophenol	µg/kg	NE	63000	240000	360 U	350 U	360 U	360 U	400 U
2-Methyl-4,6-dinitrophenol	µg/kg	NE	NE	NE	910 U	890 U	900 U	910 U	1000 U

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2752	18609-2753 (Dup)	18609-2754	18609-2755	18609-2756
Location Code					PHA4-SB03	PHA4-SB03	PHA4-SB03	PHA4-SB04	PHA4-SB04
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					15.0	15.5	20.0	5.0	10.0
	Unit	Background	Residential PRG	Industrial PRG					
2-Methylnaphthalene	µg/kg	NE	NE	NE	360 U	350 U	360 U	360 U	400 U
2-Methylphenol	µg/kg	NE	3100000	44000000	360 U	350 U	360 U	360 U	400 U
2-Nitroaniline	µg/kg	NE	3500	50000	910 U	890 U	900 U	910 U	1000 U
2-Nitrophenol	µg/kg	NE	NE	NE	360 U	350 U	360 U	360 U	400 U
3,3'-Dichlorobenzidine	µg/kg	NE	1100	5500	360 U	350 U	360 U	360 U	400 U
3-Methyl-4-chlorophenol	µg/kg	NE	NE	NE	360 U	350 U	360 U	360 U	400 U
3-Nitroaniline	µg/kg	NE	NE	NE	910 U	890 U	900 U	910 U	1000 U
4-Bromophenyl phenyl ether	µg/kg	NE	NE	NE	360 U	350 U	360 U	360 U	400 U
4-Chloroaniline	µg/kg	NE	240000	3500000	360 U	350 U	360 U	360 U	400 U
4-Chlorophenyl phenyl ether	µg/kg	NE	NE	NE	360 U	350 U	360 U	360 U	400 U
4-Methylphenol	µg/kg	NE	310000	4400000	360 U	350 U	360 U	360 U	400 U
4-Nitroaniline	µg/kg	NE	NE	NE	910 U	890 U	900 U	910 U	1000 U
4-Nitrophenol	µg/kg	NE	490000	7000000	910 U	890 U	900 U	910 U	1000 U
Acenaphthene	µg/kg	NE	3700000	38000000	360 U	350 U	360 U	360 U	400 U
Acenaphthylene	µg/kg	NE	NE	NE	360 U	350 U	360 U	360 U	400 U
Anthracene	µg/kg	NE	22000000	100000000	360 U	350 U	360 U	360 U	400 U
Benzo[a]anthracene	µg/kg	22	620	2900	360 U B	350 U B	360 U B	360 U B	400 U B
Benzo[a]pyrene	µg/kg	27	62	290	270 U B Y	270 U B Y	270 U B Y	270 U B Y	300 U B Y X
Benzo[b]fluoranthene	µg/kg	28	620	2900	360 U B	350 U B	360 U B	360 U B	400 U B
Benzo[ghi]perylene	µg/kg	NE	NE	NE	360 U	350 U	360 U	360 U	400 U
Benzo[k]fluoranthene	µg/kg	24	6200	29000	360 U B	350 U B	360 U B	360 U B	400 U B
Bis (2-chloroethoxy)methane	µg/kg	NE	NE	NE	360 U	350 U	360 U	360 U	400 U
Bis (2-chloroethyl)ether	µg/kg	NE	210	620	360 U Y	350 U Y	360 U Y	360 U Y	400 U Y
Bis (2-chloroisopropyl)ether	µg/kg	NE	2900	8100	360 U	350 U	360 U	360 U	400 U
Bis (2-ethylhexyl)phthalate	µg/kg	NE	35000	180000	360 U	350 U	360 U	360 U	400 U
Butyl benzyl phthalate	µg/kg	NE	12000000	100000000	360 U	350 U	360 U	360 U	400 U
Chrysene	µg/kg	31	6100	290000	360 U B	350 U B	360 U B	360 U B	400 U B
Di-n-butyl phthalate	µg/kg	NE	6100000	88000000	360 U	350 U	360 U	360 U	400 U
Di-n-octyl phthalate	µg/kg	NE	1200000	10000000	360 U	350 U	360 U	360 U	400 U
Dibenz[a,h]anthracene	µg/kg	8	62	290	270 U B Y	270 U B Y	270 U B Y	270 U B Y	300 U B Y X
Dibenzofuran	µg/kg	NE	290000	5100000	360 U	350 U	360 U	360 U	400 U
Diethyl phthalate	µg/kg	NE	49000000	100000000	360 U	350 U	360 U	360 U	400 U

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2752	18609-2753 (Dup)	18609-2754	18609-2755	18609-2756
Location Code					PHA4-SB03	PHA4-SB03	PHA4-SB03	PHA4-SB04	PHA4-SB04
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					15.0	15.5	20.0	5.0	10.0
	Unit	**Background**	**Residential PRG**	**Industrial PRG**					
Dimethyl phthalate	µg/kg	NE	100000000	100000000	360 U	350 U	360 U	360 U	400 U
Fluoranthene	µg/kg	45	2300000	30000000	360 U B	350 U B	360 U B	360 U B	400 U B
Fluorene	µg/kg	NE	2600000	33000000	360 U	350 U	360 U	360 U	400 U
Hexachlorobenzene	µg/kg	NE	300	1500	360 U Y	350 U Y	360 U Y	360 U Y	400 U Y
Hexachlorobutadiene	µg/kg	NE	6200	32000	360 U	350 U	360 U	360 U	400 U
Hexachlorocyclopentadiene	µg/kg	NE	420000	5900000	360 UJ	350 UJ	360 UJ	360 UJ	400 UJ
Hexachloroethane	µg/kg	NE	35000	180000	360 U	350 U	360 U	360 U	400 U
Indeno[1,2,3-cd]pyrene	µg/kg	21	620	2900	360 U B	350 U B	360 U B	360 U B	400 U B
N-Nitrosodi-n-propylamine	µg/kg	NE	69	350	270 U Y	270 U Y	270 U Y	270 U Y	300 U Y
N-Nitrosodiphenylamine	µg/kg	NE	99000	500000	360 U	350 U	360 U	360 U	400 U
Naphthalene	µg/kg	NE	56000	190000	360 U	350 U	360 U	360 U	400 U
Nitrobenzene	µg/kg	NE	20000	110000	360 U	350 U	360 U	360 U	400 U
Pentachlorophenol	µg/kg	NE	3000	11000	360 U	350 U	360 U	360 U	400 U
Phenanthrene	µg/kg	18	NE	NE	360 U B	350 U B	360 U B	360 U B	400 U B
Phenol	µg/kg	NE	37000000	100000000	360 U	350 U	360 U	360 U	400 U
Pyrene	µg/kg	41	2300000	54000000	360 U B	350 U B	360 U B	360 U B	400 U B
EPA 6010									
Aluminum	mg/kg	14800	76000	100000	4550	17500 B	10500	9220	5240
Antimony	mg/kg	3.06	31	820	11 U B	10.7 U B	10.8 U B	11 U B	12.1 U B
Arsenic	mg/kg	6.86	0.39	2.7	1.66 U Y	3.73 Y X	4.38 Y X	3.17 Y X	1.7 U Y
Barium	mg/kg	173	5400	100000	87.7	198 B	166	150	77.3
Beryllium	mg/kg	0.669	150	2200	.225 U	.635	.389 U	.329 U	.242 U
Cadmium	mg/kg	2.35	9.0	810	1.1 U	1.07 U	1.08 U	1.1 U	1.21 U
Calcium	mg/kg	46000	NE	NE	5400 J	12000 J	7580 J	8750 J	5420 J
Chromium	mg/kg	26.9	210	450	4.39 J	15.2 J	10.1 J	9.11 J	5.64 J
Cobalt	mg/kg	6.98	4700	100000	2.58 J	7.55 J B	5.47 J	4.68 J	2.87 J
Copper	mg/kg	10.5	2900	76000	2.46	9.79	9.7	7.88	3.87
Iron	mg/kg	18400	23000	100000	6580 J	20200 J B	14600 J	11700 J	7190 J
Lead	mg/kg	15.1	400	750	1.1 U	3.46	1.76	1.82	1.41
Magnesium	mg/kg	8370	NE	NE	3000 J	11200 J B	6650 J	5660 J	3400 J
Manganese	mg/kg	291	1800	32000	164 J	313 J B	257 J	250 J	146 J
Molybdenum	mg/kg	NE	390	10000	2.2 U	2.15 U	2.16 U	2.2 U	2.42 U

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2752	18609-2753 (Dup)	18609-2754	18609-2755	18609-2756
Location Code					PHA4-SB03	PHA4-SB03	PHA4-SB03	PHA4-SB04	PHA4-SB04
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					15.0	15.5	20.0	5.0	10.0
	Unit	Background	Residential PRG	Industrial PRG					
Nickel	mg/kg	15.3	150	41000	2.2 J	7.85 J	6.61 J	6.26 J	2.76 J
Potassium	mg/kg	4890	NE	NE	1460	5970 B	4550	3280	1930
Selenium	mg/kg	0.32	390	10000	1.1 U B	1.07 U B	1.08 U B	1.1 U B	1.21 U B
Silver	mg/kg	0.539	390	10000	2.2 U B	2.15 U B	2.16 U B	2.2 U B	2.42 U B
Sodium	mg/kg	405	NE	NE	549 U B	715 B	750 B	549 U B	604 U B
Thallium	mg/kg	0.42	5.2	130	1.1 U B	1.07 U B	1.08 U B	1.1 U B	1.21 U B
Vanadium	mg/kg	71.8	550	14000	16.7 J	46.5 J	36.9 J	28.8 J	18.2 J
Zinc	mg/kg	77.9	23000	100000	21.7 J	65 J	47.6 J	36.5 J	22.3 J
EPA 7471A									
Mercury	mg/kg	0.22	23	610	.11 U	.107 U	.108 U	.11 U	.121 U
EPA 9012									
Cyanide	mg/kg	NE	1200	18000	.549 U	.536 U	.541 U	.549 U	.604 U

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2757	18609-2758	18609-2759	18609-2760
Location Code					PHA4-SB04	PHA4-SB05	PHA4-SB05	PHA4-SB05
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					20.0	5.0	10.0	20.0
	Unit	Background	Residential PRG	Industrial PRG				
CA LUFT 8015M								
TPH as Diesel	mg/kg	NE	NE	NE	13.9 U	10.7 U	10.2 U	10.6 U
TPH as Gasoline	mg/kg	NE	NE	NE	14 U	9.3 U	9.16 U	10.5 U
EPA 8081								
4,4'-DDD	mg/kg	0.0361	2.4	17	.0042 U	.0032 U	.0031 U	.0032 U
4,4'-DDE	mg/kg	0.145	1.7	12	.058 U	.001 J	.043 U	.045 U
4,4'-DDT	mg/kg	0.236	1.7	12	.0042 U	.0032 U	.0031 U	.0032 U
Aldrin	mg/kg	NE	0.029	0.15	.021 U	.016 U	.015 U	.016 U
alpha-BHC	mg/kg	NE	0.09	0.59	.0026 U	.002 U	.0019 U	.002 U
alpha-Chlordane	mg/kg	0.00224	1.6	11	.021 U B	.016 U B	.015 U B	.016 U B
Beta-BHC	mg/kg	NE	0.32	2.1	.046 U	.035 U	.034 U	.035 U
Delta-BHC	mg/kg	NE	NE	NE	.015 U	.012 U	.011 U	.012 U
Dieldrin	mg/kg	0.0199	0.03	0.15	.049 U B Y	.037 U B Y	.036 U B Y	.037 U B Y
Endosulfan I	mg/kg	0.000179	370	5300	.029 U B	.022 U B	.021 U B	.022 U B
Endosulfan II	mg/kg	0.00222	370	5300	.033 U B	.026 U B	.024 U B	.025 U B
Endosulfan sulfate	mg/kg	0.0031	NE	NE	.05 U B	.039 U B	.037 U B	.038 U B
Endrin	mg/kg	0.00222	18	260	.05 U B	.039 U B	.037 U B	.038 U B
Endrin aldehyde	mg/kg	0.00222	NE	NE	.022 U B	.017 U B	.016 U B	.017 U B
gamma-BHC	mg/kg	NE	0.44	2.9	.028 U	.021 U	.02 U	.021 U
gamma-Chlordane	mg/kg	0.0027	1.6	11	.021 U B	.016 U B	.015 U B	.016 U B
Heptachlor	mg/kg	NE	0.11	0.55	.028 U	.021 U	.0012 J	.021 U
Heptachlor epoxide	mg/kg	NE	0.053	0.27	.029 U	.022 U	.021 U	.022 U
Methoxychlor	mg/kg	NE	310	4400	.079 UJ	.061 UJ	.058 UJ	.06 UJ
Toxaphene	mg/kg	NE	0.44	2.2	.97 U Y	.75 U Y	.71 U Y	.74 U Y
EPA 8082								
Aroclor-1016	mg/kg	NE	3.9	29	.97 U	.75 U	.71 U	.74 U
Aroclor-1221	mg/kg	NE	0.22	1	.97 U Y	.75 U Y	.71 U Y	.74 U Y
Aroclor-1232	mg/kg	NE	0.22	1	.97 U Y	.75 U Y	.71 U Y	.74 U Y
Aroclor-1242	mg/kg	NE	0.22	1	.97 U Y	.75 U Y	.71 U Y	.74 U Y
Aroclor-1248	mg/kg	NE	0.22	1	.97 U Y	.75 U Y	.71 U Y	.74 U Y
Aroclor-1254	mg/kg	NE	0.22	1	.97 U Y	.75 U Y	.71 U Y	.74 U Y
Aroclor-1260	mg/kg	NE	0.22	1	.97 U Y	.75 U Y	.71 U Y	.74 U Y

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2757	18609-2758	18609-2759	18609-2760
Location Code					PHA4-SB04	PHA4-SB05	PHA4-SB05	PHA4-SB05
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					20.0	5.0	10.0	20.0
	Unit	**Background**	**Residential PRG**	**Industrial PRG**				
EPA 8151								
2,4,5-T	mg/kg	NE	NE	NE	.28 U	.21 U	.2 U	.21 U
2,4,5-TP (Silvex)	mg/kg	NE	NE	NE	.28 U	.21 U	.2 U	.21 U
2,4-D	mg/kg	NE	NE	NE	2.2 U	1.7 U	1.6 U	1.7 U
2,4-DB	mg/kg	NE	NE	NE	1.7 U	1.3 U	1.2 U	1.3 U
Dalapon	mg/kg	NE	1800	26000	11 U	8.6 U	8.1 U	8.5 U
Dicamba	mg/kg	NE	1800	26000	.56 U	.43 U	.41 U	.42 U
Dichlorprop	mg/kg	NE	NE	NE	1.4 U	1.1 U	1 U	1.1 U
Dinoseb	mg/kg	NE	61	880	.14 UJ	.11 UJ	.1 R	.11 UJ
MCPA	mg/kg	NE	NE	NE	470 U	360 U	350 U	360 U
MCPP	mg/kg	NE	NE	NE	360 U	280 U	260 U	280 U
EPA 8260								
1,1,1-Trichloroethane	µg/kg	NE	770000	1400000	7.6 U	5.3 U	6.1 U	5.8 U
1,1,2,2-Tetrachloroethane	µg/kg	NE	380	900	7.6 U	5.3 U	6.1 U	5.8 U
1,1,2-Trichloroethane	µg/kg	NE	840	1900	7.6 U	5.3 U	6.1 U	5.8 U
1,1-Dichloroethane	µg/kg	NE	3300	7100	7.6 U	5.3 U	6.1 U	5.8 U
1,1-Dichloroethene	µg/kg	NE	54	120	7.6 U	5.3 U	6.1 U	5.8 U
1,2-Dichloroethane	µg/kg	NE	350	760	7.6 U	5.3 U	6.1 U	5.8 U
1,2-Dichloropropane	µg/kg	NE	350	770	7.6 U	5.3 U	6.1 U	5.8 U
2-Butanone (MEK)	µg/kg	NE	7300000	28000000	76 U	53 U	61 U	58 U
2-Chloroethyl vinyl ether	µg/kg	NE	NE	NE	76 U	53 U	61 U	58 U
2-Hexanone	µg/kg	NE	NE	NE	76 U	53 U	61 U	58 U
4-Methyl-2-pentanone (MIBK)	µg/kg	NE	790000	2900000	76 U	53 U	61 U	58 U
Acetone	µg/kg	NE	1600000	6200000	76 U	53 U	61 U	58 U
Benzene	µg/kg	NE	650	1500	7.6 U	5.3 U	6.1 U	5.8 U
Bromodichloromethane	µg/kg	NE	1000	2400	7.6 U	5.3 U	6.1 U	5.8 U
Bromoform	µg/kg	NE	62000	310000	7.6 U	5.3 U	6.1 U	5.8 U
Bromomethane	µg/kg	NE	3900	13000	7.6 U	5.3 U	6.1 U	5.8 U
Carbon disulfide	µg/kg	NE	360000	720000	7.6 U	5.3 U	6.1 U	5.8 U
Carbon tetrachloride	µg/kg	NE	240	530	7.6 U	5.3 U	6.1 U	5.8 U
Chlorobenzene	µg/kg	NE	150000	540000	7.6 U	5.3 U	6.1 U	5.8 U
Chloroethane	µg/kg	NE	3000	6500	7.6 U	5.3 U	6.1 U	5.8 U

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2757	18609-2758	18609-2759	18609-2760
Location Code					PHA4-SB04	PHA4-SB05	PHA4-SB05	PHA4-SB05
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					20.0	5.0	10.0	20.0
	Unit	Background	Residential PRG	Industrial PRG				
Chloroform	µg/kg	NE	240	520	7.6 U	5.3 U	6.1 U	5.8 U
Chloromethane	µg/kg	NE	1200	2700	7.6 U	5.3 U	6.1 U	5.8 U
cis-1,2-Dichloroethene	µg/kg	NE	43000	150000	7.6 U	5.3 U	6.1 U	5.8 U
cis-1,3-Dichloropropene	µg/kg	NE	82	180	7.6 U	5.3 U	6.1 U	5.8 U
Dibromochloromethane	µg/kg	NE	1100	2700	7.6 U	5.3 U	6.1 U	5.8 U
Ethylbenzene	µg/kg	NE	230000	230000	7.6 U	5.3 U	6.1 U	5.8 U
Methyl tert-butyl ether (MTBE)	µg/kg	NE	17	37	15 U	11 U	12 U	12 U
Methylene chloride	µg/kg	NE	8900	21000	7.1 U	5.3 U	6.3 U	5.8 U
Styrene	µg/kg	NE	1700000	1700000	7.6 U	5.3 U	6.1 U	5.8 U
Tetrachloroethene (PCE)	µg/kg	NE	5700	19000	7.6 U	5.3 U	6.1 U	5.8 U
Toluene	µg/kg	NE	520000	520000	7.6 U	5.3 U	6.1 U	5.8 U
trans-1,2-Dichloroethene	µg/kg	NE	63000	210000	7.6 U	5.3 U	6.1 U	5.8 U
trans-1,3-Dichloropropene	µg/kg	NE	82	180	7.6 U	5.3 U	6.1 U	5.8 U
Trichloroethene (TCE)	µg/kg	NE	2800	6100	7.6 U	5.3 U	6.1 U	5.8 U
Vinyl acetate	µg/kg	NE	430000	1400000	76 U	53 U	61 U	58 U
Vinyl chloride	µg/kg	NE	150	830	7.6 U	5.3 U	6.1 U	5.8 U
Xylenes (total)	µg/kg	NE	210000	210000	7.6 U	5.3 U	6.1 U	5.8 U
EPA 8270								
1,2,4-Trichlorobenzene	µg/kg	NE	650000	3000000	460 UJ	350 UJ	340 UJ	350 UJ
1,2-Dichlorobenzene	µg/kg	NE	370000	370000	460 U	350 U	340 U	350 U
1,3-Dichlorobenzene	µg/kg	NE	13000	52000	460 U	350 U	340 U	350 U
1,4-Dichlorobenzene	µg/kg	NE	3400	8100	460 UJ	350 UJ	340 UJ	350 UJ
2,4,5-Trichlorophenol	µg/kg	NE	6100000	88000000	1200 U	890 U	850 U	880 U
2,4,6-Trichlorophenol	µg/kg	NE	44000	220000	460 U	350 U	340 U	350 U
2,4-Dichlorophenol	µg/kg	NE	180000	2600000	460 U	350 U	340 U	350 U
2,4-Dimethylphenol	µg/kg	NE	1200000	18000000	460 U	350 U	340 U	350 U
2,4-Dinitrophenol	µg/kg	NE	120000	1800000	1200 U	890 U	850 U	880 U
2,4-Dinitrotoluene	µg/kg	NE	120000	1800000	460 U	350 U	340 U	350 U
2,6-Dinitrotoluene	µg/kg	NE	61000	880000	460 U	350 U	340 U	350 U
2-Chloronaphthalene	µg/kg	NE	4900000	27000000	460 U	350 U	340 U	350 U
2-Chlorophenol	µg/kg	NE	63000	240000	460 UJ	350 UJ	340 UJ	350 UJ
2-Methyl-4,6-dinitrophenol	µg/kg	NE	NE	NE	1200 U	890 U	850 U	880 U

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2757	18609-2758	18609-2759	18609-2760
Location Code					PHA4-SB04	PHA4-SB05	PHA4-SB05	PHA4-SB05
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					20.0	5.0	10.0	20.0
	Unit	**Background**	**Residential PRG**	**Industrial PRG**				
2-Methylnaphthalene	µg/kg	NE	NE	NE	460 U	350 U	340 U	350 U
2-Methylphenol	µg/kg	NE	3100000	44000000	460 U	350 U	340 U	350 U
2-Nitroaniline	µg/kg	NE	3500	50000	1200 U	890 U	850 U	880 U
2-Nitrophenol	µg/kg	NE	NE	NE	460 U	350 U	340 U	350 U
3,3'-Dichlorobenzidine	µg/kg	NE	1100	5500	460 U	350 U	340 U	350 U
3-Methyl-4-chlorophenol	µg/kg	NE	NE	NE	460 UJ	350 UJ	340 UJ	350 UJ
3-Nitroaniline	µg/kg	NE	NE	NE	1200 U	890 U	850 U	880 U
4-Bromophenyl phenyl ether	µg/kg	NE	NE	NE	460 U	350 U	340 U	350 U
4-Chloroaniline	µg/kg	NE	240000	3500000	460 U	350 U	340 U	350 U
4-Chlorophenyl phenyl ether	µg/kg	NE	NE	NE	460 U	350 U	340 U	350 U
4-Methylphenol	µg/kg	NE	310000	4400000	460 U	350 U	340 U	350 U
4-Nitroaniline	µg/kg	NE	NE	NE	1200 U	890 U	850 U	880 U
4-Nitrophenol	µg/kg	NE	490000	7000000	1200 UJ	890 UJ	850 UJ	880 UJ
Acenaphthene	µg/kg	NE	3700000	38000000	460 U	350 U	340 U	350 U
Acenaphthylene	µg/kg	NE	NE	NE	460 U	350 U	340 U	350 U
Anthracene	µg/kg	NE	22000000	100000000	460 U	350 U	340 U	350 U
Benzo[a]anthracene	µg/kg	22	620	2900	460 U B	350 U B	340 U B	350 U B
Benzo[a]pyrene	µg/kg	27	62	290	350 U B Y X	270 U B Y	250 U B Y	270 U B Y
Benzo[b]fluoranthene	µg/kg	28	620	2900	460 U B	350 U B	340 U B	350 U B
Benzo[ghi]perylene	µg/kg	NE	NE	NE	460 U	350 U	340 U	350 U
Benzo[k]fluoranthene	µg/kg	24	6200	29000	460 U B	350 U B	340 U B	350 U B
Bis (2-chloroethoxy)methane	µg/kg	NE	NE	NE	460 U	350 U	340 U	350 U
Bis (2-chloroethyl)ether	µg/kg	NE	210	620	460 U Y	350 U Y	340 U Y	350 U Y
Bis (2-chloroisopropyl)ether	µg/kg	NE	2900	8100	460 U	350 U	340 U	350 U
Bis (2-ethylhexyl)phthalate	µg/kg	NE	35000	180000	460 U	350 U	340 U	350 U
Butyl benzyl phthalate	µg/kg	NE	12000000	100000000	460 U	350 U	340 U	350 U
Chrysene	µg/kg	31	6100	290000	460 U B	350 U B	340 U B	350 U B
Di-n-butyl phthalate	µg/kg	NE	6100000	88000000	460 U	350 U	340 U	350 U
Di-n-octyl phthalate	µg/kg	NE	1200000	10000000	460 U	350 U	340 U	350 U
Dibenz[a,h]anthracene	µg/kg	8	62	290	350 U B Y X	270 U B Y	250 U B Y	270 U B Y
Dibenzofuran	µg/kg	NE	290000	5100000	460 U	350 U	340 U	350 U
Diethyl phthalate	µg/kg	NE	49000000	100000000	460 U	350 U	340 U	350 U

