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8:02 am, Jan 24, 2012

Alameda County
Environmental Health

January 20, 2012

Alameda County Environmental Health
Attn: Barbara Jakub, P.G.
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Subject: Soil and Water Investigation Workplan
Former Unocal Service Station
20405 Redwood Road
Castro Valley, California

Dear Ms. Jakub:

Enclosed please find a copy of the subject Soil and Water Investigation Workplan dated January 20, 2012, prepared by BSK Associates.

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge.

Sincerely,

Randall Nahas

BSK Associates
Engineers & Laboratories

WORKPLAN
SOIL AND WATER INVESTIGATION

FORMER UNOCAL SERVICE STATION
20405 REDWOOD ROAD
CASTRO VALLEY, CALIFORNIA

BSK PROJECT E0805401S

PREPARED FOR:

MR. RANDALL NAHAS
P.O. BOX 3049
SAN RAMON, CA 94583

JANUARY 20, 2012

WORKPLAN
SOIL AND WATER INVESTIGATION
FORMER UNOCAL SERVICE STATION
20405 REDWOOD ROAD
CASTRO VALLEY, CALIFORNIA

Prepared for:

Mr. Randall Nahas
P.O. Box 3059
San Ramon, CA 94583

E0805401S

January 20, 2012

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WORKPLAN
SOIL AND WATER INVESTIGATION
FORMER UNOCAL SERVICE STATION
CASTRO VALLEY, CALIFORNIA

1. INTRODUCTION

At the request of Mr. Randall Nahas, BSK Associates has prepared this workplan to perform additional groundwater and soil vapor investigations at the Former Unocal Service Station (the site). The additional activities were requested by the Alameda County Environmental Health Department (ACEH) in a letter dated November 11, 2011, in order to update the site risk assessment.

Figure 1 illustrates the site vicinity. A site plan is shown on Figure 2. Site information is as follows:

Site Name and Location:	Former Unocal Service Station 20405 Redwood Road, Castro Valley, California
Contacts:	Mr. Randall Nahas P.O. Box 3059 San Ramon, California 94583
Global ID:	T0600101370

2. PROJECT HISTORY

December 1989, Soil Investigation and Monitoring Well Installation: In December 1989, three groundwater monitoring wells (MW-2, MW-3 and MW-4) were installed at the locations shown on Figure 2. Soil samples were collected from soil borings MW-1 and MW-1A; however, they were not converted to monitoring wells (BSK, 1995). Summaries of soil sample analytical results are presented in Table 1 (petroleum hydrocarbons) and Table 2 (volatile and semi-volatile organic compounds). Monitoring well groundwater sample analytical results are summarized in Table 3 (petroleum hydrocarbons), Table 4 (volatile organic carbons).

March 1991, Soil Investigation: Thirteen soil borings (SB-1 through SB-13) were advanced at the locations shown on Figure 2 to depths ranging between approximately 10 and 20 feet below ground surface (bgs) (BSK, 1996). Soil sample analytical results are summarized in Table 1.

March through April 1992, Soil Borings and Monitoring Well Installation: Soil borings MW-5, MW-6, MW-7, SB-14, and SB-15 were drilled at the locations shown on Figure 2. A summary of soil sample analytical results is presented in Table 1. Borings MW-5, MW-6, and MW-7 were completed as groundwater monitoring wells.

October 1992, Chromatograph Evaluation: BSK identified a non-standard peak in the chromatograph from a groundwater sample from well MW-7. The peak was not typical of petroleum hydrocarbons.

November 1992, Groundwater Sampling: Groundwater samples from monitoring well MW-7 were analyzed for volatile halocarbons by EPA Method 601. Analytical results are summarized in Table 3. Tetrachloroethene (PCE) and trichloroethylene (TCE) were detected in groundwater samples from well MW-7 at concentrations of 14,000 µg/L and 660 µg/L, respectively. BSK Associates attributed the previous concentrations of total petroleum hydrocarbons as gasoline (TPHg) to the presence of PCE and concluded gasoline contamination may not occur in a significant quantity in monitoring well MW-7. As a result, BSK Associates recommended ceasing any further investigation of the gasoline plume south of well MW-7 (BSK, 1992).

November 1993, Soil Borings: Soil borings SP-1 and SP-2 were advanced at the locations shown on Figure 2. Soil and groundwater samples were collected from each boring. Summaries of soil sample analytical results are presented in Table 1 (petroleum hydrocarbons) and Table 2 (volatile and semi-volatile organic compounds). Monitoring well groundwater sample analytical results are summarized in Table 3 (Philip Environmental, 1996).

December 1995, Feasibility Study: Excavation and on-site treatment of excavated soil was selected as the remedial alternative for soil impacts. As a part of the feasibility study, an aquifer pump test was conducted. Groundwater extraction well MW-101 was installed at the location shown on Figure 2. Pump-and-treat was determined to be a feasible remedial alternative for groundwater impacts at the site. (BSK, 1995).

June 1996, Revised Corrective Action Plan: Philip Environmental prepared a Revised Corrective Action Plan. The plan stated that the site operator and property owner planned to cease operation of the site as a service station, which would require closure of the underground storage tanks. Philip Environmental recommended removal of the USTs, soil excavation and limited groundwater extraction (Philip Environmental, 1996).

As part of the Revised Corrective Action Plan, Tier I and Tier II Risk Assessments were conducted. Results of the Tier I Risk Assessment show benzene levels in soil at the site exceeded the risk based screening levels for volatilization from soil to outdoor air, vapor intrusion from soil to on-site buildings, soil ingestion, and leachate from soil to water exposure pathways. Toluene levels in soil at the site exceeded the risk based screening levels for the vapor intrusion from soil to on-site buildings exposure pathway. Results of the Tier II Risk Assessment indicated that concentrations of hydrocarbons and benzene in soil and groundwater exceed Tier II site specific screening levels in the area adjacent to the USTs and the southern property boundary (Philip Environmental, 1996).

Summer 1997, Service Station Building Demolition: The service station building was demolished and fuel dispensers removed (Life Springs Environmental Inc., 1999).

November 1998, UST Removal: The concrete slabs and foundation of the building, fueling area, and pump islands, were broken up and hauled to a recycling facility. The three USTs and associated piping were removed and transported to Ecology Control Industries (ECI) in Richmond, California. Two hydraulic hoists and clarifier sump were also removed. No holes were observed in the gasoline USTs, but small holes were observed in the waste oil UST. The excavated soil (approximately 175 cubic yards) was stockpiled. Figure 3 shows the approximate extent of the excavation.

Soil samples were collected after excavation. Sample locations are shown on Figure 3. Tables 1 and 2 provide summaries of soil sample analytical results. The release of petroleum hydrocarbons at the site appears to have primarily impacted the backfill material surrounding the two 10,000 gallon gasoline USTs (Life Springs Environmental Inc., 1999).

The UST pit was backfilled with aggregate base to within 5 feet of ground surface. Winter weather conditions led Life Springs Environmental Inc. to place impacted soil back in the excavations of the waste oil UST and clarifier sump (Life Springs Environmental Inc., 1999).

April 1999, Stockpiled Soil Remediation: Beginning in April 1999, impacted soil from the main UST excavation was laid out in shallow beds and aerated by periodic tilling.

May 1999, Soil Re-Excavation and Sampling: The waste oil UST and clarifier sump areas were re-excavated, with the second excavation extending slightly deeper then the first. Excavated soil from the waste oil UST and clarifier sump pits was disposed of at Vasco Road Sanitary Landfill in Livermore, California (Life Springs Environmental Inc., 2000). Soil samples were collected from native soil in both pits and analyzed for TPHd and total oil and grease. A section of the pipe trench area was excavated to a depth of 3 feet bgs. Excavated soil from the trench was laid out in shallow beds for aeration. A soil sample was collected from the trench re-excavation (sample name: GASLINE). The sample was analyzed for TPHg, benzene, toluene, ethylbenzene, and xylenes (BTEX), and methyl tertiary-butyl ether (MTBE). Table 1 provides a summary of soil sample analytical results. Figure 3 shows the approximate extent of re-excavation and sample locations.

August 1999, Waste Oil and Clarifier Sump Pit Sampling and Soil Stockpiling: The aerated soil from precious excavations was stockpiled. Soil samples were collected from the bottom of the waste oil and clarifier sump pits at depths of 10 and 7 feet bgs respectively (Life Springs Environmental Inc., 1999). Table 1 provides a summary of soil sample analytical results, Figure 3 shows the approximate sample locations.

September 1999, Waste Oil Pit Sampling: A soil sample was collected from within the waste oil pit at a depth of 11.5 bgs and analyzed for chlorinated hydrocarbons and TPHd. Table 1 provides a summary of soil sample analytical results, Figure 3 shows the approximate sample location.

October 1999, Clarifier Sump Pit Sampling: A soil sample was collected within the clarifier sump pit at a depth of 9.5 feet bgs. Table 1 provides a summary of soil sample analytical results, Figure 3 shows the approximate sample location.

November 1998, UST Removal: The concrete slabs and foundation of the building, fueling area, and pump islands, were broken up and hauled to a recycling facility. The three USTs and associated piping were removed and transported to Ecology Control Industries (ECI) in Richmond, California. Two hydraulic hoists and clarifier sump were also removed. No holes were observed in the gasoline USTs, but small holes were observed in the waste oil UST. The excavated soil (approximately 175 cubic yards) was stockpiled. Figure 3 shows the approximate extent of the excavation.

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The UST pit was backfilled with aggregate base to within 5 feet of ground surface. Winter weather conditions led Life Springs Environmental Inc. to place impacted soil back in the excavations of the waste oil UST and clarifier sump (Life Springs Environmental Inc., 1999).

April 1999, Stockpiled Soil Remediation: Beginning in April 1999, impacted soil from the main UST excavation was laid out in shallow beds and aerated by periodic tilling.

May 1999, Soil Re-Excavation and Sampling: The waste oil UST and clarifier sump areas were re-excavated, with the second excavation extending slightly deeper then the first. Excavated soil from the waste oil UST and clarifier sump pits was disposed of at Vasco Road Sanitary Landfill in Livermore, California (Life Springs Environmental Inc., 2000). Soil samples were collected from native soil in both pits and analyzed for total petroleum hydrocarbons as diesel (TPHd) and total oil and grease. A section of the pipe trench area was excavated to a depth of 3 feet bgs. Excavated soil from the trench was laid out in shallow beds for aeration. A soil sample was collected from the trench re-excavation (sample name: GASLINE). The sample was analyzed for TPHg, benzene, toluene, ethylbenzene, and xylenes (BTEX), and methyl tertiary-butyl ether (MTBE). Table 1 provides a summary of soil sample analytical results. Figure 3 shows the approximate extent of re-excavation and sample locations.

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October 1999, Clarifier Sump Pit Sampling: A soil sample was collected within the clarifier sump pit at a depth of 9.5 feet bgs. Table 1 provides a summary of soil sample analytical results, Figure 3 shows the approximate sample location.

November 1999, Permission to Re-Use Stockpiled Soil: Permission was granted by Alameda County Environmental Health Services for the re-use of the stockpiled soil that had been remediated by aeration (Life Springs Environmental Inc., 2000).

December 1999, Waste Oil and Clarifier Sump Pit Deepening and Sampling: The waste oil pit was deepened to 10 feet bgs and the clarifier sump pit was deepened to 14 feet bgs. Soil removed from the over-excavation was also transported to the Vasco Road Sanitary Landfill in Livermore, California. Approximately 36.1 tons of soil were removed from both the waste oil pit and the clarifier sump pit during both re-excavation and over-excavation events. Soil samples were collected from the native soil in the bottom of each pit. The two excavations along with the final five feet of the main excavation were filled in with the remediated soil from the main excavation. Table 1 provides a summary of soil sample analytical results. Figure 3 shows the approximate extent of the over-excavation and sample locations.

Monitoring well MW-4 was abandoned by pressure grouting and drilling out. The vault boxes for monitoring wells MW-2 and MW-101 were replaced (Life Springs Environmental Inc., 2000).

Groundwater Monitoring Program: From August 1990 through 1999, groundwater monitoring activities were performed on a quarterly basis. Groundwater monitoring was performed semi-annually starting in 1999 through September 2003. Groundwater monitoring was not conducted from the third quarter of 2003 through the third quarter of 2008. Groundwater monitoring analytical data are summarized in Table 3 (petroleum hydrocarbon constituents) and Table 4 (volatile organic hydrocarbons). Groundwater elevation data are summarized in Table 5. Groundwater Flow direction and gradient data are summarized in Table 6. Currently, groundwater monitoring is conducted on a semi-annual basis.

Monitoring wells MW-2 and MW-3 were not sampled from the second half of 2009 through the second half of 2010. Bark and debris covers the area around MW-2 and MW-3, which prevented BSK from locating the wells on several attempts. With assistance from Mr. Nahas, the wells were located in time to sample for the first half 2011 reporting period. In the Status Report for the second half of 2010, BSK recommended locating the wells and installing a crash post next to each vault box. Since the wells have been located and referenced to nearby features, installing crash posts should no longer be necessary.

November 2011, Additional Activities: In a letter dated November 23, 2011, ACEH responded to BSK's Site Conceptual Model (BSK, 2009) and Status Report (BSK, 2011). The technical report requests included evaluating soil vapor in the area of monitoring well MW-101 and former boring SP-1, preparing a site risk assessment, and providing a wellhead elevation survey of the wells associated with the site.

3. RATIONALE

ACEH noted that the high concentration of petroleum hydrocarbons in groundwater at SP1 has not been characterized beyond the grab sample collected in 1993. ACEH requested the collection of soil vapor samples to investigate current petroleum hydrocarbon concentrations in the area. BSK agrees that further investigation is necessary; however, installation of a monitoring well near SP-1 may be more prudent for assessing true concentrations over time.

It has come to our attention that very high PCE concentrations exist under the building south of the site (ERS, 2011). DTSC has identified Marshal Steel drycleaners as the source of the PCE plume. Petroleum hydrocarbon impact below the building and to the south is negligible compared to the PCE plume; therefore the focus of our investigation should be limited to the north of the drycleaner building. We recommend collecting soil vapor samples north of the drycleaner building to evaluate the potential human health risk from petroleum hydrocarbon impact.

Future development within the footprint of the former gas station is likely and will also require a human health risk assessment. We recommend collecting soil vapor samples in this area as well.

4. SCOPE OF SERVICES

The scope of work addressed in this workplan consists of the following:

- Pre-field activities,
- Soil vapor sampling,
- Indoor air risk assessment,
- Well installation, and
- Reporting.