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2757	18609-2758	18609-2759	18609-2760
Location Code					PHA4-SB04	PHA4-SB05	PHA4-SB05	PHA4-SB05
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					20.0	5.0	10.0	20.0
	Unit	**Background**	**Residential PRG**	**Industrial PRG**				
Dimethyl phthalate	µg/kg	NE	100000000	100000000	460 U	350 U	340 U	350 U
Fluoranthene	µg/kg	45	2300000	30000000	460 U B	350 U B	340 U B	350 U B
Fluorene	µg/kg	NE	2600000	33000000	460 U	350 U	340 U	350 U
Hexachlorobenzene	µg/kg	NE	300	1500	460 U Y	350 U Y	340 U Y	350 U Y
Hexachlorobutadiene	µg/kg	NE	6200	32000	460 U	350 U	340 U	350 U
Hexachlorocyclopentadiene	µg/kg	NE	420000	5900000	460 U	350 U	340 U	350 U
Hexachloroethane	µg/kg	NE	35000	180000	460 U	350 U	340 U	350 U
Indeno[1,2,3-cd]pyrene	µg/kg	21	620	2900	460 U B	350 U B	340 U B	350 U B
N-Nitrosodi-n-propylamine	µg/kg	NE	69	350	350 UJ Y X	270 UJ Y	250 UJ Y	270 UJ Y
N-Nitrosodiphenylamine	µg/kg	NE	99000	500000	460 U	350 U	340 U	350 U
Naphthalene	µg/kg	NE	56000	190000	460 U	350 U	340 U	350 U
Nitrobenzene	µg/kg	NE	20000	110000	460 U	350 U	340 U	350 U
Pentachlorophenol	µg/kg	NE	3000	11000	460 U	350 U	340 U	350 U
Phenanthrene	µg/kg	18	NE	NE	460 U B	350 U B	340 U B	350 U B
Phenol	µg/kg	NE	37000000	100000000	460 UJ	350 UJ	340 UJ	350 UJ
Pyrene	µg/kg	41	2300000	54000000	460 U B	350 U B	340 U B	350 U B
EPA 6010								
Aluminum	mg/kg	14800	76000	100000	13700	10500	5640	10500
Antimony	mg/kg	3.06	31	820	13.9 U B	10.7 U B	10.2 U B	10.6 U B
Arsenic	mg/kg	6.86	0.39	2.7	3.09 Y X	2.54 Y	1.41 U Y	3.33 Y X
Barium	mg/kg	173	5400	100000	212 B	131	94.5	158
Beryllium	mg/kg	0.669	150	2200	.482	.4 U	.21 U	.366
Cadmium	mg/kg	2.35	9.0	810	1.39 U	1.07 U	1.02 U	1.06 U
Calcium	mg/kg	46000	NE	NE	10300 J	4660 J	4490 J	7070 J
Chromium	mg/kg	26.9	210	450	14.2 J	10.3 J	7.18 J	9.79 J
Cobalt	mg/kg	6.98	4700	100000	7.99 J B	4.78 J	3.01 J	5.25 J
Copper	mg/kg	10.5	2900	76000	8.14	53.2 B	6.49	6.32
Iron	mg/kg	18400	23000	100000	19000 J B	13000 J	7420 J	14800 J
Lead	mg/kg	15.1	400	750	2.31	2.15	1.04	1.81
Magnesium	mg/kg	8370	NE	NE	8790 J B	5140 J	3300 J	6620 J
Manganese	mg/kg	291	1800	32000	337 J B	229 J	134 J	257 J
Molybdenum	mg/kg	NE	390	10000	2.78 U	2.14 U	2.04 U	2.12 U

Table 4-1
Summary of Analytical Results — APHO 6

Sample Identification					18609-2757	18609-2758	18609-2759	18609-2760
Location Code					PHA4-SB04	PHA4-SB05	PHA4-SB05	PHA4-SB05
Date Sampled					02/02/00	02/02/00	02/02/00	02/02/00
Depth (feet below ground surface)					20.0	5.0	10.0	20.0
	Unit	**Background**	**Residential PRG**	**Industrial PRG**				
Nickel	mg/kg	15.3	150	41000	9.06 J	7.09 J	2.77 J	5.45 J
Potassium	mg/kg	4890	NE	NE	6030 B	3870	1940 J	4350 J
Selenium	mg/kg	0.32	390	10000	1.39 U B	1.07 U B	1.02 U B	1.06 U B
Silver	mg/kg	0.539	390	10000	2.78 U B	2.14 U B	2.04 U B	2.12 U B
Sodium	mg/kg	405	NE	NE	983 B	535 U B	509 U B	530 U B
Thallium	mg/kg	0.42	5.2	130	1.39 U B	1.07 U B	1.02 U B	1.06 U B
Vanadium	mg/kg	71.8	550	14000	44.6 J	29.3 J	17.2 J	33.8 J
Zinc	mg/kg	77.9	23000	100000	62 J	60 J	23.5 J	46.3 J
EPA 7471A								
Mercury	mg/kg	0.22	23	610	.139 U	.107 U	.102 U	.106 U
EPA 9012								
Cyanide	mg/kg	NE	1200	18000	.695 U	.535 U	.509 U	.53 U

Table 4-1
Summary of Analytical Results — APHO 6

Explanation:
B - result exceeds established background limits
CA LUFT - California Leaking Underground Fuel Tank
EPA - United States Environmental Protection Agency
J - estimated value
M - Modified
MDL - method detection limit
mg/kg - milligrams per kilogram
MS/MSD - matrix spike/matrix spike duplicate
NA - not analyzed
NE - not established
OHM - OHM Remediation Services Corp.
PHA4 - photo anomaly area 4
PRG - Preliminary Remediation Goal, EPA Region IX, October 1999
R - data is not usable
RL - reporting limit
SB - soil boring
TPH - total petroleum hydrocarbons
U - not detected above or equal to the stated reporting limit
UJ - the sample detection limit is an estimated value
X - result exceeds industrial PRGs
Y - result exceeds residential PRGs
µg/kg - micrograms per kilogram

* If the analyte had been detected between the MDL and RL, the actual value would have been reported and flagged with a "J" qualifier. For the samples in question, the laboratory did not detect analyte concentrations between the MDL and the RL. As a result, the samples are qualified as non-detect ("U").
** This sample was used as an MS/MSD sample. The percent recoveries for antimony were below the QC limits for the MS/MSD, therefore, the MS/MSD sample was flagged as "UJ".
*** This sample was used as an MS/MSD sample. There were no percent recoveries for dinoseb in the MS/MSD samples, therefore, the MS/MSD sample was flagged as "R", and the associated samples were flagged with "UJ".

Table 4-2
Summary of QC Results — APHO 6

Sample Identification Location Code Date Sampled	Unit	18609-2761 Equipment Rinsate 02/02/00	18609-2773 Trip Blank 02/02/00
CA LUFT 8015M			
TPH as Diesel	mg/L	.12	NA
TPH as Gasoline	mg/L	.15	NA
EPA 8081			
4,4'-DDD	µg/L	.49 U	NA
4,4'-DDE	µg/L	.49 U	NA
4,4'-DDT	µg/L	.098 U	NA
Aldrin	µg/L	.029 U	NA
alpha-BHC	µg/L	.34 U	NA
alpha-Chlordane	µg/L	.78 U	NA
Beta-BHC	µg/L	.23 U	NA
Delta-BHC	µg/L	.24 U	NA
Dieldrin	µg/L	.43 U	NA
Endosulfan I	µg/L	.29 U	NA
Endosulfan II	µg/L	.39 U	NA
Endosulfan sulfate	µg/L	.34 U	NA
Endrin	µg/L	.38 U	NA
Endrin aldehyde	µg/L	.49 U	NA
gamma-BHC	µg/L	.25 U	NA
gamma-Chlordane	µg/L	.36 U	NA
Heptachlor	µg/L	.39 U	NA
Heptachlor epoxide	µg/L	.31 U	NA
Methoxychlor	µg/L	.84 U	NA
Toxaphene	µg/L	2 U	NA
EPA 8082			
Aroclor-1016	µg/L	2 U	NA
Aroclor-1221	µg/L	2 U	NA
Aroclor-1232	µg/L	.98 U	NA
Aroclor-1242	µg/L	.98 U	NA
Aroclor-1248	µg/L	.98 U	NA
Aroclor-1254	µg/L	.98 U	NA
Aroclor-1260	µg/L	.98 U	NA

Table 4-2
Summary of QC Results — APHO 6

Sample Identification Location Code Date Sampled	Unit	18609-2761 Equipment Rinsate 02/02/00	18609-2773 Trip Blank 02/02/00
EPA 8151			
2,4,5-T	µg/L	2 UJ	NA
2,4,5-TP (Silvex)	µg/L	1.7 U	NA
2,4-D	µg/L	12 U	NA
2,4-DB	µg/L	9 U	NA
Dalapon	µg/L	60 U	NA
Dicamba	µg/L	2.7 U	NA
Dichlorprop	µg/L	6.5 U	NA
Dinoseb	µg/L	.7 U	NA
MCPA	µg/L	2500 U	NA
MCPP	µg/L	1900 U	NA
EPA 8260A			
1,1,1-Trichloroethane	µg/L	5 U	5 U
1,1,2,2-Tetrachloroethane	µg/L	5 U	5 U
1,1,2-Trichloroethane	µg/L	5 U	5 U
1,1-Dichloroethane	µg/L	5 U	5 U
1,1-Dichloroethene	µg/L	5 U	5 U
1,2-Dichloroethane	µg/L	5 U	5 U
1,2-Dichloropropane	µg/L	5 U	5 U
2-Butanone (MEK)	µg/L	50 U	50 U
2-Chloroethyl vinyl ether	µg/L	50 U	50 U
2-Hexanone	µg/L	50 U	50 U
4-Methyl-2-pentanone (MIBK)	µg/L	50 U	50 U
Acetone	µg/L	50 U	50 U
Benzene	µg/L	5 U	5 U
Bromodichloromethane	µg/L	5 U	5 U
Bromoform	µg/L	5 U	5 U
Bromomethane	µg/L	5 U	5 U
Carbon disulfide	µg/L	5 U	5 U
Carbon tetrachloride	µg/L	5 U	5 U
Chlorobenzene	µg/L	5 U	5 U
Chloroethane	µg/L	5 U	5 U

Table 4-2
Summary of QC Results — APHO 6

Sample Identification Location Code Date Sampled	Unit	18609-2761 Equipment Rinsate 02/02/00	18609-2773 Trip Blank 02/02/00
Chloroform	µg/L	5 U	5 U
Chloromethane	µg/L	5 U	5 U
cis-1,2-Dichloroethene	µg/L	5 U	5 U
cis-1,3-Dichloropropene	µg/L	5 U	5 U
Dibromochloromethane	µg/L	5 U	5 U
Ethylbenzene	µg/L	5 U	5 U
Methyl tert-butyl ether (MTBE)	µg/L	10 U	10 U
Methylene chloride	µg/L	5 U	5 U
Styrene	µg/L	5 U	5 U
Tetrachloroethene	µg/L	5 U	5 U
Toluene	µg/L	5 U	5 U
trans-1,2-Dichloroethene	µg/L	5 U	5 U
trans-1,3-Dichloropropene	µg/L	5 U	5 U
Trichloroethene	µg/L	5 U	5 U
Vinyl acetate	µg/L	50 U	50 U
Vinyl chloride	µg/L	5 U	5 U
Xylenes (total)	µg/L	5 U	5 U
EPA 8270			
1,2,4-Trichlorobenzene	µg/L	9.6 U	NA
1,2-Dichlorobenzene	µg/L	9.6 U	NA
1,3-Dichlorobenzene	µg/L	9.6 U	NA
1,4-Dichlorobenzene	µg/L	9.6 U	NA
2,4,5-Trichlorophenol	µg/L	24 U	NA
2,4,6-Trichlorophenol	µg/L	9.6 U	NA
2,4-Dichlorophenol	µg/L	9.6 U	NA
2,4-Dimethylphenol	µg/L	9.6 U	NA
2,4-Dinitrophenol	µg/L	24 U	NA
2,4-Dinitrotoluene	µg/L	9.6 U	NA
2,6-Dinitrotoluene	µg/L	9.6 U	NA
2-Chloronaphthalene	µg/L	9.6 U	NA
2-Chlorophenol	µg/L	9.6 U	NA
2-Methyl-4,6-dinitrophenol	µg/L	24 U	NA

Table 4-2
Summary of QC Results — APHO 6

Sample Identification		18609-2761	18609-2773
Location Code		Equipment Rinsate	Trip Blank
Date Sampled		02/02/00	02/02/00
	Unit		
2-Methylnaphthalene	µg/L	9.6 U	NA
2-Methylphenol	µg/L	9.6 U	NA
2-Nitroaniline	µg/L	24 U	NA
2-Nitrophenol	µg/L	9.6 U	NA
3,3'-Dichlorobenzidine	µg/L	9.6 U	NA
3-Methyl-4-chlorophenol	µg/L	9.6 U	NA
3-Nitroaniline	µg/L	24 U	NA
4-Bromophenyl phenyl ether	µg/L	9.6 U	NA
4-Chloroaniline	µg/L	9.6 U	NA
4-Chlorophenyl phenyl ether	µg/L	9.6 U	NA
4-Methylphenol	µg/L	9.6 U	NA
4-Nitroaniline	µg/L	24 U	NA
4-Nitrophenol	µg/L	24 U	NA
Acenaphthene	µg/L	9.6 U	NA
Acenaphthylene	µg/L	9.6 U	NA
Anthracene	µg/L	9.6 U	NA
Benzo[a]anthracene	µg/L	9.6 U	NA
Benzo[a]pyrene	µg/L	9.6 U	NA
Benzo[b]fluoranthene	µg/L	9.6 U	NA
Benzo[ghi]perylene	µg/L	9.6 U	NA
Benzo[k]fluoranthene	µg/L	9.6 U	NA
Bis (2-chloroethoxy)methane	µg/L	9.6 U	NA
Bis (2-chloroethyl)ether	µg/L	9.6 U	NA
Bis (2-chloroisopropyl)ether	µg/L	9.6 U	NA
Bis (2-ethylhexyl)phthalate	µg/L	9.6 U	NA
Butyl benzyl phthalate	µg/L	9.6 U	NA
Chrysene	µg/L	9.6 U	NA
Di-n-butyl phthalate	µg/L	9.6 U	NA
Di-n-octyl phthalate	µg/L	9.6 U	NA
Dibenz[a,h]anthracene	µg/L	9.6 U	NA
Dibenzofuran	µg/L	9.6 U	NA
Diethyl phthalate	µg/L	9.6 U	NA

Table 4-2
Summary of QC Results — APHO 6

Sample Identification		18609-2761	18609-2773
Location Code		Equipment Rinsate	Trip Blank
Date Sampled		02/02/00	02/02/00
	Unit		
Dimethyl phthalate	µg/L	9.6 U	NA
Fluoranthene	µg/L	9.6 U	NA
Fluorene	µg/L	9.6 U	NA
Hexachlorobenzene	µg/L	9.6 U	NA
Hexachlorobutadiene	µg/L	9.6 U	NA
Hexachlorocyclopentadiene	µg/L	9.6 U	NA
Hexachloroethane	µg/L	9.6 U	NA
Indeno[1,2,3-cd]pyrene	µg/L	9.6 U	NA
N-Nitrosodi-n-propylamine	µg/L	9.6 U	NA
N-Nitrosodiphenylamine	µg/L	9.6 U	NA
Naphthalene	µg/L	9.6 U	NA
Nitrobenzene	µg/L	9.6 U	NA
Pentachlorophenol	µg/L	9.6 U	NA
Phenanthrene	µg/L	9.6 U	NA
Phenol	µg/L	9.6 U	NA
Pyrene	µg/L	9.6 U	NA
EPA 6010			
Aluminum	µg/L	500 U	NA
Antimony	µg/L	500 U	NA
Arsenic	µg/L	10 U	NA
Barium	µg/L	100 U	NA
Beryllium	µg/L	10 U	NA
Cadmium	µg/L	10 U	NA
Calcium	µg/L	5000 U	NA
Chromium	µg/L	50 U	NA
Cobalt	µg/L	50 U	NA
Copper	µg/L	50 U	NA
Iron	µg/L	200 U	NA
Lead	µg/L	10 U	NA
Magnesium	µg/L	5000 U	NA
Manganese	µg/L	20 U	NA
Molybdenum	µg/L	100 U	NA

Table 4-2
Summary of QC Results — APHO 6

Sample Identification		18609-2761	18609-2773
Location Code		Equipment Rinsate	Trip Blank
Date Sampled		02/02/00	02/02/00
	Unit		
Nickel	µg/L	150 U	NA
Potassium	µg/L	5000 U	NA
Selenium	µg/L	10 U	NA
Silver	µg/L	50 U	NA
Sodium	µg/L	5000 U	NA
Thallium	µg/L	400 U	NA
Vanadium	µg/L	100 U	NA
Zinc	µg/L	31.5	NA
EPA 7470A			
Mercury	mg/L	.2 U	NA
EPA 9010			
Cyanide	mg/L	.01 U	NA

Table 4-2
Summary of QC Results — APHO 6

Explanation:
CA LUFT - California Leaking Underground Fuel Tank
EPA - United States Environmental Protection Agency
J - estimated value
M - Modified
MDL - method detection limit
mg/L - milligrams per liter
MS/MSD - matrix spike/matrix spike duplicate
NA - not analyzed
NE - not established
OHM - OHM Remediation Services Corp.
PHA4 - photo anomaly area 4
R - data is not usable
RL - reporting limit
TPH - total petroleum hydrocarbons
U - not detected above or equal to the stated reporting limit
UJ - the sample detection limit is an estimated value
μg/L - micrograms per liter

Table 5-1
Residential-Use Risk Screening Worksheet for Soil
APHO 6, Marine Corps Air Station, El Toro

Detected Chemical	Maximum APHO 6 Soil Concentration (mg/kg)	MCAS El Toro Background Concentration[A] (mg/kg)	CANCER			NON-CANCER		
			Residential PRG[B] (mg/kg)	APHO 6 Maximum Ratio[C]	MCAS El Toro Background Ratio[D]	Residential PRG[E] (mg/kg)	APHO 6 Maximum Ratio[F]	MCAS El Toro Background Ratio[F]
ORGANICS								
Heptachlor	0.0016	NE	1.1E-01	1.45E-02	1.45E-02	NE	NE	NE
4,4'-DDE	0.001	0.145	1.7E+00	5.88E-04	5.88E-04	NE	NE	NE
METALS								
Arsenic	5.19	6.86	3.9E-01	1.33E+01	1.33E+01	2.2E+01	2.36E-01	3.12E-01
Barium	295	173	NE	NE	NE	5.4E+03	5.46E-02	3.20E-02
Beryllium	0.817	0.669	NE	NE	NE	1.5E+02	5.45E-03	4.46E-03
Chromium	20	26.9	2.1E+02	9.52E-02	9.52E-02	NE	NE	NE
Cobalt	9.43	6.98	NE	NE	NE	4.7E+02	2.01E-02	1.49E-02
Copper	13.00	10.5	NE	NE	NE	2.9E+03	4.48E-03	3.62E-03
Lead	4.18	15.1	NE	NE	NE	4.0E+02	1.05E-02	3.78E-02
Manganese	365	291	NE	NE	NE	1.8E+03	2.03E-01	1.62E-01
Nickel	13	15.3	NE	NE	NE	1.5E+02	8.67E-02	1.02E-01
Thallium	1.38	0.42	NE	NE	NE	5.2E+00	2.65E-01	8.08E-02
Vanadium	58.1	71.8	NE	NE	NE	5.5E+02	1.06E-01	1.31E-01
Zinc	79.4	77.9	NE	NE	NE	2.3E+04	3.45E-03	3.39E-03
Subtotal sum of ratios				1.34E+01	1.34E+01		9.95E-01	8.83E-01
MCAS EL TORO BACKGROUND RISK RATIOS			**CANCER RISK**		**1.34E-05**	**NON-CANCER HAZARD INDEX**		**0.88**
APHO 6 SUMMED RISK			**CANCER RISK**	**1.34E-05**		**NON-CANCER HAZARD INDEX**	**0.99**	
APHO 6 RISK LESS BACKGROUND RISK (NET RISK)			**NET CANCER RISK**	**0.00E+00**				

[A] MCAS El Toro Background upper threshold limit concentrations from Final Technical Memorandum Background and Reference Levels, Bechtel National, Inc. 1996.

[B] Residential soil PRG for cancer from the EPA Region 9, November, 2000 list.

[C] The Ratio is determined by dividing the Concentration by the respective PRG.

[D] Where the background concentration exceeds the maximum concentration the background ratio was defaulted to the maximum ratio.

[E] Residential soil PRG for non-cancer from the EPA Region 9, November, 2000 list.

[F] The Ratio is determined by dividing the Concentration by the respective PRG.No ratios were calculated for chemicals detected below background levels.

Table 5-1
Residential-Use Risk Screening Worksheet for Soil
APHO 6, Marine Corps Air Station, El Toro

mg/kg - Milligrams per kilogram.

NE - Not established/No entry.

PRG - Preliminary remediation goal.