4.1 Pre-Field Activities

Prior to initiating field activities, BSK will obtain a drilling permit from ACEH.

Working areas will be pre-marked with white paint and Underground Service Alert (USA) will be notified at least 48 hours prior to the start of the field work.

4.2 Soil Vapor Sampling

Shallow soil vapor samples will be collected and used to estimate the risk associated with indoor air exposure from migrating vapors. Soil vapor samples will be collected at eight locations as shown on Figure 4.

The boreholes will be advanced to five feet bgs using a rotary hammer fitted with 5/8-inch-diameter auger. A sacrificial stainless steel filter push-tip connected to ¼-inch-diameter Teflon™ tubing will be pushed to the bottom of each boring. A six-inch-thick layer of #20 sand will be place around the porous tip. Granular bentonite will be placed in the remainder of the annulus to within six inches of the ground surface and allowed to hydrate overnight prior to sample collection. A gas-tight valve will be attached to the surface end of each sampling tube to prevent the intrusion of ambient air or water from entering the sampling apparatus.

One soil gas sample from each of the three temporary sample probes will be collected in general accordance with BSK's *Standard Operating Procedure, Soil-Gas Sampling Using EPA Method TO-15*, which is included in Appendix A. The filled sample containers will be stored at ambient temperatures until delivery to Air Toxics, Ltd., for laboratory analysis. The samples will be analyzed for TPHg, BTEX, fuel oxygenates, and lead scavengers, by EPA Method TO-15. Soil vapor samples collected along the north side of the strip mall will also be analyzed for TCE and PCE by EPA Method TO-15. After collection of the soil vapor samples, the tubing will be removed and the sampling point boreholes will be backfilled with granular bentonite.

4.3 Indoor Air Risk Assessment

A screening level risk assessment will be performed using the analytical results of the soil vapor samples. Soil vapor concentrations will be compared to California Human Health Screening Levels (CHHSLs) soil-gas screening numbers for commercial/industrial land use developed by Cal/EPA Office of Environmental Health and Hazard Assessment (OEHHA). Soil vapor concentrations that exceed the OEHHA soil-gas screening numbers will be further evaluated using site-specific soil parameters incorporated into the Johnson and Ettinger model. The risk assessment will be performed using the OEHHA modifications to incorporate the most recent California criteria.

4.4 Well Installation

One soil boring will be drilled by a licensed drilling contractor to a depth of approximately 30 feet below ground surface (bgs). Soil samples will be collected at five foot intervals for logging purposes. One soil sample will submitted to BSK's state-certified laboratory for analysis of TPHg, BTEX, MTBE, TCE, and PCE. The location of the boring is shown on Figure 4.

A 2-inch-diameter schedule 40 PVC monitoring well will be installed in the boring. The monitoring well will be screened with 0.002 inch slotted PVC from 30 to 10 feet bgs. A #2/12 sand filter pack will be placed in the borehole annulus from 30 to 7 feet bgs. A three-foot-thick bentonite seal will be placed from 7 to 4 feet bgs, and a neat cement grout seal will be placed from 4 feet bgs to the ground surface. The wellhead will be protected by a flush-mounted and traffic-rated well vault box. Drill spoils and equipment decontamination rinsate will be temporarily stored on-site in DOT-approved 55-gallon drums.

The monitoring well will be developed no sooner than 72 hours after installation by surging, bailing, and pumping to remove any sand that may inter the well. The monitoring well will be surveyed by a licensed surveyor in accordance with GeoTracker requirements.

Initial monitoring well sampling will take place during subsequent semi-annual monitoring events.

4.5 Report Preparation

On completion of field work, laboratory analysis and risk assessment, BSK will prepare a summary report. The report will contain a description of field activities, observations, and protocols, soil boring logs, tabulated results of chemical analyses with copies of analytical laboratory results, a map showing sampling locations, results of the risk assessment, conclusions and recommendations. The report will be prepared under the supervision of, and signed and stamped by, a Professional Engineer or Geologist licensed in California.

5. LIMITATIONS

The findings presented in this report were based upon field observations during a site reconnaissance and review of agency database listings. Observations describe only the conditions present at the time of this investigation. The data reviewed and observations made are limited to accessible areas and available records searched during the course of this investigation. BSK cannot guarantee the completeness or accuracy of the regulatory agency records reviewed. Unless BSK otherwise expressly agrees in writing, no other party is entitled to rely upon the observations, research information, or conclusions presented in this report or in any other material obtained by BSK from the sources identified in this report. It must also be understood that changing circumstances in the property usage, proposed property usage, site zoning, and changes in the environmental status of the other nearby properties can alter the validity of conclusions and information contained in this report. Therefore, the data obtained are clear and accurate only to the degree implied by the sources and methods used.

This report provides neither certification nor guarantee that the properties evaluated are free of hazardous-material and/or petroleum-product contamination or that there are no recognized environmental conditions associated with the site that potentially pose an environmental risk/liability or that the site is in compliance with current applicable federal, state, or local regulations. Findings of this assessment may have a potential for negative impact on the value or suitability of the property for the purpose intended. BSK cannot assume liability for such negative impact. No warranties, expressed or implied, are made as to the findings or conclusions presented in this report. Sampling and analytical testing of soil, groundwater, air, radon gas, biological agents and/or construction/building materials was not part of the scope of services for this assessment. This assessment did not include sampling or laboratory analysis of materials suspected of being radioactive or containing asbestos, lead, urea-formaldehyde, mold, pesticides or PCBs.

6. REFERENCES

BSK 1992, Letter Report, Well MW-7 Special Sampling, *Unocal 76 Service Station/Safeway Parking Lot, 20405 and 20629 Redwood Road, Castro Valley, California*, BSK Associates, December 23, 1992.

BSK 1995, *Feasibility Study, Soil and Groundwater Remediation, Tien's Unocal Station, 20405 Redwood Road, Castro Valley, California*, BSK Associates, December 11, 1995.

BSK 1996, *Semi-Annual Groundwater Monitoring Report, Unocal 76 Service Station, 20405 and 20629 Redwood Road, Castro Valley, California*, BSK Associates, May 14, 1996.

Philip Environmental 1996, *Revised Corrective Action Plan, R.T. Nahas Property/Tien Unocal 76 Service Station, 20405 Redwood Road, Castro Valley, California*, Philip Environmental, June 14, 1996.

Life Springs Environmental, Inc. 1999, *Technical Report, Tank Closure, Underground Fuel Tank Site, R.T. Nahas Company Property, Formerly Frank Tien Unocal 76 Service Station, 20405 Redwood Road, Castro Valley, California, 94546*, Life Springs Environmental, Inc., February 18, 1999.

Life Springs Environmental, Inc. 1999, *Soil Remediation Status Report, R.T. Nahas Property, Castro Valley*, Life Springs Environmental, Inc., August 17, 1999.

Life Springs Environmental, Inc. 1999, *Soil Remediation Status Report #2, R.T. Nahas Property, Castro Valley*, Life Springs Environmental, Inc., October 26, 1999.

Life Springs Environmental, Inc. 2000, *Technical Report, Soil Remediation Closure Report, Underground Fuel Tank Site, R.T. Nahas Company Property, Formerly Frank Tien Unocal 76 Service Station, 20405 Redwood Road, Castro Valley, California, 94546*, Life Springs Environmental, Inc., April 13, 2000.