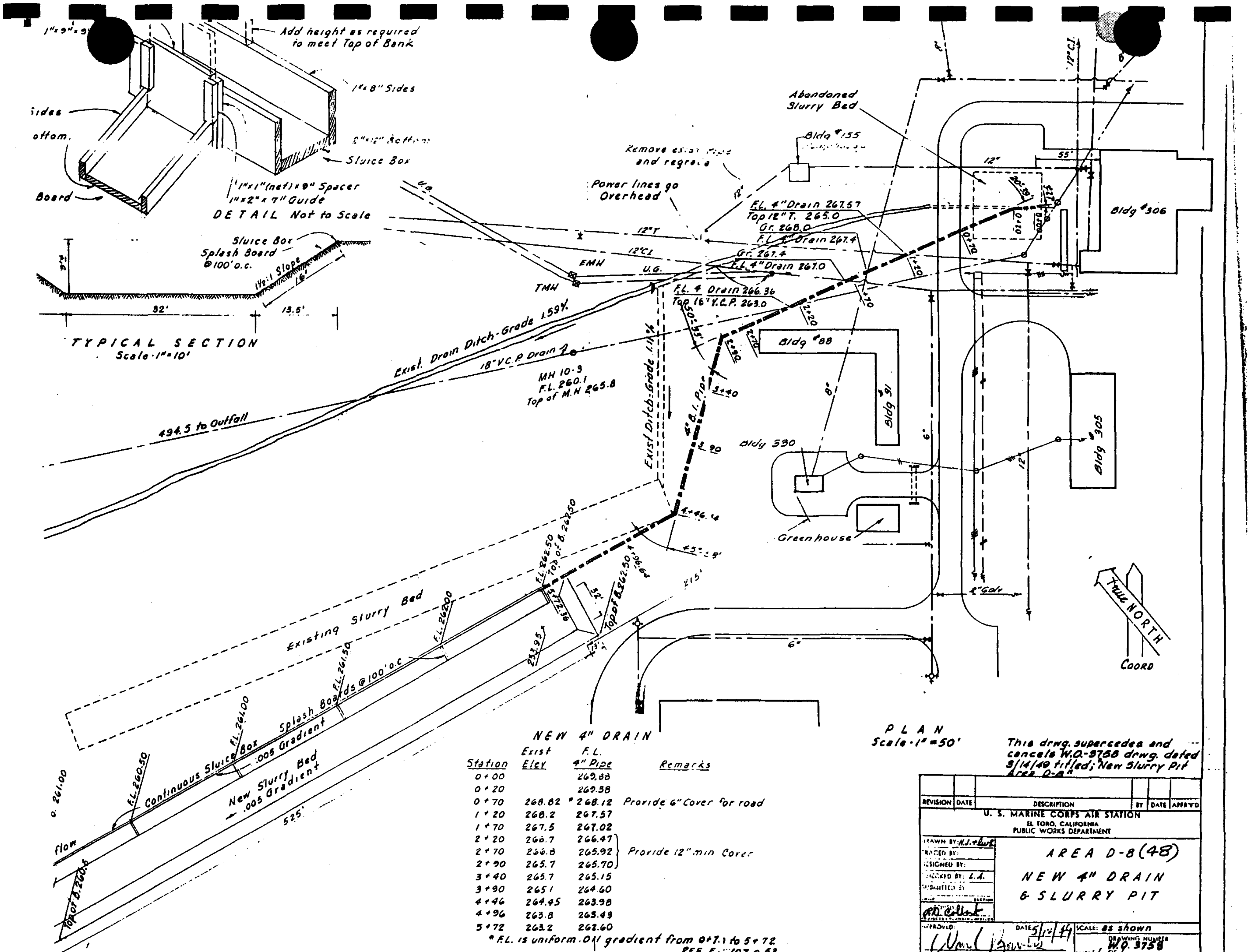
APPENDIX A
HISTORICAL STATION MAP

Technical Memorandum

Aerial Photograph Anomalies
Marine Corps Air Station, El Toro, California

5 April 1999

Prepared by
Southwest Division, Naval Facilities Engineering Command
BRAC Operations Office
1420 Kettner Boulevard, San Diego, CA 92101



NEW 4" DRAIN

Station	Exist Elev	F.L. 4" Pipe	Remarks
0+00		269.88	
0+20		269.38	
0+70	268.82	*268.12	Provide 6" Cover for road
1+20	268.2	267.57	
1+70	267.5	267.02	
2+20	266.7	266.47	Provide 12" min. Cover
2+70	266.8	265.92	Provide 12" min. Cover
2+90	265.7	265.70	Provide 12" min. Cover
3+40	265.7	265.15	
3+90	265.1	264.60	
4+46	264.45	263.98	
4+96	263.8	263.49	
5+72	263.2	262.60	

* F.L. is uniform .011 gradient from 0+70 to 5+72

REF. F.B. 107 p.53

U. S. MARINE CORPS AIR STATION
EL TORO, CALIFORNIA
PUBLIC WORKS DEPARTMENT

AREA D-8 (48)
NEW 4" DRAIN
& SLURRY PIT

SCALE: as shown
DRAWING NUMBER W.O. 3758
SHEET 1 OF 1

APPENDIX B
SAMPLING STRATEGY AERIAL PHOTOGRAPH ANOMALY AREAS 4 AND 5

SOUTHWESTNAVFACENGCOM
Code 5BME.LMH
1220 Pacific Highway
San Diego, CA 92132
Telephone: (619) 532-4162/Fax: (619) 532-4160

File: anomaly3

FACSIMILE

Date: 7 June 1999

From: Lynn Marie Hornecker

To: Glenn Kistner (USEPA)
Tayseer Mahmoud (Cal EPA)
Patricia Hannon (RWQCB)

Subj: Sampling Strategy for Aerial Photograph Anomaly Areas 4 and 5
Marine Corps Air Station, El Toro

The purposes of this facsimile are to provide notification of our planned schedule for sampling and to provide additional information pertaining to the sampling strategy for Aerial Photograph Anomaly Areas 4 and 5 (also known as Anomaly Areas 4 and 5) at the Marine Corps Air Station, El Toro, California. If you have questions pertaining to this facsimile, please do not hesitate to call me at (619) 532-4162.

Schedule and Background Information

We will have an opportunity to conduct sampling activities at Anomaly Areas 4 and 5 in July or August 1999. We plan to investigate these sites under the Station's petroleum corrective action program and we plan to report the results in a Site Assessment Report that will include site photographs, laboratory test results, an assessment of the potential risk to ground water caused by residual petroleum hydrocarbons at the anomaly sites, and recommendations for the future management of the sites. Copies of the Site Assessment Report(s) will be provided to all BRAC Cleanup Team members.

Sampling will be conducted in accordance with the procedures described in *the Draft Supplemental Work Plan, Closure of Various Temporary Accumulation Areas and RCRA Facility Assessment Sites, Marine Corps Air Station, El Toro* (OHM, 1997). This work plan, that is used for the current sampling activities at Temporary Accumulation Areas, includes procedures for sample collection and test methods for analyses of samples for petroleum hydrocarbons, volatile organic compounds, metals, and other potential contaminants of concern.

Detailed information, including the historical aerial photographs on which the individual anomalies within Areas 4 and 5 were identified, are presented in the Technical Memorandum, Aerial Photograph Anomalies (Southwest Division, April 1999) that was submitted to the Base Realignment and Closure Cleanup Team (BCT) members on 5 April 1999.

SOUTHWESTNAVFACENGCOM
Code 5BME.LMH
1220 Pacific Highway
San Diego, CA 92132
Telephone: (619) 532-4162/Fax: (619) 532-4160

Sampling Strategy

Anomaly Area 4 (former slurry beds identified on 1946 photograph):

Anomaly Area 4 is located adjacent to Building 306, the former water treatment facility, within the boundaries of Installation Restoration Program (IRP) Site 24 – the Volatile Organic Compound (VOC) Source Area. The former water treatment plant appears to have operated during the 1940's. The former water treatment plant included slurry beds (or surface impoundments) that have been filled with soil to match the existing grade. The vicinity of the former impoundments located north of Building 307 is covered with a grass cover. The vicinity of the former slurry beds located immediately northwest of Building 306 is covered with asphalt pavement.

Proposed sampling locations are shown on Figure 2. Five shallow soil borings are proposed for the slurry beds immediately adjacent to Building 306 and three shallow soil borings are proposed for the impoundments located north of Building 307 (total of eight borings). Samples will be analyzed for petroleum hydrocarbons, volatile organic compounds (including methyl tertiary butyl ether (MTBE)), and metals.

Monitoring wells for Installation Restoration Program (IRP) Site 9 (the Crash Crew Training Pit Number 1) and IRP Site 12 (the former Sludge Drying Beds) are located in the vicinity of Anomaly Area 4, and water quality information from these wells will be reviewed during the assessment of Anomaly Area 4. Anomaly Area 4 overlies the VOC ground water plume from IRP Site 24, and the depth to ground water is approximately 100 feet.

Anomaly Area 5 (former construction staging area (and areas of disturbed ground) identified on photographs during the period from 1967 to 1988):

Anomaly Area 5 is located adjacent to the east end of the east-west runway in the vicinity of MSC D1 (the Desert Storm Staging Area) and Solid Waste Management Unit 264 (Defense Reutilization and Marketing Office Yard 3). Most of Anomaly Area 5 is covered with a grass cover, however, some of the individual anomalies appear to be located beneath the end of the runway.

Proposed sampling locations are shown on Figure 3. Five shallow borings are proposed near the edge of the east-west runway. Samples will be analyzed for petroleum hydrocarbons and volatile organic compounds (including MTBE), and metals.

Monitoring wells for IRP Site 5 (the Perimeter Landfill) are located nearby, and water quality data from these wells will be reviewed during the assessment of Anomaly Area 5. The depth to ground water at IRP Site 5 is approximately 160 feet.

SOUTHWESTNAVFACENGCOM
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1220 Pacific Highway
San Diego, CA 92132
Telephone: (619) 532-4162/Fax: (619) 532-4160

File: anomaly3

Table. Proposed Sampling Strategy for Aerial Photograph Anomaly Areas 4 and 5 Marine Corps Air Station, El Toro

Site Identification	Sampling Strategy	Comments
Anomaly Area 4 (SAIC 39 (1946) former slurry beds	8 shallow borings, each approximately 20 feet deep, with analysis of two samples per boring by EPA Methods 8015M (jet fuel, diesel, gasoline), 8260 (Volatile Organic Compounds including MTBE), and 6000/7000 metals	Site is located near Buildings 306 and 307. Small slurry bed area, near Building 306, is approximately 60 feet by 60 feet. Large slurry bed area, north of Building 307, is approximately 100 feet by 800 feet.
Anomaly Area 5 (SAIC 161 (1967), SAIC 215 (1971), SAIC 287 (1974), SAIC 314 (1975), and SAIC 542 (1988)) (Staging Area for previous construction projects (anomaly sites)	5 shallow borings, each approximately 20 feet deep, with analysis of two samples per boring by EPA Methods 8015M (jet fuel, diesel, gasoline), 8260 (Volatile Organic Compounds including MTBE), and 6000/7000 metals	Site is located adjacent to the east end of the east-west runway. Desert Storm Staging Area (MSC D1) may be investigated concurrently with Area 5. Anomaly Area 5 is approximately 250 feet by 450 feet.

SOUTHWESTNAVFACENGCOM
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1220 Pacific Highway
San Diego, CA 92132
Telephone: (619) 532-4162/Fax: (619) 532-4160

File: anomaly3

References and/or Sources of Information

CDM Federal Programs Corporation. 1997. *Final Groundwater Monitoring Report, July 1997 Sampling Round, Groundwater Monitoring Program for Marine Corps Air Station, El Toro, El Toro, California.* [Navy Contract N68711-96-D-2029, Delivery Order 5]

Jacobs Engineering Group (JEG). 1993. *Installation Restoration Program, Final Resource Conservation and Recovery Act Facility Assessment Report for Marine Corps Air Station, El Toro, California.* [Navy Contract N68711-89-D-9296, Contract Task Order 193]

OHM Remediation Services Corporation. 1997. *Draft Supplemental Work Plan, Closure of Various Temporary Accumulation Areas and RCRA Facility Assessment Sites, Marine Corps Air Station, El Toro, California.* [Navy Contract N68711-93-D-1459, Delivery Order 70]

Southwest Division, Naval Facilities Engineering Command. 1999. *Technical Memorandum, Aerial Photograph Anomalies, Marine Corps Air Station, El Toro, California.* April.

Figures

CF:
Joseph Joyce (MCAS El Toro BEC)
Andy Piszkin (MCAS El Toro Lead RPM)
Dave DeMars (MCAS El Toro RPM)
Project File (MCAS El Toro)

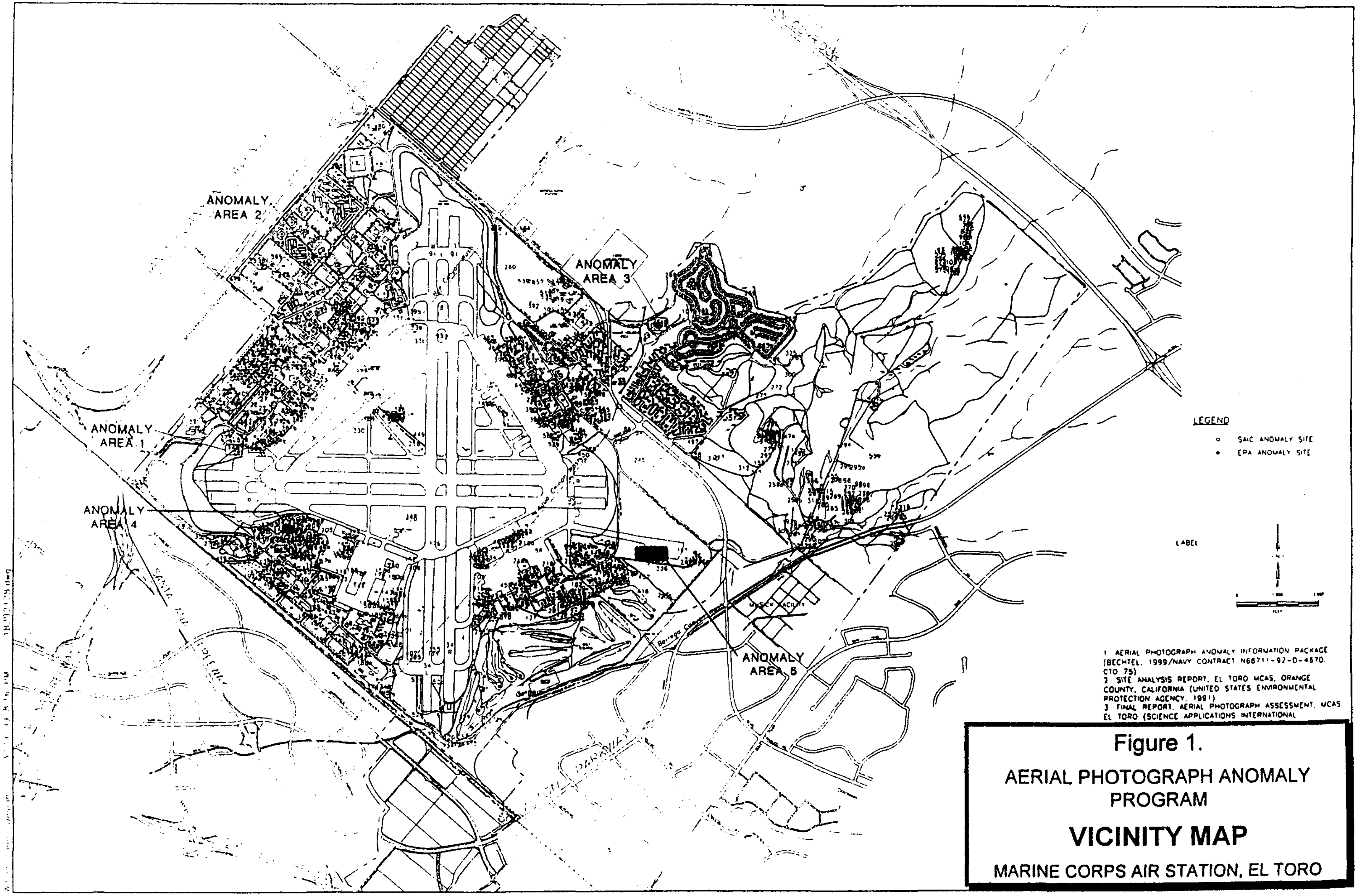


Figure 1.

AERIAL PHOTOGRAPH ANOMALY PROGRAM

VICINITY MAP

MARINE CORPS AIR STATION, EL TORO

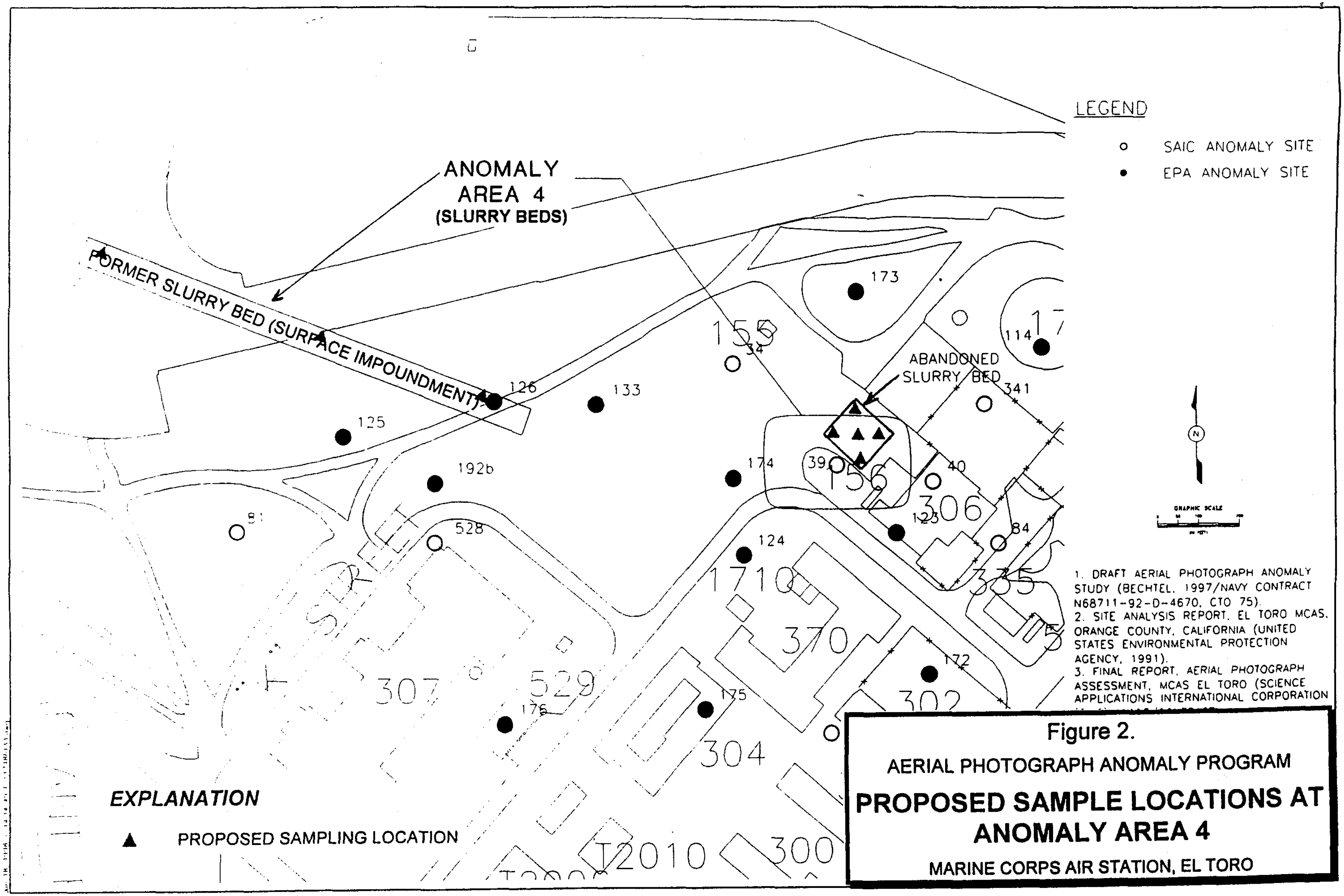


Figure 2.

AERIAL PHOTOGRAPH ANOMALY PROGRAM

PROPOSED SAMPLE LOCATIONS AT ANOMALY AREA 4

MARINE CORPS AIR STATION, EL TORO

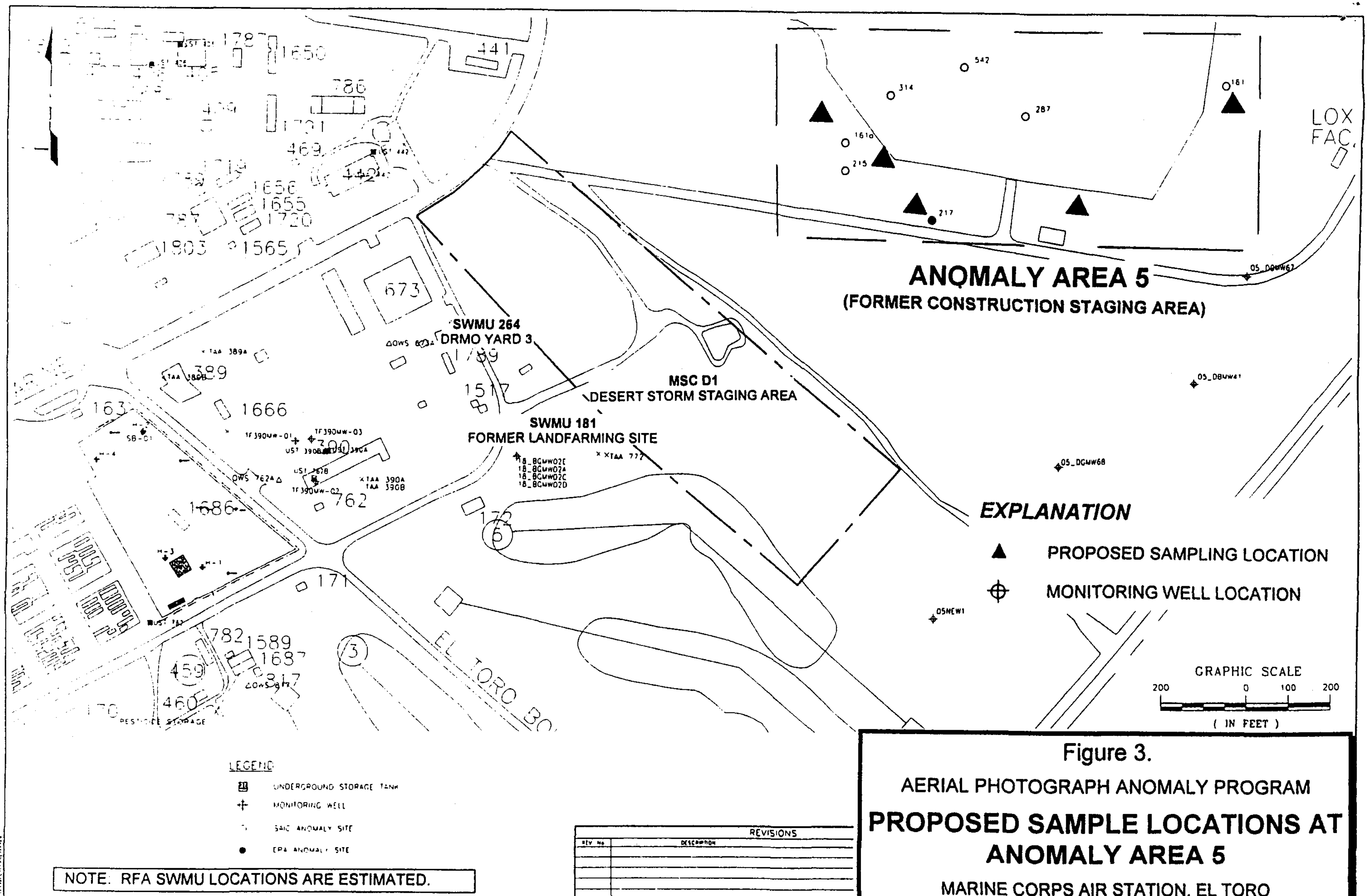


Figure 3.

AERIAL PHOTOGRAPH ANOMALY PROGRAM

PROPOSED SAMPLE LOCATIONS AT ANOMALY AREA 5

MARINE CORPS AIR STATION, EL TORO

D 7/2

OHM Remediation Services Corp.
3347 Michelson Drive, Suite 200
Irvine, CA 92612-1692
Tel. 949.261.6441
Fax. 949.474.8309

A Member of The IT Group

the IT group

November 8, 1999

Contracting Officer
Naval Facilities Engineering Command
Southwest Division
Bozier H. Demarree
1220 Pacific Highway
San Diego, CA 92132-5187

Attention: Ms. Lynn Hornecker

Subject: Supplemental Sampling Strategy, Aerial Photograph Areas 4 and 5
Contract N68711-93-D-1459, Delivery Order 070,
Remediation of Various UST, AOC and RFA Sites, MCAS El Toro, California

Dear Ms. Hornecker:

The attached Supplemental Sampling Strategy, Aerial Photograph Anomaly Areas 4 and 5 provides a response to the comments generated by DTSC on the original Sampling Strategy the you faxed to the agencies on June 7, 1999. This supplemental document addresses the questions raised and includes the chemicals of concern and detection limits anticipated for these chemicals.