Graymer, R.W. 2000, Geologic map and map database of the Oakland metropolitan area, Alameda, Contra Costa, and San Francisco Counties, California: U.S. Geological Survey, Miscellaneous Field Studies Map MF-2342, scale 1:50000.

BSK 2009, *Site Conceptual Model, Former Unocal Service Station, 20405 Redwood Road, Castro Valley, California*, BSK Associates, March 6, 2009.

BSK 2011, *Status Report, Second Half 2010, Former Unocal Service Station, 20405 Redwood Road, Castro Valley, California*, BSK Associates, July 13, 2011.

TABLES

Table 1
Soil Sample Analytical Results
Petroleum Hydrocarbon Constituents
Former Unocal Service Station
20405 Redwood Road, Castro Valley, California
(Concentrations in mg/kg)

Location	Depth (feet)	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Xylenes	Oil and Grease	Total Lead	MTBE
December 1989, Soil Investigation and Monitoring Well Installation										
MW-1	5	<10	-	<0.02	<0.02	<0.02	<0.02	-	-	-
	10	**89**	-	**1.8**	**7.8**	**3.8**	**20**	-	-	-
	15	<10	-	**0.09**	<0.02	<0.02	<0.02	-	-	-
	19	<10	-	<0.02	<0.02	<0.02	<0.02	-	-	-
MW-1A	5	<10	<10	<0.02	<0.02	<0.02	<0.02	-	<2.0	-
	10	**110**	**50**[b]	**2.2**	**11**	**5.4**	**25**	-	<2.0	-
	13	**11**	<10	**0.64**	**0.71**	**0.64**	**3.5**	-	<2.0	-
	16.5	<10	<10	<0.02	<0.02	<0.02	<0.02	-	<2.0	-
MW-2	5	<10	-	<0.02	<0.02	<0.02	<0.02	-	-	-
	10	<10	-	**0.05**	<0.02	<0.02	**0.03**	-	-	-
	15	<10	-	<0.02	<0.02	<0.02	<0.02	-	-	-
	20	<10	-	<0.02	<0.02	<0.02	<0.02	-	-	-
MW-3	5	<10	-	<0.02	<0.02	<0.02	<0.02	-	-	-
	10	<10	-	<0.02	<0.02	<0.02	<0.02	-	-	-
	15	**92**	-	ND	ND	**0.97**	**4.0**	-	-	-
	19	<10	-	<0.02	<0.02	<0.02	<0.02	-	-	-
MW-4[a]	5	-	<10	<0.02	<0.02	<0.02	<0.02	<100	-	-
	8.5	-	<10	<0.02	<0.02	<0.02	<0.02	<100	-	-
	13	-	<10	<0.02	<0.02	<0.02	<0.02	<100	-	-
March 1991, Soil Investigation										
SB-1	14.5	<10	-	**0.05**	**0.03**	<0.02	**0.06**	-	-	-
SB-2	10.5	**440**	-	**4.5**	**18**	**11**	**55**	-	<2.0	-
	13	**810**	**340**[b]	**5.3**	**4.2**	**13**	**76**	-	-	-
SB-3	13.5	**15**	<10	**0.09**	**0.18**	**0.19**	**1.1**	-	<2.0	-
	17	<10	-	<0.02	<0.02	<0.02	<0.02	-	-	-
SB-4	14	<10	<10	<0.02	<0.02	<0.02	**0.1**	-	-	-
SB-5	14.5	<10	-	<0.02	<0.02	<0.02	<0.02	-	-	-
SB-6	15	**310**	-	**0.8**	**15**	**6.2**	**36**	-	-	-
SB-8	20.5	<10	-	<0.02	<0.02	<0.02	<0.02	-	-	-
SB-10	16	<10	-	<0.02	<0.02	<0.02	<0.02	-	-	-
SB-11	10.5	**31**	-	**0.09**	**0.03**	**0.49**	**1.8**	-	-	-
SB-12	15.5	<10	-	<0.02	<0.02	<0.02	<0.02	-	-	-
SB-13	10.5	**1100**	-	**5.5**	**67**	**27**	**140**	-	-	-
	14	**530**	-	**7.8**	**48**	**14**	**73**	-	-	-

Table 1
Soil Sample Analytical Results
Petroleum Hydrocarbon Constituents
Former Unocal Service Station
20405 Redwood Road, Castro Valley, California
(Concentrations in mg/kg)

Location	Depth (feet)	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Xylenes	Oil and Grease	Total Lead	MTBE
March through April 1992, Soil Borings and Monitoring Well Installation										
SB-14	21	<1	<1	<0.005	<0.005	<0.005	<0.005	-	-	-
SB-15	20.5	<1	**3**	<0.005	**0.007**	<0.005	<0.008	-	-	-
MW-5	21	<1	<1	<0.005	<0.005	<0.005	<0.005	-	-	-
MW-6	16	<1	<1	<0.005	<0.005	<0.005	<0.005	-	-	-
MW-7	15.5	<1	<1	<0.005	<0.005	<0.005	<0.005	-	-	-
November 1993, Soil Borings										
SP-2	14	**9**	-	**0.14**	**0.52**	**0.19**	**1.0**	-	-	-
SP-1	16	-	-	**0.18**	<0.005	**0.075**	**0.055**	-	-	-
December 1995, Monitoring Well Installation										
MW-101	10	**120**	-	<0.005	**0.95**	**2.1**	**11**	-	-	-
	15	**63**	-	ND	**1.5**	**0.87**	**9.8**	-	-	-
November 1998, UST Removal										
WO	8	<1.0	**270**	<0.005	**0.0061**	**0.027**	**0.079**	**2300**	**9.0**	<0.005
PIT NE COR	12	**47**	-	<0.62	<0.62	**0.74**	**3.4**	-	-	<0.62
PIT NE BOT	13	**14**	-	<0.62	<0.62	<0.62	<0.62	-	-	<0.62
PIT SE	12	**31**	-	<0.62	**1.8**	<0.62	**3.0**	-	-	<0.62
PIT SE	unk	**100**	-	<2.5	<2.5	**2.6**	**14**	-	-	<2.5
PIT SW	11.5	**22**	-	<0.62	<0.62	<0.62	**3.0**	-	-	<0.62
PIT NW	12	**2.6**	-	**0.088**	**0.0054**	**0.11**	**0.52**	-	-	**0.014**
WL NW	2	<1.0	-	<0.005	<0.005	<0.005	<0.005	-	-	**0.018**
WL J	2	<1.0	-	<0.005	<0.005	<0.005	<0.005	-	-	<0.005
WIS S	2	**410**	-	**3.6**	**11**	**12**	**72**	-	-	**0.80**
WIS N	2	<1.0	-	<0.005	<0.005	<0.005	<0.005	-	-	<0.005
EJ	2	<1.0	-	<0.005	<0.005	<0.005	<0.005	-	-	<0.005
EIS S	2	<1.0	-	<0.005	<0.005	<0.005	<0.005	-	-	<0.005
EIS N	2	<1.0	-	<0.005	<0.005	<0.005	<0.005	-	-	<0.005
CJ	2	<1.0	-	<0.005	<0.005	<0.005	<0.005	-	-	<0.005
WEST HOIST[3]	8.5	-	**1000*,[1]**	-	-	-	-	-	-	-
EAST HOIST[3]	8.5	-	<1.0**	-	-	-	-	-	-	-
SUMP	4.5	<1.0	**120[1]**	<0.005	<0.005	<0.005	<0.005	**96**	**7.9**	<0.005