Following your concurrence, and that of DTSC, OHM will implement the field sampling discussed in the document.

If you have any questions or need additional information or copies please call or e-mail me.

Sincerely,

William Sedlak, P.E.
Sr. Project Manager

cc: L. Holloway, COTR 1C/1E
OHM PMO File 1C/1E
Project File, Communications B.01.

Supplemental Sampling Strategy, Aerial Photograph Anomaly Areas 4 and 5
Clarification of Comments from California Department of Toxic Substances Control

Background

A sampling strategy was developed and submitted to the BRAC Cleanup Team (BCT) (including U.S. EPA, California Department of Toxic Substances Control and Regional Water Quality Control Board) in early June 1999. The Department of Toxic Substances Control (DTSC) submitted comments on the strategy on June 22, 1999. In these comments, DTSC requested clarification of the sampling quality control and laboratory methodology.

	Comments by Tayseer Mahmoud, June 22, 1999 General Comments	Response/Clarification
1	Please ensure that quality assurance/quality control (QA/QC) laboratory samples are in accordance with the procedures described in the Draft Supplemental Work Plan, Closure of Various Temporary Accumulation Areas and RCRA Assessment Sites (OHM, 1997). The Site Assessment Reports should contain a narrative pertaining to the laboratory analyses that includes description of sampling techniques, decontamination procedures, analytical methods and laboratory procedures. Laboratory data quality, and data validation results.	The procedures identified in the Final Supplemental Work Plan(OHM 1997) will be followed.
2	The Sampling Strategy states that sample analyses will be conducted for petroleum hydrocarbons, volatile hydrocarbons, volatile organic compounds (VOCs), metals and other potential contaminant of concern. The Sampling Strategy must also specify the contaminants of concern (COCs), appropriate test methods, and detection limits.	The COCs are provided in Table 1, along with test methods and anticipated levels of detection. Analyses will include VOCs, TPH, semi-volatile organic compounds (SVOC), pesticides/herbicides, metals, and PCBs. The detection levels are dependent on a variety of factors including the nature of the contaminant, type of media analyzed, and other contaminants that mask, or due to higher concentrations raise the detection limit. Detection limits are desired below the Preliminary Remediation Goal (PRGs) for each compound. The same methodology used in the analysis of samples from the temporary accumulation areas will be used for the anomalies.
3	The sampling Strategy states that "shallow" soil samples, approximately 20 feet deep will be collected. Please provide the rationale for the depth proposed for taking the samples.	The 20 foot depth referred to in the Proposed Strategy Table is the anticipated maximum depth. Sample depths are discussed in response to item 4 and 5 below.
	Specific Comments	

4	Anomaly Area 4 - former slurry beds identified on 1946 photograph. Located adjacent to Building 306, the former water treatment facility, within the boundaries of IRP Site 24, the VOC source area.	
4	a. All samples collected from the former slurry beds should, at a minimum, be analyzed for the same COCs identified at IRP Site 12, the former Sludge Drying Beds, since they probably handled the same waste. Soil samples at IRP Site 12 were analyzed for VOCs, TPH, SVOCs (specifically for PAHs), PCBs, Pesticides, Herbicides, and cyanide.	Agreed. Table 1 identifies the COCs and test methods.
4	b. Five shallow soil borings adjacent to Building 306 and three shallow soil borings are proposed for the impoundments located north of Building 307. DTSC recommends that two samples be collected from each proposed sample location; one sample at a depth near the bottom of the slurry bed and one sample five feet below the bottom of the slurry bed. Additional samples may be required at deeper depths if contamination is discovered. Continuous coring should be conducted and the lithology recorded.	The depth of the slurry bed is estimated to be from 9 to 10 feet below the surface grade. This is based on a 1949 drawing of the slurry pit and vicinity(see attached copy). Based on the details provided in the Phase II RI for IRP Site 12, the slurry beds at that site were abandoned in place, and simply tilled into the existing grade. This resulted in an increased ground elevation of approximately 5 feet. Due to the uncertainty in the depth of the slurry pits, sampling is proposed at 5, 10 and 15 feet bgs. The 5-foot sample theoretically would be in the tilled materials, the 10 foot should be at the bottom of the bed, and the 15 foot sample should be below the bottom of the bed. Lithology will be recorded adjacent to sampling depths.
5	Anomaly Area 5 - former construction staging area (and areas of disturbed ground) identified on photographs during the period from 1967 to 1988. DTSC recommends the soil samples be collected within 10 feet below ground surface (bgs). The information will be useful for preparing a risk assessment if contamination is found. Should the disturbed earth extend beyond 10 feet bgs, additional samples should be collected at the contact surface between the disturbed and native soil.	Two samples are proposed per boring. Proposed sample depths are from 5 to 7 feet bgs (depending on whether surface is paved or dirt) and 10 to 12 feet bgs.

Table 1: Potential Contaminants of Concern Reporting Limits

Parameter/Method	Analyte	Water		Soil	
		RL	Unit	RL	Unit
VOCs	1,1,1-TCA	5	µg/L	5	µg/kg
EPA 8260A	1,1,2,2-Tetrachloroethane	5	µg/L	5	µg/kg
	1,1,2-TCA	5	µg/L	5	µg/kg
	1,1-DCA	5	µg/L	5	µg/kg
	1,1-DCE	5	µg/L	5	µg/kg
	1,2-DCA	5	µg/L	5	µg/kg
	1,2-Dichloropropane	5	µg/L	5	µg/kg
	Acetone	50	µg/L	50	µg/kg
	Methyl ethyl ketone (MEK)	50	µg/L	50	µg/kg
	Methylisobutyl ketone (MIBK)	50	µg/L	50	µg/kg
	Methyl tert-butyl ether (MTBE)	10	µg/L	10	µg/kg
	2-Hexanone	50	µg/L	50	µg/kg
	Vinyl acetate	50	µg/L	50	µg/kg
	2-Chloroethylvinylether	50	µg/L	50	µg/kg
	Benzene	5	µg/L	5	µg/kg
	Bromodichloromethane	5	µg/L	5	µg/kg
	Bromoform	5	µg/L	5	µg/kg
	Bromomethane	5	µg/L	5	µg/kg
	Carbon disulfide	5	µg/L	5	µg/kg
	Carbon tetrachloride	5	µg/L	5	µg/kg
	Chlorobenzene	5	µg/L	5	µg/kg
	Chloroethane	5	µg/L	5	µg/kg
	Chloroform	5	µg/L	5	µg/kg
	Chloromethane	5	µg/L	5	µg/kg
	cis-1,2-DCE	5	µg/L	5	µg/kg
	cis-1,3-Dichloropropene	5	µg/L	5	µg/kg
	Dibromochloromethane	5	µg/L	5	µg/kg
	Ethylbenzene	5	µg/L	5	µg/kg
	Methylene chloride	5	µg/L	5	µg/kg
	Styrene	5	µg/L	5	µg/kg
	TCE	5	µg/L	5	µg/kg
	Tetrachloroethene	5	µg/L	5	µg/kg
	Toluene	5	µg/L	5	µg/kg
	trans-1,2-DCE	5	µg/L	5	µg/kg
	trans-1,3-Dichloropropene	5	µg/L	5	µg/kg
	Vinyl chloride	5	µg/L	5	µg/kg
	Xylene, Total	5	µg/L	5	µg/kg

Table 1: Potential Contaminants of Concern Reporting Limits

Parameter/Method	Analyte	Water		Soil	
		RL	Unit	RL	Unit
Semivolatile organics Base/Neutral Extractables EPA 8270B	1,2,4-Trichlorobenzene	10	µg/L	330	µg/kg
	1,2-Dichlorobenzene	10	µg/L	330	µg/kg
	1,3-Dichlorobenzene	10	µg/L	330	µg/kg
	1,4-Dichlorobenzene	10	µg/L	330	µg/kg
	2,4-Dinitrotoluene	10	µg/L	330	µg/kg
	2,6-Dinitrotoluene	10	µg/L	330	µg/kg
	2-Chloronaphthalene	10	µg/L	330	µg/kg
	2-Methylnaphthalene	10	µg/L	330	µg/kg
	2-Nitroaniline	25	µg/L	830	µg/kg
	3-Nitroaniline	25	µg/L	830	µg/kg
	3,3'-Dichlorobenzidine	10	µg/L	330	µg/kg
	4-Bromophenyl phenyl ether	10	µg/L	330	µg/kg
	4-Chloroaniline	10	µg/L	330	µg/kg
	4-Chlorophenyl phenyl ether	10	µg/L	330	µg/kg
	4-Nitroaniline	25	µg/L	830	µg/kg
	Acenaphthylene	10	µg/L	330	µg/kg
	Acenapthene	10	µg/L	330	µg/kg
	Anthracene	10	µg/L	330	µg/kg
	Benzo (a) anthracene	10	µg/l	330	µg/kg
	Benzo (a) pyrene	10	µg/L	250	µg/kg
	Benzo (b) fluoranthene	10	µg/L	330	µg/kg
	Benzo (k) fluoranthene	10	µg/L	330	µg/kg
	Benzo (g,h,i) perylene	10	µg/L	330	µg/kg
	Bis (2-chloroethoxy) methane	10	µg/L	330	µg/kg
	Bis (2-chloroethyl) ether	10	µg/L	50	µg/kg
	Bis (2-chloroisopropyl) ether	10	µg/L	330	µg/kg
	Bis (2-ethylhexyl) phthalate	10	µg/L	330	µg/kg
	Butyl benzylphthalate	10	µg/L	330	µg/kg
	Chrysene	10	µg/L	330	µg/kg
	Di-n-butylphthalate	10	µg/L	330	µg/kg
	Di-n-octylphthalate	10	µg/L	330	µg/kg
	Dibenz (a,h) anthracene	10	µg/L	250	µg/kg
	Dibenzofuran	10	µg/L	330	µg/kg
	Diethyl phthalate	10	µg/L	330	µg/kg
	Dimethyl phthalate	10	µg/L	330	µg/kg
	Fluoranthene	10	µg/L	330	µg/kg
	Fluorene	10	µg/L	330	µg/kg
	Hexachlorobenzene	10	µg/L	330	µg/kg
	Hexachlorobutadiene	10	µg/L	330	µg/kg
	Hexachlorocyclopentadiene	10	µg/L	330	µg/kg
	Hexachloroethane	10	µg/L	330	µg/kg
	Indeno (1,2,3-cd) pyrene	10	µg/L	330	µg/kg
	N-Nitrosodiphenylamine	10	µg/L	330	µg/kg
	N-Nitrosodi-n-propylamine	10	µg/L	250	µg/kg
	Naphthalene	10	µg/L	330	µg/kg
	Nitrobenzene	10	µg/L	330	µg/kg
	Phenanthrene	10	µg/L	330	µg/kg

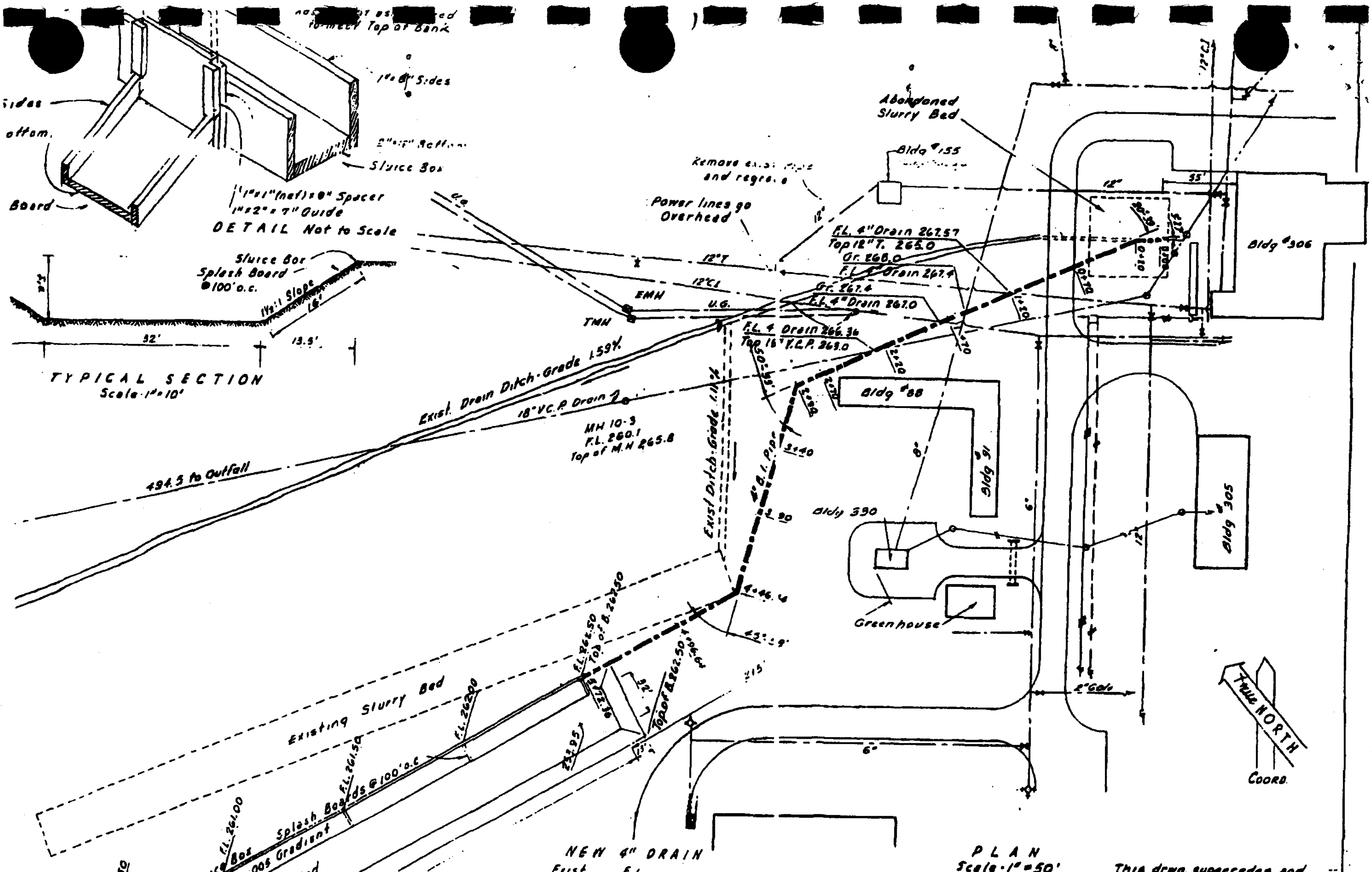
Table 1: Potential Contaminants of Concern Reporting Limits

Parameter/Method	Analyte	Water RL	Water Unit	Soil RL	Soil Unit
EPA 8270B (cont'd)	Pyrene	10	µg/L	330	µg/kg
	2,4,5-Trichlorophenol	25	µg/L	830	µg/kg
	2,4,6-Trichlorophenol	10	µg/L	330	µg/kg
	2,4-Dichlorophenol	10	µg/L	330	µg/kg
	2,4-Dimethylphenol	10	µg/L	330	µg/kg
	2,4-Dinitrophenol	25	µg/L	830	µg/kg
	2-Chlorophenol	10	µg/L	330	µg/kg
	2-Methylphenol	10	µg/L	330	µg/kg
	2-Nitrophenol	10	µg/L	330	µg/kg
	4,6-Dinitro-2-methylphenol	25	µg/L	830	µg/kg
	4-Chloro-3-methylphenol	10	µg/L	330	µg/kg
	4-Methylphenol	10	µg/L	330	µg/kg
	4-Nitrophenol	25	µg/L	830	µg/kg
	Pentachlorophenol	10	µg/L	330	µg/kg
	Phenol	10	µg/L	330	µg/kg
Organochlorine Pesticides and PCBs EPA 8081/8082	α-BHC	0.35	µg/L	0.019	mg/kg
	β-BHC	0.23	µg/L	0.033	mg/kg
	δ-BHC	0.24	µg/L	0.011	mg/kg
	γ-BHC (Lindane)	0.25	µg/L	0.020	mg/kg
	α-Chlordane	0.80	µg/L	0.015	mg/kg
	γ-Chlordane	0.37	µg/L	0.015	mg/kg
	4,4'-DDD	0.50	µg/L	0.042	mg/kg
	4,4'-DDE	0.58	µg/L	0.025	mg/kg
	4,4'-DDT	0.81	µg/L	0.036	mg/kg
	Aldrin	0.34	µg/L	0.022	mg/kg
	Dieldrin	0.44	µg/L	0.035	mg/kg
	Endosulfan I	0.30	µg/L	0.021	mg/kg
	Endosulfan II	0.40	µg/L	0.024	mg/kg
	Endosulfan Sulfate	0.35	µg/L	0.036	mg/kg
	Endrin	0.39	µg/L	0.036	mg/kg
	Endrin Aldehyde	0.50	µg/L	0.016	mg/kg
	Heptachlor	0.40	µg/L	0.020	mg/kg
	Heptachlor Epoxide	0.32	µg/L	0.021	mg/kg
	Methoxychlor	0.86	µg/L	0.057	mg/kg
	PCB-1016	1.00	µg/L	0.70	mg/kg
	PCB-1221	1.00	µg/L	0.70	mg/kg
	PCB-1232	1.00	µg/L	0.70	mg/kg
	PCB-1242	1.00	µg/L	0.70	mg/kg
	PCB-1248	1.00	µg/L	0.70	mg/kg
	PCB-1254	1.00	µg/L	0.70	mg/kg
	PCB-1260	1.00	µg/L	0.70	mg/kg
	Toxaphene	0.50	µg/L	0.57	mg/kg

Table 1: Potential Contaminants of Concern Reporting Limits

Parameter/Method	Analyte	Water		Soil	
		RL	Unit	RL	Unit
Chlorinated Phenoxy Acid Herbicides EPA 8150	2,4-D	12.0	µg/L	0.8	mg/kg
	2,4-DB	9.0	µg/L	0.6	mg/kg
	2,4,5-T	2.0	µg/L	0.1	mg/kg
	2,4,5-TP	1.7	µg/L	0.1	mg/kg
	Dalapon	60.0	µg/L	4.0	mg/kg
	Dicamba	2.7	µg/L	0.2	mg/kg
	Dichloroprop	6.5	µg/L	0.5	mg/kg
	Dinoseb	0.7	µg/L	0.05	mg/kg
	MCPA	2,500.0	µg/L	170.0	mg/kg
	MCPP	1,900.0	µg/L	130.0	mg/kg
ICP Screen for Metals EPA 6010/7000	Antimony	500	µg/L	1	mg/kg
	Arsenic	5	µg/L	0.5	mg/kg
	Barium	100	µg/L	1	mg/kg
	Beryllium	10	µg/L	0.2	mg/kg
	Cadmium	5	µg/L	0.5	mg/kg
	Chromium	50	µg/L	1	mg/kg
	Cobalt	50	µg/L	1	mg/kg
	Copper	50	µg/L	1	mg/kg
	Lead	5	µg/L	0.3	mg/kg
	Manganese	20	µg/L	2	mg/kg
	Molybdenum	100	µg/L	2	mg/kg
	Nickel	150	µg/L	2	mg/kg
	Selenium	5	µg/L	0.5	mg/kg
	Silver	50	µg/L	1	mg/kg
	Thallium	400	µg/L	1	mg/kg
	Vanadium	100	µg/L	1	mg/kg
	Zinc	20	µg/L	1	mg/kg
TPH-Purgeable CA LUFT	Gasoline	0.1	mg/L	10	mg/kg
TPH-Extractable CA LUFT	Diesel	0.1	mg/L	10	mg/kg
EPA 9010	Cyanide	0.02	mg/L	0.5	mg/kg

If required for semi-volatile organic compounds, the Selected Ion Monitoring (SIM) technique may be used to achieve lower detection limits to meet certain EPA Region IX PRG values. The OHM criteria for acceptance of the SIM data is that the laboratory Method Detection Limit must be equal to or less than half of the PRG value.



NEW 4" DRAIN

Station	Exist Elev	F.L. 4" Pipe	Remarks
0+00		269.88	
0+20		269.58	
0+70	268.82	*268.12	Provide 6" Cover for road
1+20	268.2	267.57	
1+70	267.5	267.02	
2+20	266.7	266.47	Provide 12" min Cover
2+70	266.8	265.92	Provide 12" min Cover
2+90	265.7	265.70	Provide 12" min Cover
3+40	265.7	265.15	
3+90	265.1	264.60	
4+46	264.45	263.98	
4+96	263.8	263.49	
5+72	263.2	262.60	

* F.L. is uniform .011 gradient from 0+7.1 to 5+72

REF. F.B. 107 p.53

This drwg. supercedes and cancels W.O.-3758 drwg. dated 3/14/40 titled; "New Slurry Pit Area D-8"

REVISION	DATE	DESCRIPTION	BY	DATE	APPR'V'D

U. S. MARINE CORPS AIR STATION
EL TORO, CALIFORNIA
PUBLIC WORKS DEPARTMENT

DRAWN BY: K.J. Clark
TRACED BY:
DESIGNED BY:
CHECKED BY: L.A.
SUBMITTED BY:

AREA D-8 (48)
NEW 4" DRAIN
& SLURRY PIT

APPROVED:
DATE 5/15/44
SCALE: as shown
DRAWING NUMBER W.O. 3758
SHEET 1 OF 1

P.02/02

APPENDIX C
PHOTO LOG AND CHECKLIST FORM

CHECKLIST

Aerial Photograph Anomaly Program, Marine Corps Air Station, El Toro

Anomaly Identification Information:

Date of aerial photograph: 29 December 1946

APHO (from BRAC Cleanup Plan)	SAIC	EPA
06	39	na

Recommendation: No Further Investigation Status

Anomaly Description: (from source document(s) Site Analysis, El Toro MCAS (EPA, 1991) or Final Report, Aerial Photograph Assessment (SAIC, 1993)):

SAIC 39: *Two impoundments (IM) can be observed on the southwest side of Building 306 near S 11th Street and L Street. Investigation of the impoundments' uses is recommended.*

Visual Inspection Date (s): November 1999.

Participant(s) (with affiliation (s)) in inspection(s): Dhananjay Rawal
IT Corporation, Project Engineer

Current Site Conditions: Good condition. Area is unpaved and relatively flat. No stains or distressed vegetation observed on the ground surface. Water tank 156 noted, south of APHO 6, in parking lot area adjacent to building 306.

Is there visual evidence of the anomaly identified in the photograph present at the site? No

Is there evidence of past releases? No

Description of photograph(s): APHO 6, SAIC 39

Date of preparation of checklist: 15 March 2002

View of adjacent area south of APHO 6, water tank on right side of photo.

Unpaved ground surface covered with grass at APHO 6.