Table 1
Soil Sample Analytical Results
Petroleum Hydrocarbon Constituents
Former Unocal Service Station
20405 Redwood Road, Castro Valley, California
(Concentrations in mg/kg)

Location	Depth (feet)	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Xylenes	Oil and Grease	Total Lead	MTBE
May 1999, Soil Re-excavation and Sampling										
GASLINE	3	<1.0	-	<0.005	<0.005	<0.005	<0.005	-	-	-
SUMP	4	-	**2700[1]/4800[c]**	-	-	-	-	-	-	-
WO	9	-	**38[1]**	-	-	-	-	**140**	-	-
August 1999, Waste Oil and Clarifier Sump Pit Sampling										
SUMP	7	-	**84**	-	-	-	-	**88**	-	-
WO	10	-	**560**	-	-	-	-	**1400**	-	-
September 1999, Waste Oil Pit Sampling										
WO	11.5	<1.0	**1.2[1]**	<0.005	<0.005	<0.005	<0.005	<50	-	-
October 1999, Clarifier Sump Pit Sampling										
SUMP[3]	9.5	**71[1]**	**270[2]**	<0.62	<0.62	<0.62	<0.62	**220**	-	<0.62
December 1999, Waste Oil and Clarifier Sump Pit Deepening and Sampling										
WO[3]	11	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005	<50	-	<0.005
SUMP[3]	15	**6.3[1]**	**690[1]**	<0.005	<0.005	**0.14**	**0.25**	**1200**	-	<0.005

Notes:
-: Not analyzed.
unk: Unknown.
[1]: Hydrocarbon reported does not match the pattern of Chromalab, Inc. standard.
[2]: Estimated concentration reported due to overlapping fuel patterns.
[3]: Exact location not mapped.
* West Hoist also had 2000 mg/kg hydraulic oil.
**East Hoist <50 mg/kg hydraulic oil.
[a]: Soil samples at were also analyzed for VOCs by EPA method 8010. None were detected.
[b]: Sample contains lower molecular weight hydrocarbons.
[c]: Reported as motor oil

Table 2
Soil Sample Analytical Results
Volatile and Semi-Volatile Organic Compounds
Former Unocal Service Station
20405 Redwood Road, Castro Valley, California
(Concentrations in mg/kg)

Well	Depth	Phenanthrene	Fluoranthene	Pyrene	bis(2-Ethylhexyl) phthalate
December 1989, Soil Investigation and Monitoring Well Installation					
MW-4*	5	-	-	-	-
	8.5	-	-	-	-
	13	-	-	-	-
November 1993, Soil Borings					
SP-2*	1	-	-	-	-
SP-1*	16	-	-	-	-
November 1998, UST Removal					
WO	8	**0.10**	**0.17**	**0.22**	**0.6**
SUMP	4.5	<0.10	<0.10	<0.10	<0.50
August 1999, Waste Oil and Clarifier Sump Pit Sampling					
SUMP	7	<0.10	<0.10	<0.10	<0.50
WO	10	<0.10	**0.13**	**0.20**	**0.82**
September 1999, Waste Oil Pit Sampling					
WO	11.5	<0.10	<0.10	<0.10	<0.50

Notes:
-: Not analyzed
*: Samples were analyzed for VOCs by EPA Method 8260 only; none were detected above reportable detection limits

Table 3
Groundwater Monitoring Analytical Results
Petroleum Hydrocarbon Constituents
Former Unocal Service Station
20405 Redwood Road, Castro Valley, California
(Concentrations in µg/L)

Well	Date	TPHg	TPHd	Total Oil and Grease	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
MW-2	12/89	72	-	-	<0.5	<0.5	<0.5	<0.5	-
	8/90	180	-	-	21	3.9	7.2	28	-
	1/91	430	-	-	50	33	22	110	-
	4/91	4,800	-	-	640	520	140	790	-
	7/91	220	-	-	14	1	17	8	-
	10/91	170	-	-	2.9	ND	2.5	6	-
	1/92	5,200	-	-	480	870	160	860	-
	4/20/92	300	-	-	70	0.3	15	7	-
	7/9/92	84	-	-	10	ND	0.6	2.3	-
	10/8/92	ND	-	-	2.3	ND	2.3	3	-
	1/12/93	170	-	-	11	5.1	1.4	6.3	-
	3/4/93	720	-	-	110	32	67	28	-
	7/1/93	220	-	-	17	1.1	6	12	-
	10/19/93	98	-	-	4.0	ND	2.3	3.1	-
	1/12/94	130	-	-	13	3.4	4.9	9.2	-
	4/25/94	270	-	-	23	1.1	8.2	17	-
	7/28/94	180	-	-	14	0.7	5.8	12	-
	10/13/94	97	-	-	2.8	ND	2.9	1.8	-
	1/10/95	440	-	-	48	2.8	15	27	-
	4/19/95	480	-	-	72	2.8	47	22	-
	10/12/95	450	-	-	7.4	ND	5.1	5.5	-
	4/12/96	690	-	-	41	2.8	27	50	-
	10/8/96	180	-	-	9.4	0.5	7.2	9.4	1,400
	4/9/97	470	-	-	23	1.6	21	31.4	1,800
	11/5/97	360	-	-	6.8	0.64	4.7	8.2	1,200
	3/1/00	560	-	-	14	0.92	16	24	1,400
	9/00	180	-	-	0.89	ND	1	0.65	620
	3/22/01	1,000	-	-	ND	ND	ND	ND	1,300[1]/1,200
	8/23/01	160	-	-	22	1.5	17	27	690[1]/820
	3/02	140	-	-	2.6	0.31	2	1.7	420
	10/02	92	-	-	ND	ND	ND	ND	280
	03/03	IA	IA	IA	IA	IA	IA	IA	IA
	9/17/03	IA	IA	IA	IA	IA	IA	IA	IA
	11/20/08	IA	IA	IA	IA	IA	IA	IA	IA
	2/11/09*	<50	<50	-	<0.3	<0.3	<0.3	<0.3	62
	8/25/09	CNL	CNL	CNL	CNL	CNL	CNL	CNL	CNL
	8/4/10	CNL	CNL	CNL	CNL	CNL	CNL	CNL	CNL
	1/7/11	CNL	CNL	CNL	CNL	CNL	CNL	CNL	CNL
	4/8/11	<50	<50	-	0.4	<0.3	1.7	1.2	110
	10/13/11	430	220	-	<0.3	<0.3	<0.3	<0.4	400

BSK Associates Engineering & Laboratories

Table 3
Groundwater Monitoring Analytical Results
Petroleum Hydrocarbon Constituents
Former Unocal Service Station
20405 Redwood Road, Castro Valley, California
(Concentrations in µg/L)