APPENDIX D
EXTRACTS FROM CDM, 2002

Final
Groundwater Monitoring Report
September 2001 Monitoring Round 14

for

Marine Corps Air Station El Toro, California

U.S. Navy Contract Number GS-10F-0227J
Delivery Order N68711-00-F-0102

Prepared for:

Department of the Navy
Southwest Division
Naval Facilities Engineering Command
1220 Pacific Highway
San Diego, California 92132

Prepared by:

CDM Federal Programs Corporation
3760 Convoy Street, Suite 210
San Diego, California 92111

14 February 2002

Table A.1A
Water Level Measurements and Groundwater Elevations for Conventional Wells
MCAS El Toro

STATION ID	WELL TYPE	SCREEN INTERVAL (feet bgs)	GROUND-WATER UNIT	TOP OF CASING ELEVATION (feet amsl)	DATE MEASURED	DEPTH TO WATER (from TOC)	WATER ELEVATION (feet amsl)	CHANGE FROM PRIOR ELEVATION (feet)
07_DBMW100	BP	131 - 171	SHALLOW	286.44	11-Jan-96	104.60	181.84	
				286.44	31-Jan-96	104.58	181.86	0.02
				286.44	27-Feb-96	104.52	181.92	0.06
				286.44	31-Oct-96	104.28	182.16	0.24
				286.44	26-Nov-96	103.60	182.84	0.68
				286.44	27-Dec-96	102.90	183.54	0.70
				286.44	26-Feb-97	103.36	183.08	-0.46
				286.44	27-Mar-97	102.63	183.81	0.73
				286.44	26-Jun-97	103.36	183.08	-0.73
				286.44	12-Aug-97	103.26	183.18	0.10
				286.44	25-Sep-97	103.12	183.32	0.14
				286.44	7-Nov-97	103.20	183.24	-0.08
				286.44	10-Nov-98	99.68	186.76	3.52
				286.44	19-Jan-99	99.19	187.25	0.49
				286.44	22-Apr-99	98.43	188.01	0.76
				286.44	9-Jul-99	98.57	187.87	-0.14
				286.44	9-Jun-00	98.25	188.19	0.32
07_DBMW100A	BP	92-132	SHALLOW	286.06	9-Feb-01	98.54	187.52	
				286.06	6-Sep-01	97.91	188.15	0.63
07_DBMW43	BP	150 - 190	SHALLOW	292.56	12-Jan-96	113.01	179.55	
				292.56	19-Feb-96	112.55	180.01	0.46
				292.56	27-Feb-96	111.41	181.15	1.14
				292.56	27-Mar-96	112.42	180.14	-1.01
				292.56	31-Oct-96	113.95	178.61	-1.53
				292.56	26-Nov-96	113.02	179.54	0.93
				292.56	26-Dec-96	112.60	179.96	0.42
				292.56	23-Jan-97	111.96	180.60	0.64
				292.56	26-Feb-97	111.40	181.16	0.56
				292.56	27-Mar-97	112.08	180.48	-0.68
				292.56	26-Jun-97	112.84	179.72	-0.76
				292.56	12-Aug-97	112.96	179.60	-0.12
				292.56	25-Sep-97	112.42	180.14	0.54
				292.56	7-Nov-97	111.38	181.18	1.04
				292.56	10-Nov-98	107.81	184.75	3.57
				292.56	19-Jan-99	109.04	183.52	-1.23
				292.56	22-Apr-99	108.59	183.97	0.45
				292.56	9-Jul-99	107.37	185.19	1.22
				292.56	9-Jun-00	107.58	184.98	-0.21
				292.56	11-Sep-01	110.76	181.80	-3.18
07_DBMW43A	BP	101-141	SHALLOW	292.53	9-Feb-01	108.22	184.31	
				292.53	6-Sep-01	107.25	185.28	0.97
08_DGMW74	BP	90 - 130	SHALLOW	276.14	14-Feb-96	84.99	191.15	
				276.14	27-Feb-96	85.08	191.06	-0.09
				276.14	27-Mar-96	85.24	190.90	-0.16
				276.14	30-Oct-96	85.23	190.91	0.01
				276.14	26-Nov-96	85.04	191.10	0.19
				276.14	26-Dec-96	85.15	190.99	-0.11
				276.14	23-Jan-97	84.80	191.34	0.35
				276.14	26-Feb-97	84.60	191.54	0.20
				276.14	27-Mar-97	84.46	191.68	0.14
				276.14	26-Jun-97	84.60	191.54	-0.14
				276.14	11-Aug-97	84.73	191.41	-0.13
				276.14	25-Sep-97	84.37	191.77	0.36
				276.14	6-Nov-97	84.50	191.64	-0.13
				276.14	10-Nov-98	81.85	194.29	2.65
				276.14	19-Jan-99	81.39	194.75	0.46
				276.14	22-Apr-99	81.85	194.29	-0.46
				276.14	9-Jul-99	80.90	195.24	0.95
				276.14	9-Jun-00	80.84	195.30	0.06
				276.14	9-Feb-01	80.72	195.42	0.12
				276.14	7-Sep-01	79.88	196.26	0.84

Table A.1A
Water Level Measurements and Groundwater Elevations for Conventional Wells
MCAS El Toro

STATION ID	WELL TYPE	SCREEN INTERVAL (feet bgs)	GROUND-WATER UNIT	TOP OF CASING ELEVATION (feet amsl)	DATE MEASURED	DEPTH TO WATER (from TOC)	WATER ELEVATION (feet amsl)	CHANGE FROM PRIOR ELEVATION (feet)
08_UGMW29	BP	95 - 135	SHALLOW	269.26	12-Jan-96	87.00	182.26	
				269.26	14-Feb-96	86.75	182.51	0.25
				269.26	27-Feb-96	86.70	182.56	0.05
				269.26	27-Mar-96	86.50	182.76	0.20
				269.26	30-Oct-96	86.46	182.80	0.04
				269.26	26-Nov-96	86.29	182.97	0.17
				269.26	27-Dec-96	86.10	183.16	0.19
				269.26	23-Jan-97	86.02	183.24	0.08
				269.26	26-Feb-97	85.84	183.42	0.18
				269.26	27-Mar-97	85.70	183.56	0.14
				269.26	26-Jun-97	85.82	183.44	-0.12
				269.26	11-Aug-97	85.89	183.37	-0.07
				269.26	25-Sep-97	85.55	183.71	0.34
				269.26	7-Nov-97	85.70	183.56	-0.15
				269.26	10-Nov-98	82.70	186.56	3.00
				269.26	19-Jan-99	82.48	186.78	0.22
				269.26	22-Apr-99	82.22	187.04	0.26
				269.26	8-Jul-99	81.90	187.36	0.32
				269.26	9-Jun-00	81.72	187.54	0.18
				269.26	7-Sep-01	81.00	188.26	0.72
08_UGMW29A	BP	75-105	SHALLOW	271.71	9-Feb-01	82.18	189.53	
				271.71	6-Sep-01	82.43	189.28	-0.25
09_DBMW45	BP	117 - 157	SHALLOW	280.00	11-Jan-96	118.70	161.30	
				280.00	15-Feb-96	118.44	161.56	0.26
				280.00	27-Feb-96	118.35	161.65	0.09
				280.00	27-Mar-96	118.02	161.98	0.33
				280.00	30-Oct-96	118.64	161.36	-0.62
				280.00	26-Nov-96	118.12	161.88	0.52
				280.00	26-Dec-96	118.07	161.93	0.05
				280.00	23-Jan-97	117.50	162.50	0.57
				280.00	27-Feb-97	116.81	163.19	0.69
				280.00	27-Mar-97	117.24	162.76	-0.43
				280.00	26-Jun-97	118.00	162.00	-0.76
				280.00	11-Aug-97	118.06	161.94	-0.06
				280.00	24-Sep-97	117.79	162.21	0.27
				280.00	7-Nov-97	117.45	162.55	0.34
				280.00	10-Nov-98	113.34	166.66	4.11
				280.00	19-Jan-99	112.81	167.19	0.53
				280.00	21-Apr-99	112.27	167.73	0.54
				280.00	9-Jul-99	112.50	167.50	-0.23
				280.00	9-Jun-00	112.13	167.87	0.37
				280.00	8-Feb-01	111.74	168.26	0.39
				280.00	10-Sep-01	111.22	168.78	0.52
09_DGMW75	BP	114 - 154	SHALLOW	271.00	11-Jan-96	112.68	158.32	
				271.00	14-Feb-96	112.20	158.80	0.48
				271.00	27-Feb-96	112.21	158.79	-0.01
				271.00	27-Mar-96	111.90	159.10	0.31
				271.00	1-Nov-96	112.47	158.53	-0.57
				271.00	26-Nov-96	111.93	159.07	0.54
				271.00	26-Dec-96	111.93	159.07	0.00
				271.00	27-Feb-97	110.82	160.18	1.11
				271.00	27-Mar-97	111.21	159.79	-0.39
				271.00	26-Jun-97	111.74	159.26	-0.53
				271.00	11-Aug-97	111.83	159.17	-0.09
				271.00	24-Sep-97	111.56	159.44	0.27
				271.00	5-Nov-97	111.31	159.69	0.25
				271.00	10-Nov-98	107.54	163.46	3.77
				271.00	19-Jan-99	106.94	164.06	0.60
				271.00	21-Apr-99	106.41	164.59	0.53
				271.00	9-Jul-99	106.54	164.46	-0.13
				271.00	9-Jun-00	106.41	164.59	0.13
				271.00	8-Feb-01	106.03	164.97	0.38
				271.00	10-Sep-01	105.24	165.76	0.79
12_DBMW48A	BP	74-104	SHALLOW	248.93	9-Feb-01	86.90	162.03	
				248.93	7-Sep-01	85.90	163.03	1.00

Table A.1A
Water Level Measurements and Groundwater Elevations for Conventional Wells
MCAS El Toro

STATION ID	WELL TYPE	SCREEN INTERVAL (feet bgs)	GROUND-WATER UNIT	TOP OF CASING ELEVATION (feet amsl)	DATE MEASURED	DEPTH TO WATER (from TOC)	WATER ELEVATION (feet amsl)	CHANGE FROM PRIOR ELEVATION (feet)
22_DBMW47	BP	116 - 156	SHALLOW	277.83	11-Jan-96	114.43	163.40	
				277.83	15-Feb-96	113.95	163.88	0.48
				277.83	28-Feb-96	114.01	163.82	-0.06
				277.83	27-Mar-96	113.66	164.17	0.35
				277.83	30-Oct-96	113.93	163.90	-0.27
				277.83	26-Nov-96	113.57	164.26	0.36
				277.83	26-Dec-96	113.58	164.25	-0.01
				277.83	23-Jan-97	113.08	164.75	0.50
				277.83	27-Feb-97	112.45	165.38	0.63
				277.83	27-Mar-97	112.70	165.13	-0.25
				277.83	26-Jun-97	113.30	164.53	-0.60
				277.83	11-Aug-97	113.36	164.47	-0.06
				277.83	24-Sep-97	113.05	164.78	0.31
				277.83	7-Nov-97	112.95	164.88	0.10
				277.83	9-Nov-98	109.12	168.71	3.83
				277.83	19-Jan-99	108.53	169.30	0.59
				277.83	21-Apr-99	107.94	169.89	0.59
				277.83	9-Jul-99	108.07	169.76	-0.13
				277.83	21-Jun-00	85.82	192.01	22.25
				277.83	9-Feb-01	107.61	170.22	-21.79
				277.83	7-Sep-01	106.72	171.11	0.89
24NEW1	SH	225 - 245	SHALLOW	281.10	31-Oct-96	123.51	157.59	
				281.10	26-Nov-96	118.78	162.32	4.73
				281.10	26-Dec-96	116.70	164.40	2.08
				281.10	23-Jan-97	115.26	165.84	1.44
				281.10	27-Feb-97	114.18	166.92	1.08
				281.10	27-Mar-97	120.28	160.82	-6.10
				281.10	26-Jun-97	122.25	158.85	-1.97
				281.10	12-Aug-97	122.44	158.66	-0.19
				281.10	24-Sep-97	122.35	158.75	0.09
				281.10	7-Nov-97	116.30	164.80	6.05
				281.10	9-Nov-98	111.06	170.04	5.24
				281.10	19-Jan-99	115.33	165.77	-4.27
				281.10	23-Apr-99	115.07	166.03	0.26
				281.00	9-Jul-99	116.16	164.84	-1.19
24NEW4	BP	108 - 148	SHALLOW	281.80	26-Nov-96	109.75	172.05	
				281.80	26-Dec-96	109.50	172.30	0.25
				281.80	23-Jan-97	109.03	172.77	0.47
				281.80	26-Feb-97	108.86	172.94	0.17
				281.80	27-Mar-97	108.94	172.86	-0.08
				281.80	26-Jun-97	109.05	172.75	-0.11
				281.80	12-Aug-97	109.00	172.80	0.05
				281.80	24-Sep-97	108.72	173.08	0.28
				281.80	7-Nov-97	108.82	172.98	-0.10
				281.80	9-Nov-98	105.36	176.44	3.46
				281.80	19-Jan-99	104.67	177.13	0.69
				281.80	22-Apr-99	104.11	177.69	0.56
				281.80	9-Jul-99	103.74	178.06	0.37
				281.80	9-Jun-00	103.61	178.19	0.13
				281.80	8-Feb-01	103.65	178.15	-0.04
				281.80	7-Sep-01	102.81	178.99	0.84
24NEW5	SH	230 - 250	SHALLOW	279.20	31-Oct-96	120.39	158.81	
				279.20	26-Nov-96	115.29	163.91	5.10
				279.20	26-Dec-96	112.34	166.86	2.95
				279.20	23-Jan-97	110.74	168.46	1.60
				279.20	27-Feb-97	109.62	169.58	1.12
				279.20	27-Mar-97	116.80	162.40	-7.18
				279.20	26-Jun-97	118.93	160.27	-2.13
				279.20	12-Aug-97	119.18	160.02	-0.25
				279.20	24-Se[illegible]	[illegible]	160.[illegible]	0.11
				279.20	7-Nov-97	112.12	167.08	6.95
				279.20	9-Nov-98	106.39	172.81	5.73
				279.20	19-Jan-99	111.14	168.06	-4.75
				279.20	9-Jul-99	112.52	166.68	-1.38
				279.20	9-Jun-00	112.06	167.14	0.46
				279.20	8-Feb-01	104.87	174.33	7.19
				279.20	7-Sep-01	111.28	167.92	-6.41

Table A.1A
Water Level Measurements and Groundwater Elevations for Conventional Wells
MCAS El Toro

STATION ID	WELL TYPE	SCREEN INTERVAL (feet bgs)	GROUND-WATER UNIT	TOP OF CASING ELEVATION (feet amsl)	DATE MEASURED	DEPTH TO WATER (from TOC)	WATER ELEVATION (feet amsl)	CHANGE FROM PRIOR ELEVATION (feet)
24NEW6	SH	165 - 185	SHALLOW	265.60	26-Nov-96	83.05	182.55	
				265.60	26-Dec-96	82.63	182.97	0.42
				265.60	23-Jan-97	82.02	183.58	0.61
				265.60	26-Feb-97	81.60	184.00	0.42
				265.60	27-Mar-97	82.43	183.17	-0.83
				265.60	26-Jun-97	83.14	182.46	-0.71
				265.60	11-Aug-97	83.33	182.27	-0.19
				265.60	24-Sep-97	83.10	182.50	0.23
				265.60	7-Nov-97	82.28	183.32	0.82
				265.60	28-Oct-98	79.17	186.43	3.11
				265.60	19-Jan-99	83.23	182.37	-4.06
				265.60	23-Apr-99	78.88	186.72	4.35
				265.60	9-Jul-99	79.32	186.28	-0.44
				265.60	9-Jun-00	78.91	186.69	0.41
				265.60	8-Feb-01	78.20	187.40	0.71
				265.60	7-Sep-01	78.36	187.24	-0.16
24NEW7	BP	118 - 158	SHALLOW	285.10	31-Oct-96	122.30	162.80	
				285.10	27-Nov-96	121.60	163.50	0.70
				285.10	26-Dec-96	121.38	163.72	0.22
				285.10	23-Jan-97	120.76	164.34	0.62
				285.10	27-Feb-97	120.33	164.77	0.43
				285.10	27-Mar-97	120.52	164.58	-0.19
				285.10	26-Jun-97	121.34	163.76	-0.82
				285.10	12-Aug-97	121.44	163.66	-0.10
				285.10	24-Sep-97	121.00	164.10	0.44
				285.10	6-Nov-97	120.78	164.32	0.22
				285.10	9-Nov-98	116.30	168.80	4.48
				285.10	19-Jan-99	115.87	169.23	0.43
				285.10	23-Apr-99	115.60	169.50	0.27
				285.10	9-Jul-99	115.56	169.54	0.04
				285.10	9-Jun-00	115.34	169.76	0.22
				285.10	8-Feb-01	114.79	170.31	0.55
				285.10	7-Sep-01	114.40	170.70	0.39
24NEW8	BP	122 - 162	SHALLOW	291.50	31-Oct-96	125.68	165.82	
				291.50	27-Nov-96	125.10	166.40	0.58
				291.50	26-Dec-96	124.92	166.58	0.18
				291.50	23-Jan-97	124.30	167.20	0.62
				291.50	27-Feb-97	123.90	167.60	0.40
				291.50	27-Mar-97	124.90	166.60	-1.00
				291.50	26-Jun-97	124.72	166.78	0.18
				291.50	12-Aug-97	124.78	166.72	-0.06
				291.50	24-Sep-97	124.40	167.10	0.38
				291.50	6-Nov-97	124.06	167.44	0.34
				291.50	9-Nov-98	119.83	171.67	4.23
				291.50	20-Jan-99	119.22	172.28	0.61
				291.50	23-Apr-99	118.76	172.74	0.46
				291.50	9-Jul-99	118.90	172.60	-0.14
				291.50	9-Jun-00	118.75	172.75	0.15
				291.50	8-Feb-01	118.09	173.41	0.66
				291.50	7-Sep-01	117.26	174.24	0.83
24EX3OB1	BP	105 - 150	SHALLOW	288.84	10-Nov-98	105.60	183.24	
				288.84	20-Jan-99	104.96	183.88	0.64
				288.84	23-Apr-99	107.94	180.90	-2.98
				288.84	9-Jul-99	104.41	184.43	3.53
				288.84	9-Jun-00	103.95	184.89	0.46
				288.84	8-Feb-01	103.73	185.11	0.22
				288.84	7-Sep-01	103.22	185.62	0.51
24EX3OB2	BP	105 -150	SHALLOW	288.07	10-Nov-98	104.23	183.84	
				288.07	20-Jan-99	103.62	184.45	0.61
				288.07	23-Apr-99	103.17	184.90	0.45
				288.07	9-Jul-99	102.70	185.37	0.47
24EX3OB3	BP	170 - 175	SHALLOW	288.18	10-Nov-98	102.69	185.49	
				288.18	20-Jan-99	102.58	185.60	0.11
				288.18	23-Apr-99	102.32	185.86	0.26
				288.18	9-Jul-99	102.65	185.53	-0.33
24EX4OB2	BP	105.7 - 150.7	SHALLOW	290.45	10-Nov-98	109.74	180.71	
				290.45	20-Jan-99	108.98	181.47	0.76
				290.45	23-Apr-99	109.74	180.71	-0.76
				290.45	9-Jul-99	108.48	181.97	1.26

APPENDIX E
GEOPHYSICAL SURVEY

GEOVision
geophysical services
a division of Blackhawk GeoServices

GEOPHYSICAL INVESTIGATION

Aerial Photographic Anomaly Area 4
Marine Corps Air Station, El Toro, California

GEOVision Project No. 9254

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March 22, 2001

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1 INTRODUCTION

A geophysical investigation was conducted from March 6 to March 16, 2001 in two small areas encompassing Aerial Photographic Anomaly Area 4, Marine Corps Air Station (MCAS), El Toro, California. The first survey area is referred to as Survey Area A and is about 3.25-acres in size. The second survey area is referred to as Survey Area B and is about 0.25-acres in size. The purpose of the investigation was to screen the two survey areas for buried metallic and/or construction debris.

The geophysical survey areas consisted of grass field, dirt lots, and/or asphalted areas located in the southwestern portion of the base as shown on Figure 1.

There was no surficial evidence of disposal activities at the two sites. Surface cultural features within the survey area that could adversely affect the geophysical data included fences, manholes, utility vaults, aboveground storage tanks, runway lights and miscellaneous other surface infrastructure.

Geophysical techniques used during this investigation included the magnetic and electromagnetic (EM) methods. These techniques complement one another as each responds to different physical properties of subsurface materials and has different strengths and limitations. The magnetic method was applied to this investigation because it has the greatest depth of investigation of the geophysical techniques typically applied to mapping buried ferrous metallic debris. However, this greater depth of investigation comes at the expense of lateral resolution. The EM induction technique was applied to this investigation because it can map both shallow buried metallic debris and variations in soil conductivity. Changes in soil conductivity may be used to infer the presence of fill soils, providing the fill has a different composition than native soils. An EM digital metal detector was also applied at Survey Area B.

Geophysical techniques used during the investigation are discussed in Section 2. Field procedures are described in Section 3. Data processing and interpretation are discussed in Section 4. Conclusions are presented in Section 5, and our professional certification is presented in Section 6.

2 GEOPHYSICAL TECHNIQUES

This section presents background information on the magnetic and EM methods used during this investigation. A description of the geophysical methods used during this investigation, common applications of the methods, photographs of the instruments, and example applications are included in Appendix A.

2.1 Magnetic Method

The magnetometers used during this investigation consisted of a Geometrics G858 optically pumped cesium-vapor magnetometer (G858) and a GEM GSM-19 base station magnetometer. These instruments measure the intensity of the earth's magnetic field in nanoteslas (nT).

The earth's magnetic field is believed to originate in convection currents in the earth's liquid outer core. The magnetic field varies in intensity from about 25,000 nT at the equator, where it is parallel to the earth's surface to about 70,000 nT at the poles where it perpendicular to the earth's surface. The intensity of the earth's magnetic field in North America varies from about 45,000 to 60,000 nT, and has an associated inclination that varies from about 60 to 75 degrees. The earth's magnetic field undergoes low-frequency diurnal variations (drift) caused by the earth's rotation. The magnetic field can also undergo short-period, high-amplitude variations during periods of sunspot activity called magnetic storms. Often magnetic field intensity can be so variable during a magnetic storm that meaningful magnetic data cannot be acquired. When it is necessary to correct for magnetic drift a base station magnetometer is set up in a quiet portion of the site and programmed to record total magnetic field intensity at fixed increments (i.e. 5-second intervals) throughout the day. This base station data is then used to remove the effects of drift from the field data. In small survey areas where the data is acquired over a small amount of time and the anomalies have large amplitudes correction for diurnal variation is not necessary.

Buried ferromagnetic objects give rise to local perturbations (anomalies) in the earth's magnetic field. In North America, these anomalies are often dipolar with a positive response south and a negative response north of the object. The dimensions and amplitude of a magnetic anomaly are a function of the size, mass, depth and magnetic properties of the source. Magnetometers can typically locate a metallic object the size of a 55-gallon drum to a depth of about 10 feet providing background noise levels are not too high and the object is not significantly corroded. Larger metallic objects can be located to greater depths. The magnetic anomaly due to an object the size of a 55-gallon drum is expected to have dimensions of greater than 10- by 10-feet. Magnetometers are not able to detect nonferrous metals such as aluminum or brass.

Typical applications of the magnetic method include:

- Locating pits and trenches containing ferrous metallic debris
- Locating buried drums, tanks and pipes
- Delineating boundaries of landfills containing ferrous debris
- Locating abandoned steel well casing
- Detecting unexploded ordnance
- Mapping basement faults and geology

- Mapping archeological sites.

Some advantages of magnetic surveys are:

- Rapid – modern instruments can acquire up to 10 readings per second as the operator walks down survey lines
- Depth of investigation – magnetometers can often locate buried ferrous metallic objects to greater depths than other methods
- Anomalies are much larger than the source allowing for larger line spacing in some situations

Some limitations of the magnetic surveys are:

- Unable to detect nonferrous metals such as aluminum or brass
- Magnetic anomalies are unsymmetrical and much larger than the source and it can, therefore, be difficult to determine the precise locations and size of the source
- Ineffective in areas having extensive metallic debris at the surface as no distinction can be made between anomalies caused by surface and buried debris
- Metallic structures such as buildings, fences, reinforced concrete, and light posts interfere with the measurements
- High voltage powerlines can often strongly interfere with the measurements
- Data can be very noisy in areas containing volcanic rock, specifically basalt

2.2 Electromagnetic Induction Method

EM induction equipment used during this investigation consisted of a Geonics EM-31 terrain conductivity meter (EM-31) and Geonics EM-61 digital metal detector (EM-61), each coupled to a digital data logger. A discussion of each of these instruments is presented below.