Well	Date	TPHg	TPHd	Total Oil and Grease	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
MW-3	12/89	<50	-	-	<0.5	<0.5	<0.5	<0.5	-
	8/90	290	-	-	55	3.8	20	59	-
	1/91	110	-	-	29	3.3	9.7	34	-
	4/91	3,600	-	-	450	270	150	760	-
	7/91	220	-	-	14	14	33	8.0	-
	10/91	ND	ND	ND	ND	ND	ND	ND	-
	1/92	60	-	-	4.0	10	2.0	8.0	-
	4/20/92	ND	-	-	1.0	0.4	ND	0.9	-
	7/9/92	ND	-	-	1.3	0.40	ND	1.3	-
	10/8/92	ND	-	-	2.1	ND	ND	0.30	-
	1/12/93	ND	-	-	1.2	1.0	0.60	4.1	-
	3/4/93	330	-	-	32	0.90	64	13	-
	7/1/93	330	-	-	24	11	14	82	-
	10/19/93	ND	-	-	5.0	ND	0.60	1.2	-
	1/12/94	69	-	-	13	3.4	4.9	9.2	-
	4/25/94	62	-	-	17	1.0	4.9	24	-
	7/28/94	52	-	-	7.2	0.4	1.6	4.6	-
	10/13/94	ND	-	-	0.9	ND	ND	ND	-
	1/10/95	250	-	-	26	0.60	14	45	-
	4/19/95	450	-	-	26	0.60	40	19	-
	10/12/95	340	-	-	9.0	3.9	8.5	34	-
	4/12/96	170	-	-	41	2.8	27	50	-
	10/8/96	79	-	-	3.8	1.5	2.1	6.8	55
	4/9/97	120	-	-	7.3	ND	3.3	5.4	230
	11/5/97	62	-	-	1.7	1.4	2.3	8.3	65
	3/1/00	96	-	-	0.61	ND	ND	ND	240
	9/00	ND	-	-	ND	ND	ND	ND	98
	3/22/01	ND	-	-	ND	ND	ND	ND	190
	8/23/01	ND	-	-	ND	ND	ND	ND	26
	3/02	ND	-	-	ND	ND	ND	ND	26
	10/02	ND	-	-	ND	ND	ND	ND	15
	3/03	IA	IA	IA	IA	IA	IA	IA	IA
	9/17/03	ND	-	-	ND	ND	ND	ND	13
	11/20/08	IA	IA	IA	IA	IA	IA	IA	IA
	2/11/09*	<50	<50	-	<0.3	<0.3	<0.3	<0.3	12
	8/25/09	CNL	CNL	CNL	CNL	CNL	CNL	CNL	CNL
	8/4/10	CNL	CNL	CNL	CNL	CNL	CNL	CNL	CNL
	1/7/11	CNL	CNL	CNL	CNL	CNL	CNL	CNL	CNL
	4/8/11	<50	<50	-	<0.3	<0.3	<0.3	<0.4	19
	10/13/11	<50	130	-	<0.3	<0.3	<0.3	<0.4	15

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Table 3
Groundwater Monitoring Analytical Results
Petroleum Hydrocarbon Constituents
Former Unocal Service Station
20405 Redwood Road, Castro Valley, California
(Concentrations in µg/L)

Well	Date	TPHg	TPHd	Total Oil and Grease	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
MW-4	12/89	<50	<100	<5,000	<0.5	<0.5	<0.5	<0.5	-
	08/90	ND	ND	ND	ND	ND	ND	ND	-
	1/91	-	-	-	-	-	-	-	-
	4/91	ND	ND	ND	ND	ND	ND	ND	-
	7/91	-	-	-	-	-	-	-	-
	10/91	ND	ND	ND	ND	ND	ND	ND	-
	1/92	-	-	-	-	-	-	-	-
	4/20/92	ND	ND	ND	ND	ND	ND	ND	-
	7/9/92	-	-	-	-	-	-	-	-
	10/8/92	ND	**120**	ND	ND	ND	ND	ND	-
	1/12/93	ND	ND	ND	ND	ND	ND	ND	-
	3/4/93	ND	ND	ND	ND	ND	ND	ND	-
	7/1/93	ND	ND	**1,000**	ND	ND	ND	ND	-
	10/19/93	ND	ND	ND	**0.40**	ND	ND	**0.40**	-
	4/25/94	ND	ND	ND	ND	ND	ND	**0.40**	-
	7/28/94	ND	**86**	ND	ND	**0.60**	ND	ND	-
	10/13/94	**70**	ND	ND	ND	**36**	ND	**1.3**	-
	1/10/95	ND	ND	**2,000**	ND	ND	ND	ND	-
	4/19/95	ND	ND	ND	ND	ND	ND	ND	-
	10/12/95	ND	ND	-	ND	ND	ND	ND	-
	4/12/96	ND	ND	-	ND	ND	ND	ND	-
	10/8/96	ND	ND	-	ND	ND	ND	ND	ND
	4/9/97	ND	ND	-	ND	ND	ND	ND	ND
	11/5/97	ND	ND	-	ND	ND	ND	ND	ND
	Abandoned December 1999.								

Table 3
Groundwater Monitoring Analytical Results
Petroleum Hydrocarbon Constituents
Former Unocal Service Station
20405 Redwood Road, Castro Valley, California
(Concentrations in µg/L)

Well	Date	TPHg	TPHd	Total Oil and Grease	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
MW-5	4/13/92	ND	-	-	ND	ND	ND	ND	-
	4/27/92	ND	-	-	ND	ND	ND	ND	-
	7/9/92	ND	-	-	ND	ND	ND	ND	-
	10/8/92	ND	-	-	ND	**0.40**	ND	ND	-
	1/12/93	ND	-	-	ND	ND	ND	ND	-
	3/4/93	ND	-	-	ND	ND	ND	ND	-
	7/1/93	ND	-	-	ND	ND	ND	ND	-
	10/19/93	ND	-	-	ND	ND	ND	ND	-
	4/25/94	ND	-	-	ND	**0.40**	ND	**1.0**	-
	7/94	-	-	-	-	-	-	-	-
	10/13/94	**87**	ND	ND	ND	**36**	ND	**1.3**	-
	1/95	-	-	-	-	-	-	-	-
	4/19/95	ND	-	-	ND	ND	ND	ND	-
	10/12/95	ND	-	-	ND	ND	ND	ND	-
	4/12/96	ND	-	-	ND	ND	ND	ND	-
	10/8/96	ND	-	-	ND	ND	ND	ND	ND
	4/9/97	ND	-	-	ND	ND	ND	ND	ND
	11/5/97	ND	ND	-	ND	ND	ND	ND	ND
	3/1/00	ND	-	-	ND	ND	ND	ND	ND
	9/00	ND	-	-	ND	ND	ND	ND	ND
	3/22/01	ND	-	-	ND	ND	ND	ND	ND
	8/23/01	NS	NS	NS	NS	NS	NS	NS	NS
	3/02	NS	NS	NS	NS	NS	NS	NS	NS
	10/02	NS	NS	NS	NS	NS	NS	NS	NS
	3/03	NS	NS	NS	NS	NS	NS	NS	NS
	9/17/03	NS	NS	NS	NS	NS	NS	NS	NS
	11/20/08 *	<50	<50	-	**0.31**	<0.3	<0.3	**0.38**	<5.0
	2/6/09*	<50	<50	-	<0.3	<0.3	<0.3	<0.3	<5.0
	8/25/09	<50	<50	-	<0.5	<0.5	<0.5	<0.5	<5.0
	8/4/10	<50	<100	-	<0.3	<0.3	<0.3	<0.3	<1.0
	1/7/11	<50	<50	-	<0.3	<0.3	<0.3	**0.64**	<1.0
	4/8/11	<50	<50	-	<0.3	<0.3	<0.3	<0.4	<0.5
	10/13/11	<50	**120**	-	<0.3	<0.3	<0.3	<0.4	<0.5