2.2.1 Geonics EM-31 Terrain Conductivity Meter

The EM-31 is a frequency-domain EM induction instrument that operates at a frequency of 9.8 kHz. A photograph of the EM-31 can be found in the Technical Note on Geophysical Techniques for Shallow Environmental Investigations included as Appendix A. The EM-31 has a separate transmitter and receiver coil mounted at each end of a 12-foot long rigid boom. An alternating current is applied to the transmitter coil, causing the coil to radiate a primary EM field. This primary EM field generates eddy currents in subsurface materials, which give rise to a secondary EM field. The receiver coil measures the components of the secondary EM field both in-phase and 90-degrees out-of-phase (quadrature) to the primary field. The quadrature component is converted to units of apparent conductivity in millisiemens per meter (mS/m) and the in-phase component is recorded as parts per thousand of the primary field.

A negative EM-31 response with positive shoulders is generally observed over shallow, buried metallic objects such as pipes and tanks. When the instrument boom is orientated parallel to a long, linear conductor such as a pipe either a positive or negative response centered over the conductor is typically observed. The EM-31 can locate both ferrous and nonferrous metallic objects and can locate a 1000-gallon tank to a maximum depth of about 6-8 feet. Typically the EM-31 must pass directly over or immediately adjacent to a buried metallic object to detect it.

Because the EM-31 measures conductivity it can also locate nonmetallic features with different electrical properties than native soils such as mud pits, backfilled excavations, etc.

Applications of EM induction methods include:

- Locating buried tanks and pipes
- Locating pits and trenches containing metallic and/or nonmetallic debris
- Delineating landfill boundaries
- Delineating oil production sumps and mud pits
- Mapping conductive soil and groundwater contamination
- Mapping soil salinity in agricultural areas
- Characterizing shallow subsurface geology
- Mapping buried channel deposits
- Locating sand and gravel deposits
- Mapping conductive fault and fracture zones
- Mapping lateral variation in subsurface soil type

Strengths of EM induction methods include:

- Rapid – data can be acquired at a slow walking pace
- Locate both metallic and some nonmetallic targets
- Not as sensitive to very small metallic objects and debris as other methods
- Can locate wire cables (i.e. electric and telephone lines) which cannot often be located by other methods
- Anomalies of buried objects have simple shape facilitating identification and positioning of the source

Limitations of EM Induction Methods include:

- Metallic structures such as buildings, fences, reinforced concrete, and light posts interfere with the measurements
- High voltage powerlines can often strongly interfere with the measurements
- Depth of investigation not as great as magnetometers for buried ferrous metallic objects
- Variable soil conductivity can complicate quadrature component interpretation

2.2.2 Geonics EM-61 Digital Metal Detector

The EM-61 is a high-resolution, deep sensing, time domain EM metal detector. A photograph of the EM-61 can be found in Appendix A. The EM-61 has a single transmitter and two receiver coils. The bottom coil is the transmitter during the current on-time and receiver during current off-time. The top-coil, mounted 40-cm above the bottom coil, is a receiver coil only. The transmitter and receiver electronics controls are mounted in a backpack and a hand-held data logger is used to store field measurements. During operation a half-duty cycle waveform is applied to the transmitter coil. During the off-time the receiver coils measure the decay of eddy currents, in millivolts (mV), produced in subsurface metallic objects by the pulsed primary EM field. The top coil is gained in such a manner that the instrument response to a metallic object lying on the surface will be approximately equal at both the top and bottom coils. The affects of surface debris can, therefore, be suppressed by calculating the differential response (subtraction of the top coil from bottom coil response). Positive EM-61 anomalies centered over the source are typically observed over buried metallic objects. Above ground metallic objects will often give rise to a negative differential response, as the top coil response is larger than the bottom coil response.

The EM-61 can locate both ferrous and nonferrous metallic objects, and can locate a 1000-gallon tank to a maximum depth of about 8-10 feet. Typical applications of the EM-61 include:

- Locating pits and trenches containing metallic debris
- Locating buried drums, tanks and pipes
- Delineating landfill boundaries
- Detecting unexploded ordnance

Some advantages of EM-61 surveys are:

- Rapid – the EM-61 can acquire data at a slow walking pace
- Responds only to buried metal and measurements not strongly influenced by geology
- Better lateral resolution than magnetometers or frequency domain EM-systems
- Anomalies of buried objects have simple shape facilitating identification and positioning of the source
- Able to acquire meaningful data closer to metallic surface structures than most other methods

Some limitations of EM-61 surveys are:

- Depth of exploration not as great as that of a magnetometer
- Metallic structures such as buildings, fences, reinforced concrete, and light posts interfere with the measurements
- High voltage powerlines can strongly interfere with the measurements
- Cannot typically located utility cables (i.e. electric, telephone and communication cables)

3 FIELD PROCEDURES

This section describes the field procedures used during the investigation, including site preparation, magnetic, EM-31 and EM-61 survey procedures.

3.1 Survey Area A

3.1.1 Site Preparation

Before conducting the geophysical investigation at Survey Area A, marks were placed at 10-foot intervals along the south (S) and north (N) edges of the approximate 600- by 260- foot survey area to provide spatial control for the geophysical survey. Cones were moved along the edges of the survey area during data acquisition to ensure that relatively straight lines were walked. The establishment of survey control was conducted on March 6, 2001.

A Sokkia GIR1000 single-frequency global positioning system (GPS) was coupled to the geophysical instruments to provide horizontal control for the geophysical data. Differential corrections were applied to the GPS data using GPS base station data recorded at the Sokkia office in Orange, California. GPS data were collected in geodetic coordinates based on the WGS84 system and transformed to approximate California State Plane Coordinates, Zone 6, North American Datum of 1983 (NAD83) after applying differential corrections. Ellipsoid heights measured using the GPS system were converted to NAVD 88 elevations using the Geoid Model of 1996. Maximum horizontal errors in the corrected GPS data are estimated to be about 3 feet, with average errors being about 1 to 2 feet.

The GPS system was also used to map pertinent surficial features at the site, including the runway, manholes, vaults, fences and other surface infrastructure. Site mapping activities were conducted on March 8, 2001.

A site map showing the location of the geophysical survey area, State Plane Coordinate System, and surficial features is presented as Figure 2.

3.1.2 Magnetic Survey

Magnetic data were acquired on March 6 and 8, 2001. Prior to data acquisition, the base station magnetometer was set up south of the survey area in a location free of surface debris. The internal clock of the base station and G858 were synchronized to GPS time and the base station was programmed to record the magnetic field intensity of the earth at 5-second intervals throughout the day. The G858 and GPS unit were then programmed with the appropriate settings. The magnetometer was operated with the sensor about 3 feet above ground surface. Measurements of the earth's total magnetic field intensity were made at 0.2-second intervals as the operator walked along approximate S-N survey lines nominally spaced 5 feet apart. The 0.2-second sampling interval resulted in an average station spacing of about 1-foot. The cones placed at the ends of each survey line allowed the instrument operator to walk in a relatively straight line, thereby ensuring uniform site coverage. The magnetic data were stored in the internal memory of the magnetometer, along with line number, and time of measurement. If an error was made on a survey line the line was deleted from the magnetometer's internal memory and reacquired. GPS, base station and magnetic field data were downloaded to a laptop computer at the end of each field day.

3.1.3 Geonics EM-31 Survey

EM-31 data were acquired concurrently with magnetic data on March 6 to 8, 2001. Prior to data acquisition, the EM-31 was assembled and battery levels were checked and found to be within acceptable levels. The in-phase component was then set to zero in a portion of the site with no buried metallic objects. The EM-31 digital data logger was synchronized to GPS time and programmed with the appropriate file name, line number, measurement increment, and direction. Changes in these parameters were made as necessary throughout the survey. The EM-31 was operated in vertical dipole mode with an approximate 3-foot instrument height and the instrument boom parallel to the survey lines. EM-31 measurements of conductivity and in-phase component were made at 0.5-second intervals as the operator walked along S-N survey lines nominally spaced 5 feet apart. The 0.5-second sampling interval resulted in an average station spacing of about 2 feet. The EM-31 data were stored in a digital data logger along with line and station number. If an error was made acquiring a line, a note was made in the field log and the line repeated. EM-31 and GPS data were downloaded to a laptop computer at the end of each field day.

3.2 Survey Area B

3.2.1 Site Preparation

Before conducting the geophysical investigation at Survey Area B on March 8, 2001, a 10- by 10-foot survey grid was established in the 100- by 100- foot survey area and marked with surveyor paint. The grid was established parallel and perpendicular to a row of parking stops along the south and east portions of the site. The geophysical survey grid was approximately tied to the State Plane Coordinate System using a GPS system and is estimated to have an accuracy of about 2 feet. Obvious surface cultural features that could potentially affect the geophysical data (i.e. metallic fences, above ground storage tanks, parking stops, and other surface metallic objects) were identified in the field and plotted onto a scaled, hand-drawn site map. A site map, transcribed from the field drawings, showing the location of the geophysical survey area, geophysical survey coordinate system, and surficial features is presented as Figure 3.

3.2.2 Magnetic Survey

Prior to data acquisition, the G858 was programmed with the appropriate line number, direction, sampling interval, and control point spacing. Changes in these parameters were made as necessary during the survey. Measurements of the earth's total magnetic field were made at 0.1-second intervals as the operator walked along southeast to northwest (SE-NW) survey lines spaced 5 feet apart. The 10-foot grid points were used for spatial control. A marker key on the instrument was depressed every time a 10-foot control point was crossed and linear interpolation was used to assign station positions to the intermediate readings. The 0.1-second sampling interval resulted in an average station spacing of about 0.5 feet. The magnetic data were stored in the internal memory of the magnetometer, along with line and station number, and time of measurement. If a location error was made on a survey line (station mark skipped, etc.) the line was deleted from the magnetometer's internal memory and reacquired. Magnetic data were downloaded to a laptop computer at the end of the survey using the program MAGMAP by Geometrics Inc.

3.2.3 Geonics EM-31 Survey

The EM-31 was assembled and battery levels were checked and found to be within acceptable levels. The in-phase component was then set to zero in a portion of the site with no buried metallic objects. The EM-31 digital data logger was then programmed with the appropriate file name, line number, start station, station increment, and direction. Changes in these parameters were made as necessary throughout the survey. EM-31 measurements of conductivity and in-phase component were made at 5-foot intervals along SE-NW survey lines spaced 5 feet apart using the 10-foot grid points for spatial control. The EM-31 data were stored in a digital data logger along with line and station number. If an error was made acquiring a line, a note was made in the field log and the line repeated. EM-31 data were downloaded to a laptop computer at the end of the survey using the computer program DAT31 by Geonics Ltd.

3.2.4 Geonics EM-61 Survey

The EM-61 was assembled and battery levels were checked and found to be within acceptable levels. The EM-61 digital data logger was then programmed with the appropriate file name, line number, start station, station increment, and direction. Changes in these parameters were made as necessary throughout the survey. EM-61 measurements were made at 2.5-foot intervals along SE-NW survey lines spaced 5 feet apart using the 10-foot grid points for spatial control. The EM-61 data were stored in a digital data logger along with line and station number. If an error was made acquiring a line, a note was made in the field log and the line repeated. EM-61 data were downloaded to a laptop computer at the end of the survey using the computer program DAT61 by Geonics Ltd.

4 DATA PROCESSING AND INTERPRETATION

This section presents the data processing procedures and interpretation of the geophysical data.

4.1 Data Processing

Color-enhanced contour maps of magnetic, EM-31 and EM-61 data were generated using the GEOSOFT® geophysical mapping system. Prior to contour map generation, a number of preprocessing steps were completed. These preprocessing steps consisted of the following:

- Backup of all original field data files to floppy disk.
- Downloading GPS base station data from Sokkia bulletin board (if GPS used).
- Applying differential corrections to GPS data and outputting an ASCII file containing approximate State Plane Coordinates, elevation, and time (if GPS used).
- Correcting of all data acquisition errors (typically only deleting the first portion of a reacquired line, renaming lines incorrectly labeled, deleting additional readings outside the grid, etc.)
- Reformatting field data files to free format XYZ files containing at a minimum GPS time and field measurements or line, station and field measurements, if GPS not used.
- Merging GPS position data and geophysical data using in-house software (if GPS used).
- Removing diurnal variation from total magnetic field measurements using the base station data file and in-house software, if necessary.
- Applying small adjustments to EM-61 and EM-31 station locations (Survey Area B where GPS was not used) to compensate for data being recorded while the operator was walking
- Merging of multiple data files into a single file and sorting, if necessary.

These data adjustments were made using a combination of commercial and in-house software. All adjustments made to data files and resulting file names were documented and are retained in project files.

The outputs of the data preprocessing were data files containing California State Plane, Zone 6, NAD83 Easting and Northing, and the various data measurements (Survey Area A) or line number, station number, and data measurements (Survey Area B). The magnetic data files contained total magnetic field intensity. The EM-31 data files contained conductivity and in-phase response. The EM-61 data files contained bottom coil and differential response.

These data files were imported into the GEOSOFT® mapping system and the following data processing steps applied:

- Reformatting of data files to GEOSOFT® format.
- Generating final map scale.
- Gridding data using minimum curvature or down and cross line splines and a 2.5-foot cell size.
- Masking grid in areas where data not acquired (i.e. around obstructions).
- Applying a single pass Hanning filter to smooth the data.

- Generating color zone file describing color for different data ranges.
- Contouring the data.
- Generating map surrounds (title block, legend, scale, color bar, north arrow, etc.)
- Annotating anomalies.
- Merging various plot files and plotting final map.

The names of the files generated and the processing parameters used were recorded on data processing forms. All completed data processing forms are retained in project files. All files generated during the processing sequence were archived on CD-ROM.

4.2 Interpretation

4.2.1 Survey Area A

NA

NA

4.2.2 Survey Area B

Color-enhanced contour maps of total magnetic field, EM-31 conductivity response and EM-61 bottom coil response are presented as Figures 7 to 9, respectively. The coordinates shown in these figures reference the relative geophysical coordinate system shown in Figure 1. The color bar indicates the amplitude of the measured quantity with the magenta and cyan colors representing high and low amplitudes, respectively. The light orange, yellow and light green colors indicate average "background" values of the measured quantity. The vertical or horizontal parallel lines or tick marks show the survey lines or stations along which data were acquired. EM-61 differential response and EM-31 in-phase component data were also acquired. These data are not presented as they did not provide additional information and were, therefore, considered redundant. Contour maps of these data are, however, retained in project files. A combined interpretation of the geophysical data is presented in Figure 3.

Anomalies in the magnetic, EM-61 and EM-31 data were field checked to determine if a source of metal at the surface caused the anomaly. A number of surface metallic features; such as the fences, above ground storage tanks and other metallic surface objects/debris caused anomalies in the geophysical data. These anomalies are labeled as "SM" on the contour maps.

There are two magnetic and EM anomalies interpreted as buried pipes. These anomalies are labeled as "P" on the contour maps. There are no anomalies in the geophysical data indicative of buried metallic debris.

5 SUMMARY

A magnetic and Geonics EM-31 (EM-31) survey was conducted in an approximate 3.25-acre area (Survey Area A) encompassing a portion of Aerial Photographic Anomaly Area 4 at MCAS EL Toro, California to screen the site for buried metallic and/or construction debris and fill soils. A magnetic, EM-31 and Geonics EM-61 (EM-61) survey was also conducted in an approximate 0.25-acre area (Survey Area B), encompassing the remainder of Aerial Photographic Anomaly Area 4. Interpretation of the geophysical data is presented in Figures 2 and 3, respectively. Contour maps of total magnetic field intensity and EM-31 conductivity and in-phase response for Survey Area A are presented as Figures 4 to 6, respectively. Contour maps of total magnetic field intensity, EM-31 conductivity response and EM-61 bottom coil response for Survey Area B are presented as Figures 7 to 9, respectively.

NA

The geophysical investigation in Survey Area B found no evidence of buried metallic debris. The survey did, however, reveal the presence of two pipes as shown on Figure 3.

The geophysical survey was designed to map small accumulations of metallic debris in the subsurface and strong variations in near-surface soil type that could be indicative of fill soils. It was assumed that any debris buried at the site would contain enough metallic components (i.e. rebar, pipe segments, steel plates, etc.) to be detectable by the magnetic and EM methods.

6 CERTIFICATION

All geophysical data, analysis, interpretations, conclusions, and recommendations in this document have been prepared under the supervision of and reviewed by a **GEO*Vision*** California Registered Geophysicist.

REGISTERED GEOPHYSICIST
ANTONY JEFFREY MARTIN
GP 989
Exp. 3/31/01
STATE OF CALIFORNIA

Antony J. Martin 3/22/2001

Antony J. Martin
California Registered Geophysicist GP989
GEO*Vision* Geophysical Services

Date

* This geophysical investigation was conducted under the supervision of a California Registered Geophysicist using industry standard methods and equipment. A high degree of professionalism was maintained during all aspects of the project from the field investigation and data acquisition, through data processing interpretation and reporting. All original field data files, field notes and observations, and other pertinent information are maintained in the project files and are available for the client to review for a period of at least one year.

A registered geophysicist's certification of interpreted geophysical conditions comprises a declaration of his/her professional judgment. It does not constitute a warranty or guarantee, expressed or implied, nor does it relieve any other party of its responsibility to abide by contract documents, applicable codes, standards, regulations or ordinances.

APPENDIX A

GEOPHYSICAL TECHNIQUES FOR SHALLOW ENVIRONMENTAL INVESTIGATIONS

GEOPHYSICAL TECHNIQUES FOR SHALLOW ENVIRONMENTAL INVESTIGATIONS

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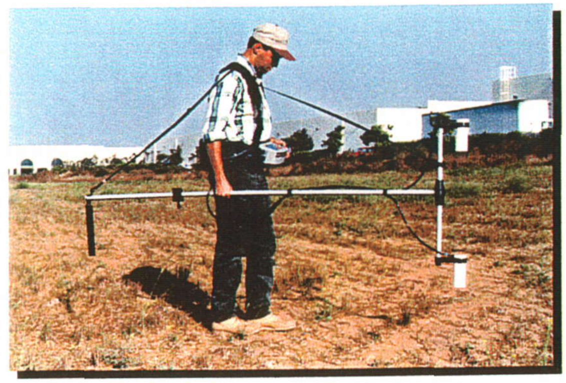
a division of Blackhawk Geometrics

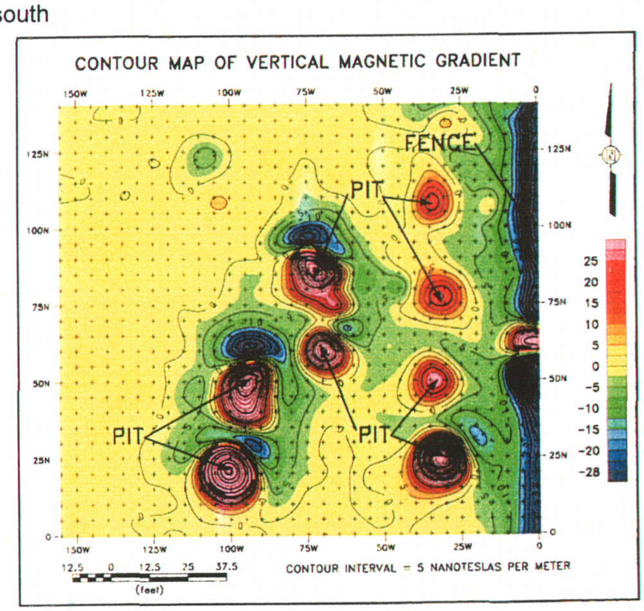
MAGNETIC METHOD

The magnetic method generally involves the measurement of the earth's magnetic field intensity or vertical gradient of the earth's magnetic field. Anomalies in the earth's magnetic field are caused by induced or *remanent magnetism*. Induced magnetic anomalies are the result of secondary magnetization induced in a ferrous body by the earth's magnetic field. The shape and amplitude of an induced magnetic anomaly is a function of the orientation, geometry, size, depth, and magnetic susceptibility of the body as well as the intensity and inclination of the earth's magnetic field in the survey area. The magnetic method is an effective way to search for small metallic objects, such as buried ordnance and drums, because magnetic anomalies have spatial dimensions much larger than those of the objects themselves. Typically, a single buried drum can be detected to a depth of about 10 feet. Larger metallic objects can often be located to greater depths. Induced magnetic anomalies over buried objects such as drums, pipes, tanks, and buried metallic debris generally exhibit an asymmetrical, south up/north down signature (positive response south of the object and negative response to the north).

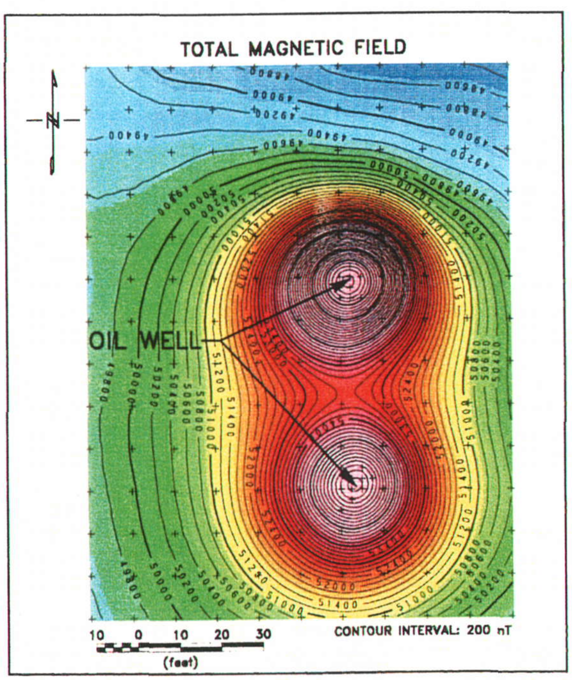
Magnetic data is typically acquired along a grid with results being presented as color-enhanced contour maps generated by the Geosoft™ Mapping System or OASIS montaj. The approximate location and depth of magnetic objects can be calculated using the Geosoft™ UXO System.



Geometrics G858 Cesium Magnetic Gradiometer



Magnetic Survey to Locate Pits Containing Buried Metallic Containers



Magnetic Survey to Locate Abandoned Oil Wells

Magnetic surveys are typically conducted to:

- Locate abandoned steel well casings
- Locate buried tanks and pipes
- Locate pits and trenches containing buried metallic debris
- Detect buried unexploded ordnance (UXO)
- Map old waste sites and landfill boundaries
- Clear drilling locations
- Map basement faults and geology
- Investigate archaeological sites

ELECTROMAGNETIC METHODS

Electromagnetic (EM) methods typically applied to shallow environmental investigations include frequency domain EM methods, such as EM induction and EM utility location methods, time domain electromagnetic (TDEM) metal detection methods, and ground penetrating radar (GPR) methods.

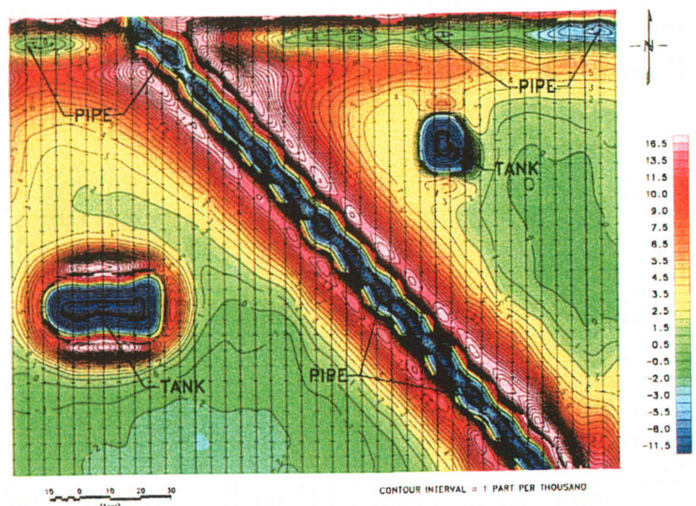
EM Induction Method

EM induction surveys are often conducted using the Geonics EM-31 terrain conductivity meter (EM-31). The EM-31 consists of a transmitter coil mounted at one end and a receiver coil mounted at the other end of a 3.7-meter long plastic boom. Electrical conductivity and in-phase component field strength are measured and stored along with line and station numbers in a digital data logger. In-phase component measurements generally only respond to buried metallic objects; whereas conductivity measurements also respond to conductivity variations caused by changes in soil type, moisture or salinity and the presence of nonmetallic bulk wastes. The EM-31 must pass over or immediately adjacent to a buried metallic object to detect it. Typical EM-31 anomalies over small, buried metallic objects consist of a negative response centered over the object and a lower amplitude positive response to the sides of the object. When the instrument boom is oriented parallel to long, linear conductors such as pipelines a strong positive response is observed. The EM-31 can explore to depths of about 6 meters, but is most sensitive to materials about 1 meter below ground surface. Single buried drums can typically be detected to depths of about 5 feet.

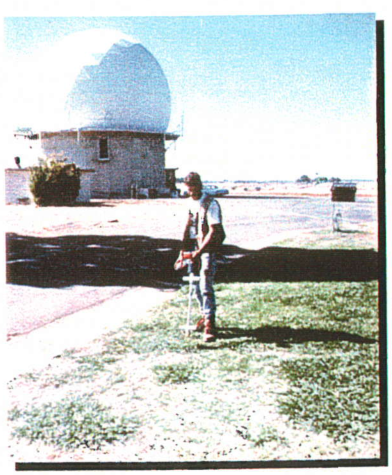
Geonics EM-31 Terrain Conductivity Meter

EM-31 surveys are typically conducted to:

- Locate buried tanks and pipes
- Locate pits and trenches containing metallic and/or nonmetallic debris
- Delineate landfill boundaries
- Delineate oil production sumps and mud pits
- Map conductive soil and groundwater contamination
- Map soil salinity in agricultural areas
- Characterize shallow subsurface hydrogeology
  - Map buried channel deposits
  - Locate sand and gravel deposits
  - Locate conductive fault and fracture zones



Geonics EM-31 Survey to Locate Underground Storage Tanks



EM Utility Location Methods

EM utility locators; such as the Metrotech 810, Metrotech 9890 and Radiodetection RD400, are designed to accurately trace metallic pipes and utility cables and clear drilling/excavation locations. These utility locators consist of a separate transmitter and a receiver. The transmitter emits a radio frequency EM field that induces secondary fields in nearby metallic pipes and cables. The receiver detects these fields and is used to accurately locate and trace the pipes, often to distances over 200 feet from the transmitter. Many of the utility locators have a passive 60Hz mode to locate live electrical lines. Modern utility locators are also capable of providing rough depth estimates of the pipes.

Metrotech EM Utility Locator

TDEM Metal Detection Methods

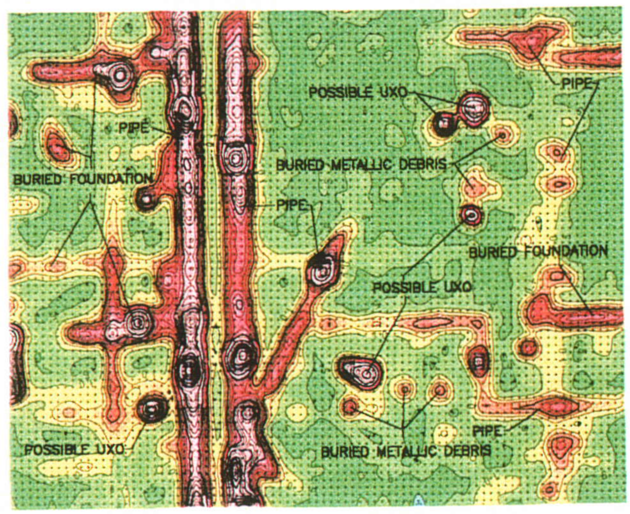
A Geonics EM-61 (EM-61) is a high sensitivity, time-domain, digital metal detector which is often used to detect both ferrous and non-ferrous metallic objects. It is designed specifically to locate buried metallic objects such as drums, tanks, pipes, UXO, and metallic debris and to be relatively insensitive to above ground structures such as fences, buildings, and vehicles.

Geonics EM-61 Digital Metal Detector

The EM-61 consists of two square, 1-meter coils, one mounted over the other and arranged on a hand-towed cart. The bottom coil acts as both a transmitter and receiver while the top coil is a receiver only. While transmitting the bottom coil generates a pulsed primary magnetic field, which induces eddy currents into nearby metallic objects. When the transmitter is in its off cycle both coils measure the decay of these eddy currents in millivolts (mV) with the results being stored in a digital data logger along with position information. The decay of the eddy currents is proportional to the size and depth of the metallic target. A symmetrical positive anomaly is recorded over metallic objects with the peak centered over the object. The signal from the top coil is amplified in such a way that both coils record effectively the same response for a metallic object on the surface and the top coil records a larger response for buried metallic objects. The response of near surface objects can, therefore, be suppressed by subtracting the lower coil response from the upper coil response (differential response).

In practice, the usable depth of investigation of the EM-61 depends on the size and shape of the object and the amount of above ground interference encountered at the site. A single buried drum can often be detected at a depth of about 10 feet.

Geonics EM-61 Survey to Map Subsurface Infrastructure and Potential UXO



GPR Methods

Ground-penetrating radar (GPR) is a high-frequency electromagnetic method commonly applied to a number of engineering and environmental problems.

GSSI SIR-10A GPR Unit

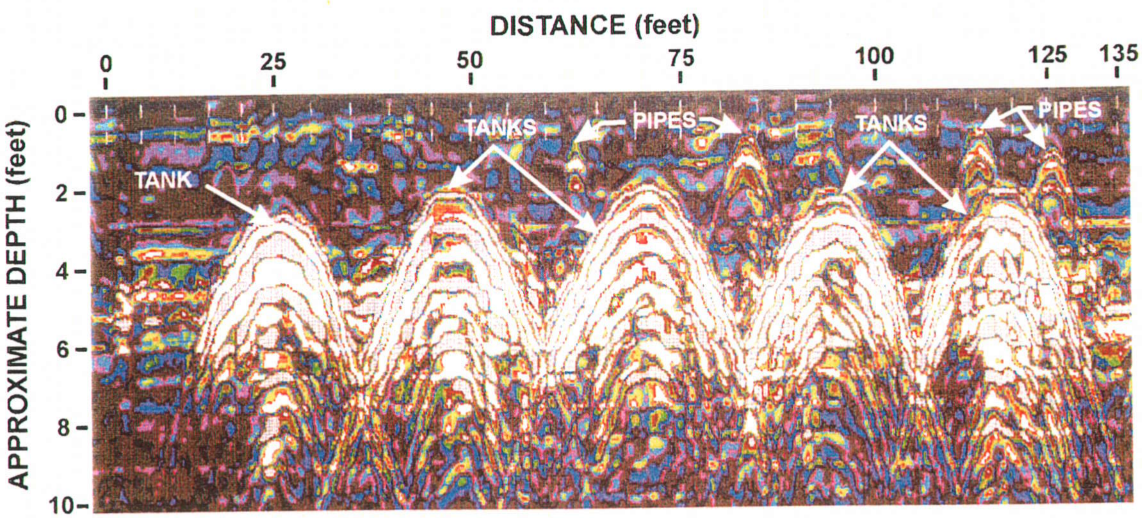
A GPR system radiates short pulses of high-frequency EM energy into the ground from a transmitting antenna. This EM wave propagates into the ground at a velocity that is primarily a function of the relative dielectric permittivity of subsurface materials. When this wave encounters the interface of two materials having different dielectric properties, a portion of the energy is reflected back to the surface, where it is detected by a receiver antenna and transmitted to a control unit for processing and display.

Depth penetration is a function of antenna frequency and the electrical conductivity of the soils in the survey area. Lower frequency antennas achieve greater depth penetration than higher frequency antennas, but have poorer spatial resolution. Conductive soils, such as clays, attenuate the radar waves much more rapidly than resistive dry sand and rock. In many environments in California, depth penetration of 500 and 300 MHz antennas is limited to 3 to 5 feet. Depth penetration may be greater if shallow soils consist of clean sands and less if shallow soils consist of clay.

GPR surveys are typically conducted to:

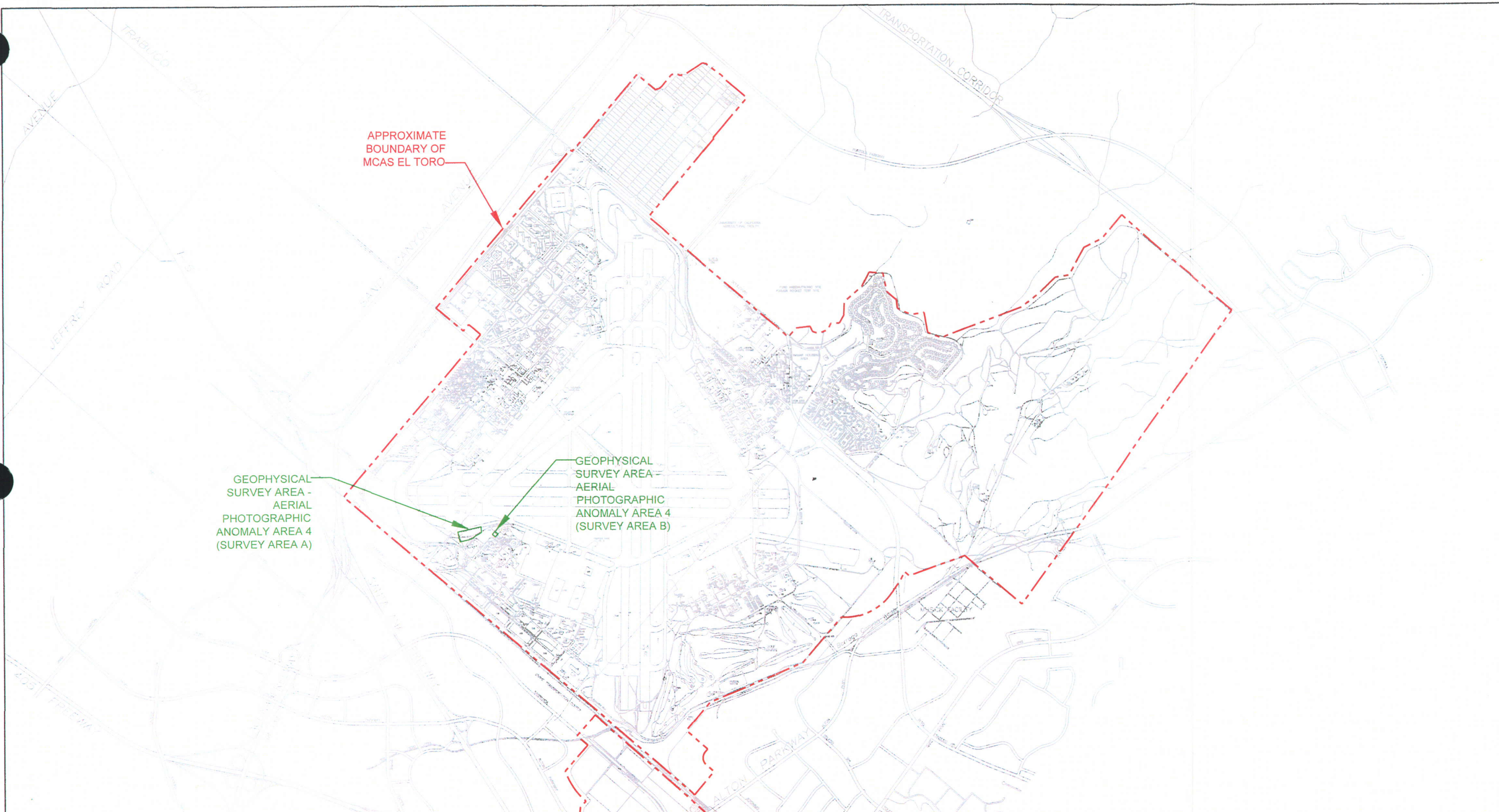
- Locate and delineate underground storage tanks (metallic and non-metallic)
- Locate metallic and nonmetallic pipes and utility cables
- Map rebar in concrete structures
- Map landfill boundaries
- Delineate pits and trenches containing metallic and nonmetallic debris
- Delineate leach fields and industrial cribs
- Delineate previously excavated and backfilled areas
- Map shallow groundwater tables
- Map shallow soil stratigraphy
- Map shallow bedrock topography
- Map shallow subsurface voids and cavities
- Characterize archaeological sites

Geophysical Survey Systems Inc. (GSSI) SIR-2 or SIR-10 GPR systems with antennas in the frequency range of 50 to 1,000 MHz are often used during GPR investigations. Mala Geoscience and Sensors and Software, Ltd also manufacture GPR systems. GPR data is processed using a variety of software including the RADAN™ or GRADIX software packages by GSSI and Interpex Ltd., respectively.



GPR Survey to Locate Underground Storage Tanks

FIGURES



NOTES:
1. BASE MAP PROVIDED BY THE IT GROUP
2. COORDINATES ARE IN THE CALIFORNIA STATE PLANE COORDINATE SYSTEM, ZONE 6, NAD83
3. ESTIMATED MAP ACCURACY = 10-30 FEET

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a division of Blackhawk Geometrics

Project No. 9254	Date Mar 19,2001
Developed by	A MARTIN
Drawn by	T RODRIGUEZ
Approved by	[signature]
File	C:\AcadMap2K\9254\S4\9254-S4-1.dwg

FIGURE - 1
SITE LOCATION MAP

MARINE CORPS AIR STATION EL TORO

ORANGE COUNTY, CALIFORNIA

PREPARED FOR THE IT GROUP

APPENDIX E – GEOPHYSICAL SURVEY

FIGURE 2 – SITE MAP WITH GEOPHYSICAL INTERPRETATION, SURVEY AREA A

SUMMARY REPORT OF AERIAL PHOTOGRAPHY ANOMALY, APHO 6

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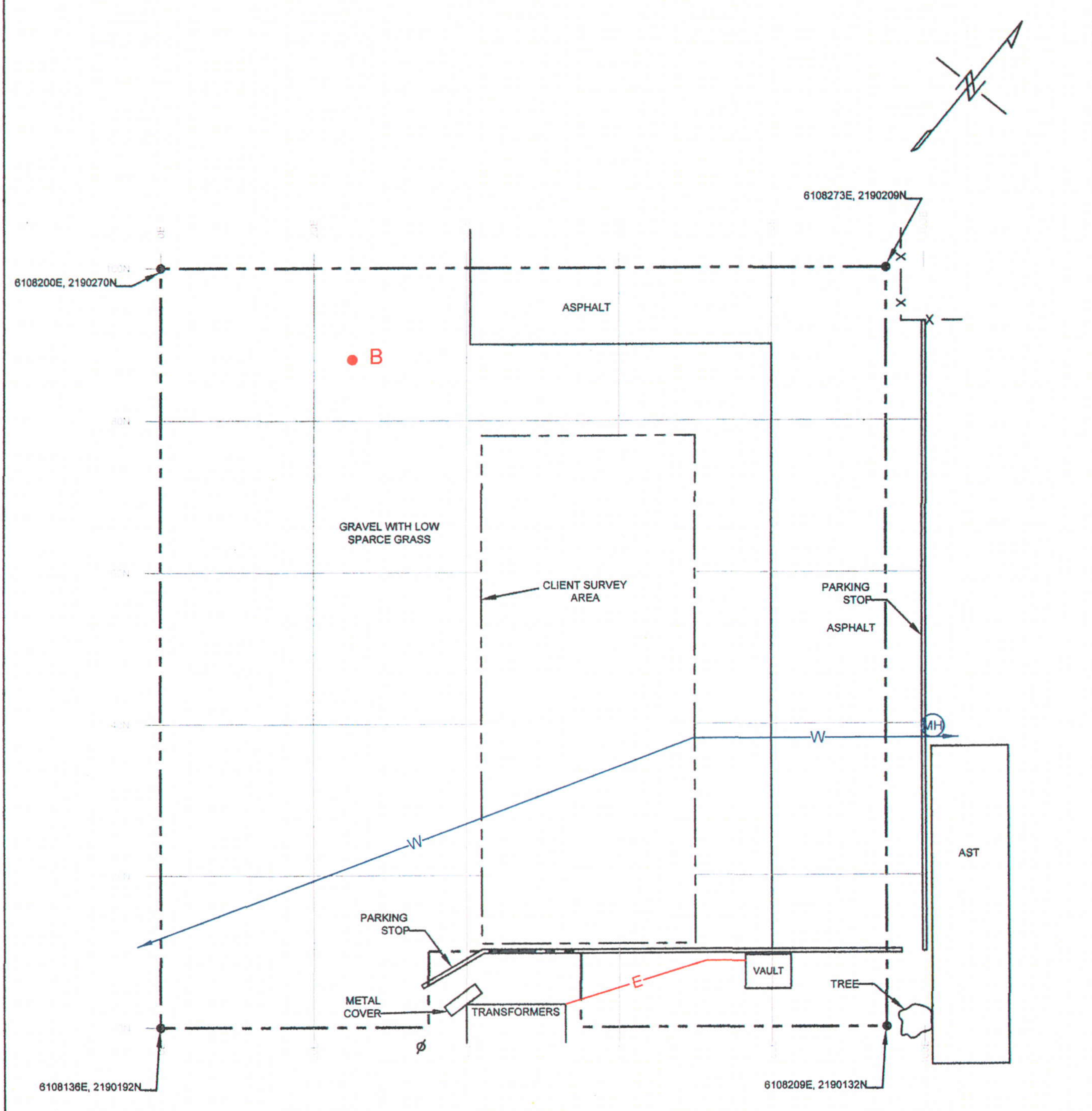

LEGEND

0N, 0E — RELATIVE COORDINATE SYSTEM OF GEOPHYSICAL SURVEY

6108200E, 2190270N — APPROXIMATE CALIFORNIA STATE PLANE COORDINATES

— — — BOUNDARY OF GEOPHYSICAL SURVEY AREA

—X—X— FENCE

(MH) MANHOLE

Ø UTILITY POLE

—W— UNDERGROUND PIPE (E=ELECTRIC, W=WATER)

● B SMALL BURIED METALLIC OBJECT / DEBRIS

0 10 20 40
(feet)

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a division of Blackhawk Geometrics

Project #	9254
Date	Mar 22,2001
Developed by	A MARTIN
Drawn by	T RODRIGUEZ
Approved by	[signature]
File	C:\AcadMap2K\9254\S4\9254-S4B.dwg

FIGURE - 3
SITE MAP WITH GEOPHYSICAL INTERPRETATION

AERIAL PHOTOGRAPHIC ANOMALY AREA 4
SURVEY AREA B
MCAS EL TORO
ORANGE COUNTY, CALIFORNIA

PREPARED FOR
THE IT GROUP

APPENDIX E – GEOPHYSICAL SURVEY

FIGURE 4 – CONTOUR MAP OF TOTAL MAGNETIC FIELD INTENSITY, SURVEY AREA A

SUMMARY REPORT OF AERIAL PHOTOGRAPHY ANOMALY, APHO 6

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APPENDIX E – GEOPHYSICAL SURVEY

FIGURE 5 – CONTOUR MAP OF GEONICS EM-31 CONDUCTIVITY RESPONSE, SURVEY AREA A

SUMMARY REPORT OF AERIAL PHOTOGRAPHY ANOMALY, APHO 6

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APPENDIX E – GEOPHYSICAL SURVEY

FIGURE 6 – CONTOUR MAP OF GEONICS EM-31 IN-PHASE RESPONSE, SURVEY AREA A

SUMMARY REPORT OF AERIAL PHOTOGRAPHY ANOMALY, APHO 6

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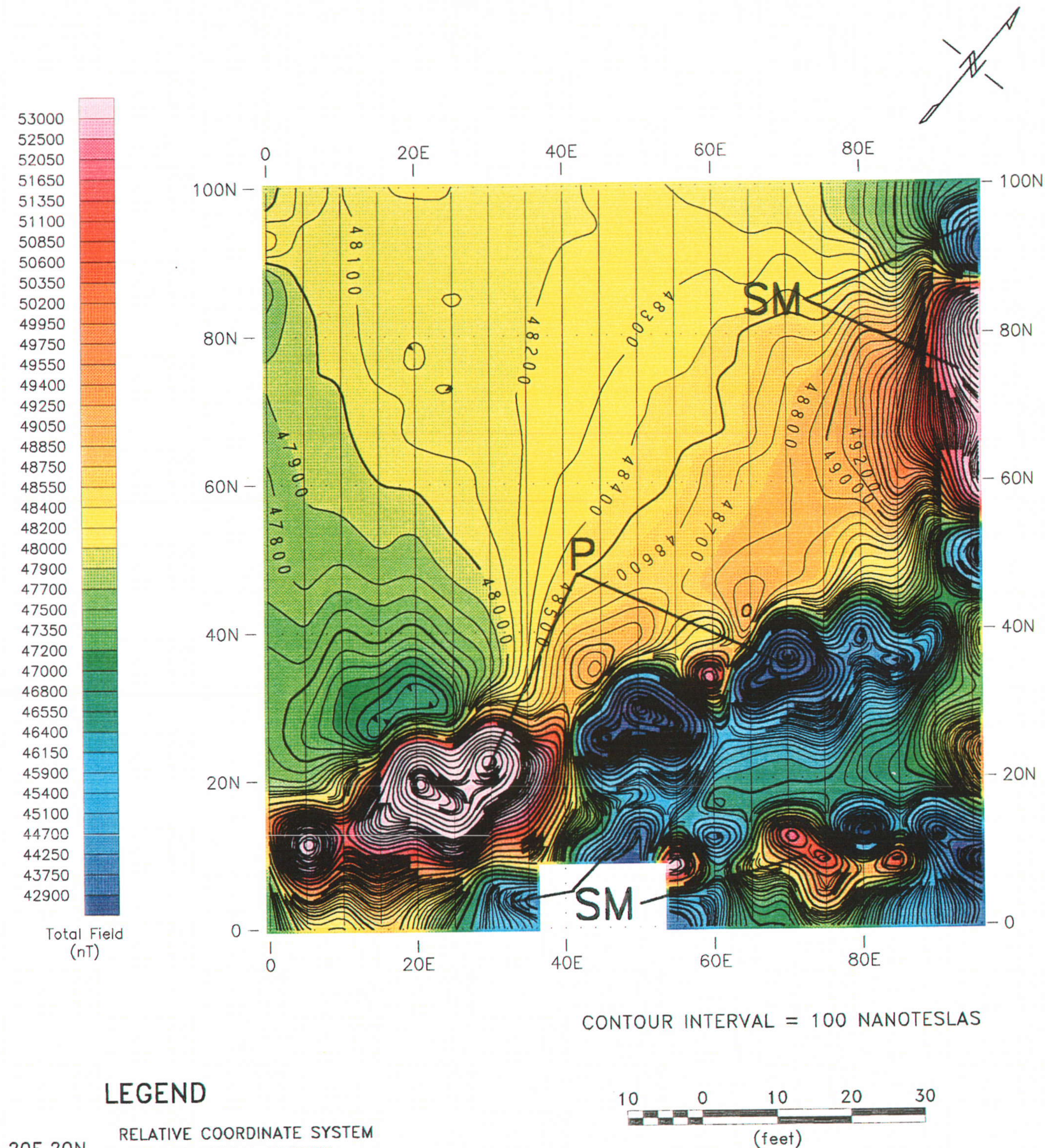