Table 3
Groundwater Monitoring Analytical Results
Petroleum Hydrocarbon Constituents
Former Unocal Service Station
20405 Redwood Road, Castro Valley, California
(Concentrations in µg/L)

Well	Date	TPHg	TPHd	Total Oil and Grease	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
MW-6	4/13/92	ND	-	-	ND	**0.30**	ND	ND	-
	4/27/92	ND	-	-	ND	ND	ND	ND	-
	7/9/92	ND	-	-	ND	ND	ND	ND	-
	10/8/92	ND	-	-	ND	ND	ND	ND	-
	1/12/93	ND	-	-	ND	ND	ND	ND	-
	3/4/93	ND	-	-	ND	ND	ND	ND	-
	7/1/93	ND	-	-	ND	ND	ND	ND	-
	10/19/93	ND	-	-	ND	ND	ND	ND	-
	4/25/94	ND	-	-	ND	**0.30**	ND	**0.40**	-
	7/94	-	-	-	-	-	-	-	-
	10/13/94	**160**	-	-	**0.40**	**140**	**0.5**	**2.3**	-
	1/95	-	-	-	-	-	-	-	-
	4/19/95	ND	-	-	ND	ND	ND	ND	-
	10/12/95	ND	-	-	ND	ND	ND	ND	-
	4/12/96	ND	-	-	**2.9**	**2.9**	ND	ND	-
	10/8/96	ND	-	-	ND	ND	ND	ND	**17**
	4/9/97	ND	-	-	ND	ND	ND	ND	ND
	11/5/97	ND	ND	-	ND	ND	ND	ND	**9.0**
	3/1/00	**78**	-	-	ND	**0.49**	ND	ND	**260**
	9/00	**54**	-	-	ND	ND	ND	ND	**170**
	3/22/01	**130**	-	-	ND	ND	ND	ND	**440**
	8/23/01	**79**	-	-	ND	ND	ND	ND	**280[1]/350**
	3/02	**91**	-	-	ND	ND	ND	ND	**370**
	10/02	**83**	-	-	ND	ND	ND	ND	**260**
	3/03	**61**	-	-	ND	ND	ND	ND	**200**
	9/17/03	**140**	-	-	ND	ND	ND	ND	**440**
	11/20/08 *	<50	<50	-	**0.81**	<0.3	<0.3	<0.3	**300**
	2/6/09*	**97**	<50	-	<0.3	<0.3	<0.3	<0.3	**200**
	8/25/09	NS	NS	NS	NS	NS	NS	NS	NS
	8/4/10	<50	<100	-	<0.3	<0.3	<0.3	<0.3	**54**
	1/7/11	<50	<50	-	<0.3	<0.3	<0.3	**0.44**	**40**
	4/8/11	<50	<50	-	<0.3	<0.3	<0.3	<0.4	**68**
	10/13/11	**99**	**85**	-	<0.3	<0.3	<0.3	<0.4	**95**

Table 3
Groundwater Monitoring Analytical Results
Petroleum Hydrocarbon Constituents
Former Unocal Service Station
20405 Redwood Road, Castro Valley, California
(Concentrations in µg/L)

Well	Date	TPHg	TPHd	Total Oil and Grease	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
MW-7	4/13/92	**1,300**	-	-	**0.40**	**0.30**	**0.30**	**0.9**	-
	4/27/92	**1,100**	-	-	ND	ND	ND	ND	-
	7/9/92	**830**	-	-	ND	ND	ND	ND	-
	10/8/92	**3,900**	-	-	ND	ND	ND	ND	-
	11/30/92	**2,700**	ND	-	-	-	-	-	-
	1/12/93	U	U	U	U	U	U	U	U
	1/93	**1,900**	-	-	ND	ND	ND	ND	-
	3/4/93	**830**	-	-	ND	ND	ND	ND	-
	7/1/93	**680**	-	-	ND	ND	ND	ND	-
	10/19/93	**360**	-	-	ND	ND	ND	**0.70**	-
	1/12/94	**330**	-	-	ND	ND	ND	ND	-
	4/25/94	**360**	-	-	ND	ND	ND	ND	-
	7/28/94	-	-	-	-	-	-	-	-
	10/13/94	-	-	-	-	-	-	-	-
	1/95	-	-	-	-	-	-	-	-
	4/19/95	-	-	-	ND	ND	ND	ND	-
	10/12/95	-	-	-	ND	ND	ND	ND	-
	4/12/96	-	-	-	ND	ND	ND	ND	-
	10/8/96	-	-	-	-	-	-	-	-
	4/9/97	-	-	-	-	-	-	-	-
	11/5/97	-	-	-	-	-	-	-	-
	3/1/00	ND	-	-	**890**	ND	ND	ND	ND
	9/00	**770**	-	-	**3.0**	**0.32**	**13**	**27**	ND
	3/22/01	**630**	-	-	ND	ND	ND	ND	ND
	8/23/01	**800**	-	-	ND	ND	ND	ND	**7.3[1]/ND**
	3/02	**280**	-	-	**0.35**	ND	**0.91**	**2.2**	**7.7**
	10/02	IA	IA	IA	IA	IA	IA	IA	IA
	3/03	IA	IA	IA	IA	IA	IA	IA	IA
	9/17/03	IA	IA	IA	IA	IA	IA	IA	IA
	11/20/08	**520**	**70**	-	<0.3	<0.3	<0.3	<0.3	<5.0
	2/6/09*	**400**	<50	-	<0.3	<0.3	<0.3	<0.3	<5.0
	8/25/09	IA	IA	IA	IA	IA	IA	IA	IA
	8/4/10	**430**	<100	-	<0.3	<0.3	<0.3	<0.3	<1
	1/7/11	**250**	<50	-	<0.3	<0.3	<0.3	<0.3	<1
	4/8/11	**130**	<50	-	<0.3	<0.3	<0.3	<0.4	<0.5
	10/13/11	IA	IA	IA	IA	IA	IA	IA	IA

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Table 3
Groundwater Monitoring Analytical Results
Petroleum Hydrocarbon Constituents
Former Unocal Service Station
20405 Redwood Road, Castro Valley, California
(Concentrations in µg/L)