LEGEND

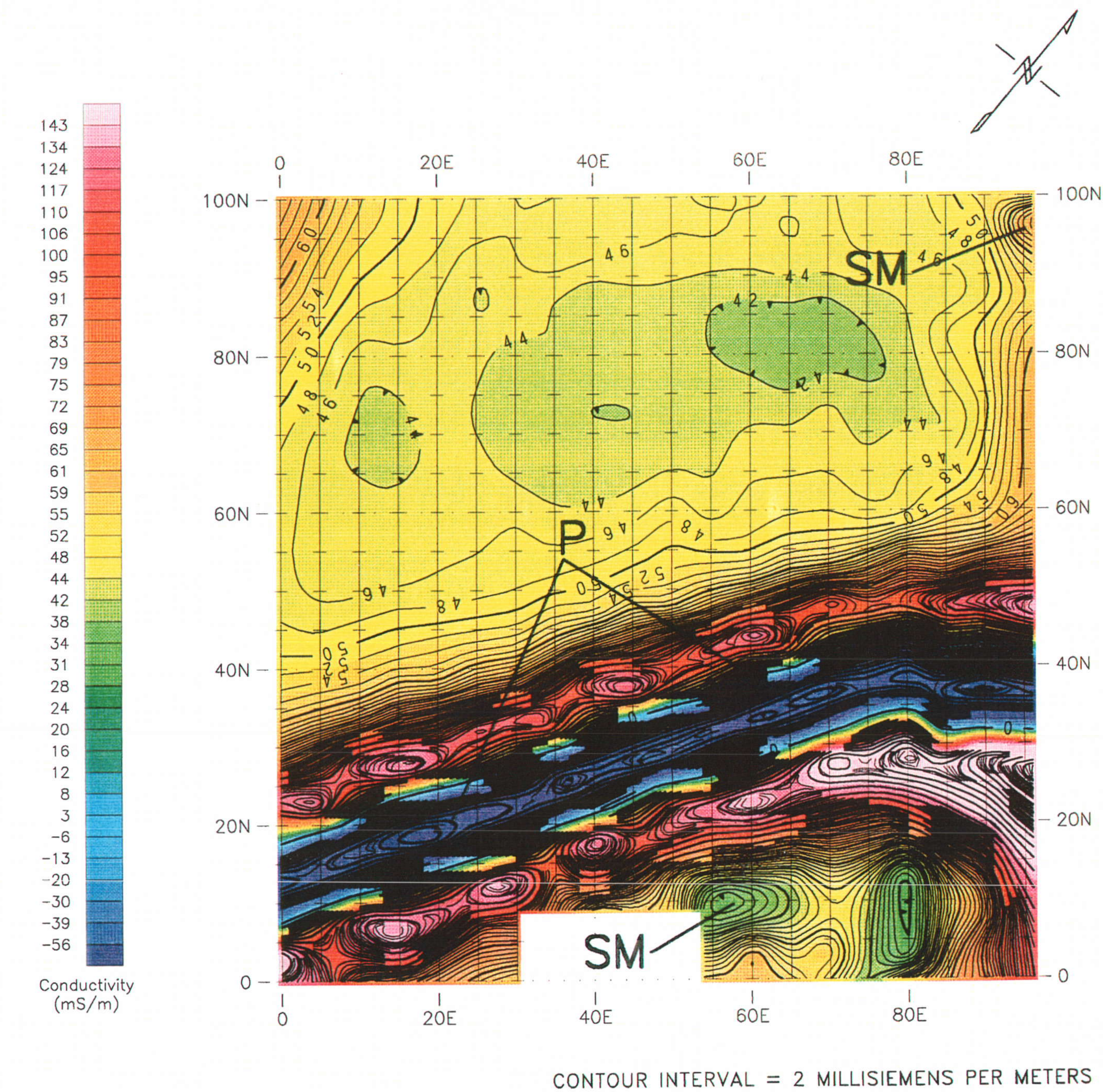
20E,20N	RELATIVE COORDINATE SYSTEM OF GEOPHYSICAL SURVEY
————	MAGNETIC SURVEY LINE
B	ANOMALY CAUSED BY A VERY SMALL BURIED METALLIC OBJECT
P	ANOMALY CAUSED BY BURIED PIPE
SM	ANOMALY CAUSED BY SURFACE OBJECT (BUILDING, REINFORCED CONCRETE, FENCE, LIGHT POST, etc.)

FIGURE 7
CONTOUR MAP OF TOTAL MAGNETIC FIELD

AERIAL PHOTOGRAPHIC ANOMALY AREA 4 - SURVEY AREA B
MCAS EL TORO, CALIFORNIA

PREPARED FOR
THE IT GROUP

GEOVISION GEOPHYSICAL SERVICES



10 0 10 20 30
(feet)

LEGEND

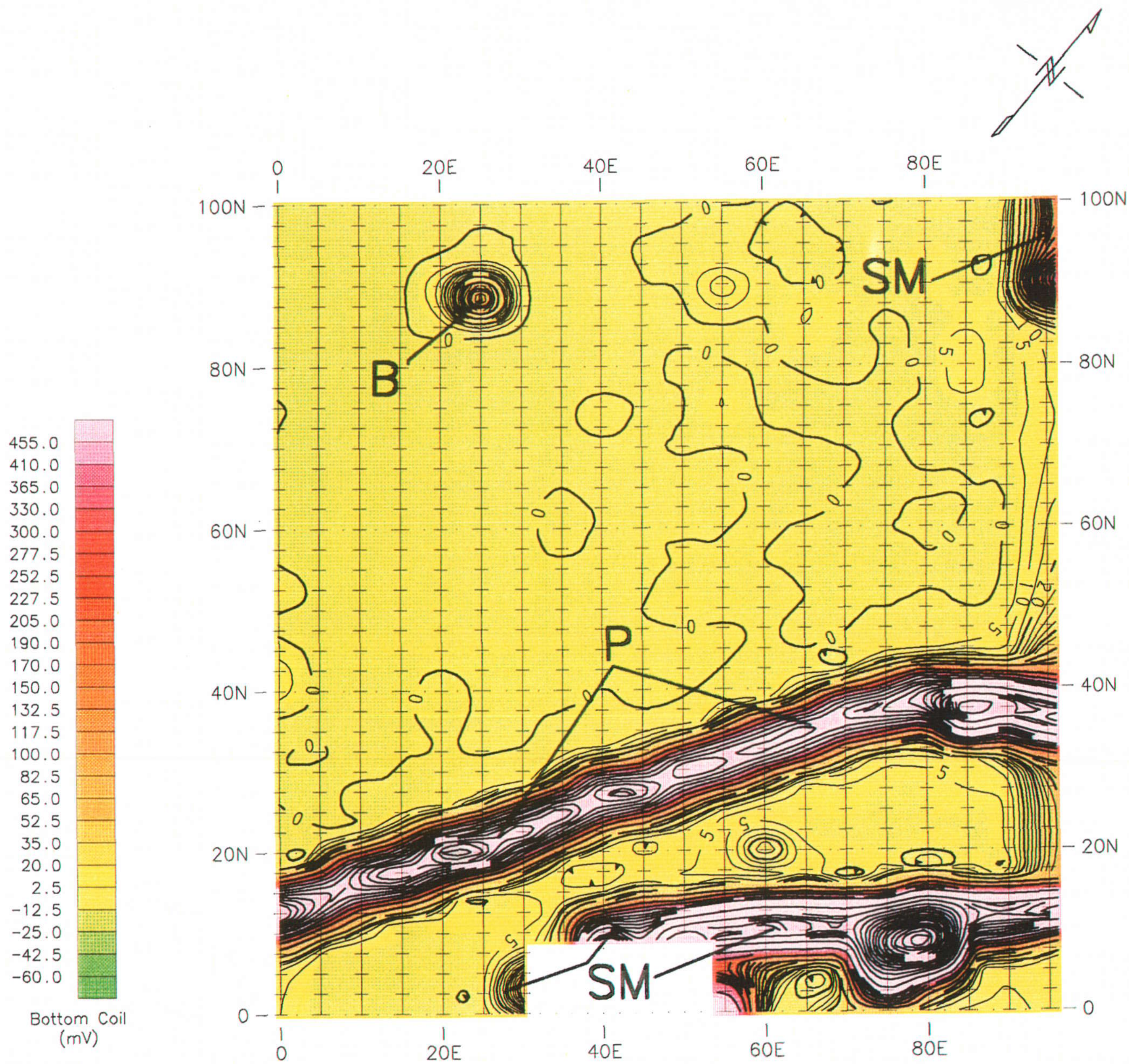
20E,20N	RELATIVE COORDINATE SYSTEM OF GEOPHYSICAL SURVEY
├─┼─┼─┼─┤	GEONICS EM-31 SURVEY LINE
B	ANOMALY CAUSED BY A VERY SMALL BURIED METALLIC OBJECT
P	ANOMALY CAUSED BY BURIED PIPE
SM	ANOMALY CAUSED BY SURFACE OBJECT (BUILDING, REINFORCED CONCRETE, FENCE, LIGHT POST, etc.)

FIGURE 8
CONTOUR MAP OF GEONICS EM31 CONDUCTIVITY RESPONSE

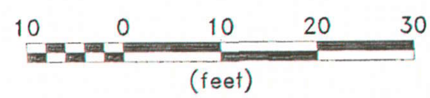
AERIAL PHOTOGRAPHIC ANOMALY AREA 4 - SURVEY AREA B
MCAS EL TORO, CALIFORNIA

PREPARED FOR
THE IT GROUP

GEOVISION GEOPHYSICAL SERVICES



CONTOUR INTERVAL = 5 MILLIVOLTS



LEGEND

20E,20N	RELATIVE COORDINATE SYSTEM OF GEOPHYSICAL SURVEY
├──┼──┼──┤	GEONICS EM-61 SURVEY LINE
B	ANOMALY CAUSED BY A VERY SMALL BURIED METALLIC OBJECT
P	ANOMALY CAUSED BY BURIED PIPE
SM	ANOMALY CAUSED BY SURFACE OBJECT (BUILDING, REINFORCED CONCRETE, FENCE, LIGHT POST, etc.)

FIGURE 9
CONTOUR MAP OF GEONICS EM61 BOTTOM COIL RESPONSE

AERIAL PHOTOGRAPHIC ANOMALY AREA 4 – SURVEY AREA B
MCAS EL TORO, CALIFORNIA

PREPARED FOR
THE IT GROUP

GEOVISION GEOPHYSICAL SERVICES

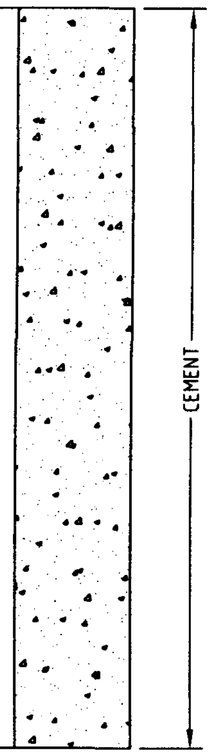
APPENDIX F
BORING LOGS

Geologic Log of Boring PHA4-SB01

Project **MCAS/EL TORO**	Northing - 2190193.29	Drilling Company BC2	
Project Number **18609**	Easting - 6108231.87	Drill Rig LIMITED ACCESS	Begin Drilling 2/2/2000
Client SWDIV	TOC Elevation NA	Driller Ramone Japeda	End Drilling 2/2/2000
Location **PHOTO ANOMALY AREA 4**	TOP OF RIM NA	Drill Method HSA	Well Completion Date 2/2/2000
Geologist B. Tanaka	DIAGRAM NOT TO SCALE		
Borehole Diameter 6-INCHES	Total Depth of Borehole 20.5 FEET	Depth to Water NOT ENCOUNTERED	

DESCRIPTION	Depth (feet)	Soil Group	Graphic Log	Samples	PID/FID (ppm)	Blows/6 in.	Recovery (inches)	BORING DETAIL
Surface: Asphalt soil. Boring was hand augered 10 to feet bgs for utility clearance. The first 10 feet was logged from hand auger cuttings.	0							
Silty Sand (SM): Brown (7.5YR 4/4), fine micaceous silts, fine sands, nonplastic, slightly moist, no odor detected. **18609-2742 Sample collected at 4.5-5.0 feet bgs.**	4	SM			0 0 0	5 13 24	2 6 6	
Sand (SP): Strong Brown (7.5YR 4/6), fine well sorted, medium dense, some fine slightly plastic silts, slightly moist, no odor detected. **18609-2743 Sample collected at 9.5-10.0 feet bgs.**	9	SP			0 0 0	8 10 12	6 6 6	
Silt (ML): Fine micaceous, nonplastic silts, soft, slightly moist, no odor detected. **18609-2744 Sample collected at 14.5-15.0 feet bgs.**	14	ML			0 0 0	8 7 13	6 6 6	
As above, slightly moist, no odor, no staining seen. **18609-2745 Sample collected at 19.5-20.0 feet bgs.**	19				0 0 0	9 11 13	6 6 6	
End of boring at 20.5 feet bgs. No groundwater was encountered in the boring. Boring was back filled with 3 (94lb) bags of Portland cement with 1 (60lb) bag of high yield Bentonite mixed with 55 gallons of potable water.	20.5							

Depth scale (feet): 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40

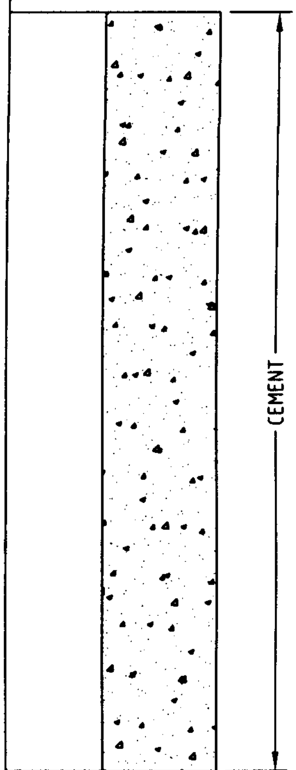


Geologic Log of Boring PHA4-SB02

Project **MCAS/EL TORO**	Northing - 2190191.05	Drilling Company BC2	
Project Number **18609**	Easting - 6108206.75	Drill Rig LIMITED ACCESS	Begin Drilling 2/2/2000
Client SWDIV	TOC Elevation NA	Driller Ramone Japeda	End Drilling 2/2/2000
Location **PHOTO ANOMALY AREA 4**	TOP OF RIM NA	Drill Method HSA	Well Completion Date 2/2/2000
Geologist B. Tanaka	DIAGRAM NOT TO SCALE		
Borehole Diameter 6-INCHES	Total Depth of Borehole 21 FEET	Depth to Water NOT ENCOUNTERED	

DESCRIPTION	Depth (feet)	Soil Group	Samples	PID/FID (ppm)	Blows/6 in.	Recovery (inches)
Surface: Asphalt Boring was hand augered 10 to feet bgs for utility clearance. The first 10 feet was logged from hand auger cuttings.	0					
Silt (ML): Brown (7.5YR 4/4), fine micaceous, nonplastic silts, slightly moist, no odor detected. **18609-2746 Sample collected at 4.5-5.0 feet bgs.**	4	ML	X	0 0 0	6 10 11	4 6 6
Sand/Silty Sand (SP/SM): Strong brown (7.5YR 4/6), fine, well sorted, medium dense, some fine slightly plastic silts, slightly moist, no odor detected. **18609-2747 Sample collected at 9.5-10.0 feet bgs.**	9	SP/SM	X	0 0 0	5 3 9	4 6 6
Silt (ML): Strong brown (7.5YR 4/6), fine nonplastic, micaceous silts, slightly moist, no odor detected. **18609-2748 Sample collected at 14.5-15.0 feet bgs.**	14	ML	X	0 0 0	8 12 14	4 6 6
Sandy Silt (ML): Strong brown (7.5YR 4/6), fine nonplastic micaceous silts, fine sand (25%), slightly moist, no odor. **18609-2749 Sample collected at 19.5-20.0 feet bgs.**	19	ML	X	0 0 0	7 11 15	6 6 6
End of boring at 21 feet bgs. No groundwater was encountered in the boring. Boring was back filled with 3 (94lb) bags of Portland cement with 1 (60lb) bag of high yield Bentonite mixed with 55 gallons of potable water.	21					

BORING DETAIL



OHM Remediation Services Corp.

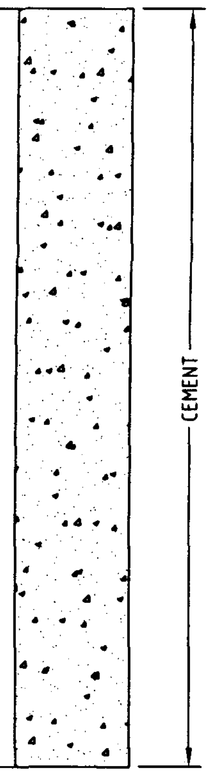
Geologic Log of Boring PHA4-SB03

Project **MCAS/EL TORO**	Northing - 2190194.09	Drilling Company BC2			
Project Number **18609**	Easting - 6108179.95	Drill Rig LIMITED ACCESS	Begin Drilling 2/2/2000		
Client SWDIV	TOC Elevation NA	Driller Ramone Japeda	End Drilling 2/2/2000		
Location **PHOTO ANOMALY AREA 4**	TOP OF RIM NA	Drill Method HSA	Well Completion Date 2/2/2000		
Geologist B. Tanaka	DIAGRAM NOT TO SCALE				
Borehole Diameter 6-INCHES	Total Depth of Borehole 21 FEET	Depth to Water NOT ENCOUNTERED			

DESCRIPTION	Depth (feet)	Soil Group	Graphic Log	Samples	PID/FID (ppm)	Blows/6 in.	Recovery (inches)
Surface: Asphalt/Soil. Boring was hand augered 10 to feet bgs for utility clearance. The first 10 feet was logged from hand auger cuttings.	0						
Silt (ML): Strong brown (7.5YR 4/4), micaceous nonplastic silts, slightly moist, no odor detected. **18609-2750 Sample collected at 4.5-5.0 feet bgs.**	4	ML		X	0 0 0	5 8 9	6 6 6
As above (ML): Slightly moist, no odor detected. **18609-2751 Sample collected at 9.5-10.0 feet bgs.**	10	ML		X	0 0 0	4 6 10	6 6 6
Sandy Silt (ML): Strong brown (7.5YR 4/6), fine nonplastic silts, fine sands, micaceous, slightly moist, no odor detected. **18609-2752 Sample collected at 15.0-15.5 feet bgs.**	15	ML		X	0 0 0	5 6 7	6 6 6
As above (ML): slightly moist, no odor detected. **18609-2754 Sample collected at 20.0-20.5 feet bgs.**	20	ML		X	0 0 0	6 8 11	6 6 6
End of boring at 21 feet bgs. No groundwater was encountered in the boring. Boring was back filled with 3 (94lb) bags of Portland cement with 1 (60lb) bag of high yield Bentonite mixed with 55 gallons of potable water.	21						

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40

BORING DETAIL



OHM Remediation Services Corp.

Geologic Log of Boring PHA4-SB04

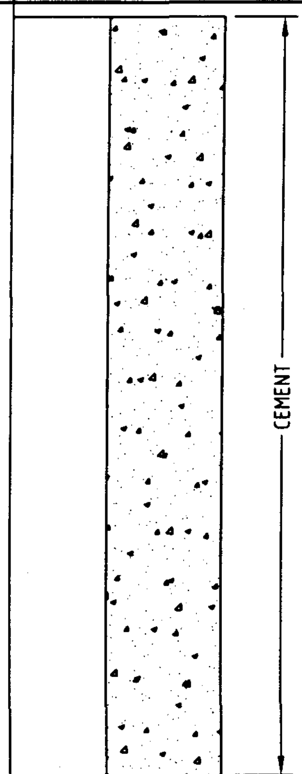
Project **MCAS/EL TORO**	Northing - 2190218.34	Drilling Company BC2
Project Number **18609**	Easting - 6108205.27	Drill Rig LIMITED ACCESS
Client SWDIV	TOC Elevation NA	Driller Ramone Japeda
Location **PHOTO ANOMALY AREA 4**	TOP OF RIM NA	Drill Method HSA
Geologist B. Tanaka	DIAGRAM NOT TO SCALE	
Borehole Diameter 6-INCHES	Total Depth of Borehole 21 FEET	Depth to Water NOT ENCOUNTERED

Begin Drilling	2/2/2000
End Drilling	2/2/2000
Well Completion Date	2/2/2000

DESCRIPTION	Depth (feet)	Soil Group	Graphic Log	Samples	PID/FID (ppm)	Blows/6 in.	Recovery (inches)
Surface: Asphalt. Boring was hand augered 10 to feet bgs for utility clearance. The first 10 feet was logged from hand auger cuttings.	0						
Silt (ML): Strong brown (7.5YR 4/4), fine, nonplastic, micaceous soft silts, slightly moist, no odor detected. **18609-2755 Sample collected at 5-5.5 feet bgs.**	5	ML			0 0 0	4 5 6	6 6 6
As above (ML): Slightly moist, no odor detected. **18609-2756 Sample collected at 10-10.5 feet bgs.**	10	ML			0 0 0	8 10 13	6 6 6
As above (ML): Slightly moist, no odor detected.	15	ML					
As above (ML): Slightly moist, no odor detected. **18609-2757 Sample collected at 20-20.5 feet bgs.**	20	ML			0 0 0	6 8 10	6 6 6
End of boring at 21 feet bgs. No groundwater was encountered in the boring. Boring was back filled with 3 (94lb) bags of Portland cement with 1 (60lb) bag of high yield Bentonite mixed with 55 gallons of potable water.	21						

Depth scale (feet): 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40

BORING DETAIL



Geologic Log of Boring PHA4-SB05

Continue

Project **MCAS/EL TORO**	Northing - 2190164.71	Drilling Company BC2	
Project Number **18609**	Easting - 6108207.19	Drill Rig LIMITED ACCESS	Begin Drilling 2/2/2000
Client SWDIV	TOC Elevation NA	Driller Ramone Japeda	End Drilling 2/2/2000
Location **PHOTO ANOMALY AREA 4**	TOP OF RIM NA	Drill Method HSA	Well Completion Date 2/2/2000
Geologist B. Tanaka	DIAGRAM NOT TO SCALE		
Borehole Diameter 6-INCHES	Total Depth of Borehole 21 FEET	Depth to Water NOT ENCOUNTERED	

DESCRIPTION	Depth (feet)	Soil Group	Samples	PID/FID (ppm)	Blows/6 in.	Recovery (inches)
Surface: Asphalt. Boring was hand augered 10 to feet bgs for utility clearance. The first 10 feet was logged from hand auger cuttings.	0					
Silt (ML): Strong brown (7.5YR 4/4), fine, micaceous, nonplastic silts, soft, slightly moist, no odor detected. **18609-2758 Sample collected at 5.0-5.5 feet bgs.**	5	ML	X	0 0 0	14 17 22	6 6 6
Sand (SP): Fine sands, well sorted, medium dense to loose, slightly moist to dry, no odor detected. **18609-2759 Sample collected at 10.0-10.5 feet bgs.**	10	SP	X	0 0 0	12 16 20	4 6 6
As above (SP): Slightly moist, no odor detected.	15	SP		0		
Silt (ML): Fine nonplastic silts, soft, micaceous, dry, no odor detected. **18609-2760 Sample collected at 20-20.5 feet bgs.**	20	SP	X	0 0 0	8 11 13	6 6 6
End of boring at 21 feet bgs. No groundwater was encountered in the boring. Boring was back filled with 3 (94lb) bags of Portland cement with 1 (60lb) bag of high yield Bentonite mixed with 55 gallons of potable water.	21					

Depth scale: 0 to 40 feet.

BORING DETAIL