Well	Date	TPHg	TPHd	Total Oil and Grease	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
MW-101	9/95	**9,400**	-	-	**170**	**94**	**150**	**710**	-
	3/01/00	**40,000**	-	-	**2,500**	**490**	**4,300**	**10,000**	**2,400[1]/1,400**
	9/00	**770**	-	-	**3.0**	**0.32**	**13**	**27**	-
	3/01	**34,000**	-	-	**1,400**	**62**	**3,400**	**7,700**	**970**
	8/23/01	**12,000**	-	-	**630**	ND	**1,500**	**480**	**1,400**
	3/02	**19,000**	-	-	**600**	**25**	**1,600**	**3,100**	**1,600[1]/870**
	10/02	**5,200**	-	-	**240**	**0.74**	**230**	**76**	**1,500[1]/1,400**
	3/03	**6,300**	-	-	**330**	ND	**440**	**370**	**1,400[1]/840**
	9/17/03	**3,000**	-	-	**150**	ND	**100**	**110**	**850[1]/1,100**
	11/20/08*	**2,800**	**5,400**	-	**61**	<0.3	**38**	**1.6**	**570**
	2/6/09*	<50	**3,600**	-	<0.3	<0.3	<0.3	<0.3	**630**
	8/25/09	**2,200**	**1,500**	-	**9.9**	<0.5	**14**	**5.6**	**440**
	8/4/10	**1,100**	<100	-	**11**	<0.3	**12**	**4.8**	**280**
	1/7/11	**1,600**	**2,300**	-	**75**	**0.72**	**150**	**110**	**420**
	4/8/11	**2,400**	**1,900**	-	**150**	**0.89**	**210**	**130**	**370**
	10/13/11	**1,300**	**2,800**	-	**37**	<0.3	**44**	**15**	**500**
SP-1	11/1993	**49,000**	-	-	**3,900**	**13,000**	**2,800**	**15,000**	-
SP-2	11/1993	**1,400**	-	-	**54**	**240**	**87**	**390**	-

Notes:
ND: Not detected.
<: Not detected above laboratory's indicated reportable detection limit.
NS: No sample collected.
IA: Well inaccessible at time of sampling.
CNL: Could not locate well.
U: Unavailable.
-: Not analyzed.
*: Other fuel oxygenates and 1,2-DCA not detected above 5 µg/L (50 µg/L for TBA).
[1]: MTBE by EPA method 8015/8020; otherwise by EPA Method 8260.

Table 4
Groundwater Monitoring Analytical Results
Volatile Organic Compounds
Former Unocal Service Station
20405 Redwood Road, Castro Valley, California
(Concentrations in µg/L)

Well	Date	Chlorobenzene	Chloroform	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloroethane	Tetrachloroethene	Trichloroethene
MW-2	3/4/93	<0.5	<0.5	<0.5	<0.5	**0.6**	<0.5	<0.5
	10/19/93	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-4	12/14/89	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5
	3/4/93	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	10/19/93	<0.5	<0.5	<0.5	<0.5	<0.5	**0.7**	**0.9**
MW-5	3/4/93	<0.5	<0.5	<0.5	<0.5	<0.5	**0.8**	<0.5
MW-6	3/4/93	<0.5	<0.5	<0.5	<0.5	<0.5	**3.5**	<0.5
MW-7	11/30/92	**2.0**	**2.0**	**180**	**1.5**	-	**14,000**	**660**
	3/4/93	-	<20	-	<20	<20	**3,700**	**210**
SP-1	11/18/93	unknown	unknown	**28**	**15**	**12**	**22**	**20**
SP-2	11/18/93	unknown	unknown	ND	ND	ND	ND	ND

Notes:
<: Not detected above laboratory's indicated reportable detection limit.
-: Not analyzed

Table 5
Summary of Groundwater Elevation Data
Former Unocal Service Station
20405 Redwood Road, Castro Valley, California

Well	Date Measured	Casing Elevation (Feet above MSL)	Depth to Groundwater (Feet)	Groundwater Elevation (Feet above MSL)
MW-101	09/95	U	U	-
	3/1/00		9.75	-
	09/00		U	-
	03/01		U	-
	08/23/01		9.70	-
	03/02		U	-
	10/02		U	-
	03/03		U	-
	9/17/03		9.80	-
	11/20/08		10.69	-
	2/6/09		10.46	-
	8/25/09		10.53	-
	8/4/10		11.47	-
	4/8/11		9.01	-
	10/13/11		10.41	-

Table 5
Summary of Groundwater Elevation Data
Former Unocal Service Station
20405 Redwood Road, Castro Valley, California

Well	Date Measured	Casing Elevation (Feet above MSL)	Depth to Groundwater (Feet)	Groundwater Elevation (Feet above MSL)
MW-2	12/89	U	U	-
	08/90		U	-
	01/91		U	-
	04/91		U	-
	07/91		U	-
	10/91		U	-
	01/92		U	-
	4/20/92	183.10	10.36	172.74
	7/9/92		10.65	172.45
	10/8/92	183.47	11.60	171.87
	1/12/93		9.11	174.36
	3/4/93		9.28	174.19
	7/1/93		10.37	173.10
	10/19/93		10.82	172.65
	1/12/94		10.66	172.81
	4/25/94		10.23	173.24
	7/28/94		10.70	172.77
	10/13/94		14.19	169.28
	1/10/95		8.12	175.35
	4/19/95		9.24	174.23
	10/12/95		10.66	172.81
	4/12/96		10.05	173.42
	10/8/96		10.61	172.86
	4/9/97		10.40	173.07
	11/5/97		10.88	172.59
	3/1/00		8.49	174.98
	09/00		U	-
	3/22/01		9.65	173.82
	8/23/01		9.65	173.82
	03/2002		U	-
	10/2002		U	-
	03/2003		IA	-
	9/17/03		IA	-
	11/20/08		IA	-
	2/11/09		U	-
	8/25/09		CNL	-
	8/4/10		CNL	-
	1/7/11		CNL	-
	4/8/11		9.35	174.12
	10/13/11		10.30	173.17

Table 5
Summary of Groundwater Elevation Data
Former Unocal Service Station
20405 Redwood Road, Castro Valley, California

Well	Date Measured	Casing Elevation (Feet above MSL)	Depth to Groundwater (Feet)	Groundwater Elevation (Feet above MSL)
MW-3	12/89	U	U	-
	08/90		U	-
	01/91		U	-
	04/91		U	-
	07/91		U	-
	10/91		U	-
	01/92		U	-
	4/20/92	183.52	10.34	173.18
	7/9/92		10.84	172.68
	10/8/92	184.03	11.96	172.07
	1/12/93		9.28	174.75
	3/4/93		9.53	174.50
	7/1/93		10.56	173.47
	10/19/93		11.04	172.99
	1/12/94		10.90	173.13
	4/25/94		10.37	173.66
	7/28/94		10.95	173.08
	10/13/94		14.37	169.66
	1/10/95		8.23	175.80
	4/19/95		9.54	174.49
	10/12/95		10.97	173.06
	4/12/96		10.06	173.97
	10/8/96		10.87	173.16
	4/9/97		10.40	173.63
	11/5/97		10.97	173.06
	3/1/00		8.68	175.35
	09/00		U	-
	3/22/01		10.22	173.81
	8/23/01		10.02	174.01
	03/02		U	-
	10/02		U	-
	03/03		U	-
	9/17/03		10.00	174.03
	11/20/08		IA	-
	2/11/09		U	-
	8/25/09		CNL	-
	8/4/10		CNL	-
	1/7/11		CNL	-
	4/8/11		9.66	174.37
	10/13/11		10.46	173.57

Table 5
Summary of Groundwater Elevation Data
Former Unocal Service Station
20405 Redwood Road, Castro Valley, California

Well	Date Measured	Casing Elevation (Feet above MSL)	Depth to Groundwater (Feet)	Groundwater Elevation (Feet above MSL)
MW-4	12/89	U	U	-
	08/90		U	-
	01/91		U	-
	04/91		U	-
	07/91		U	-
	10/91		U	-
	01/92		U	-
	4/20/92		10.89	-
	7/9/92	184.33	10.65	173.68
	10/8/92	184.61	12.78	171.83
	1/12/93		9.67	174.94
	3/4/93		10.20	174.41
	7/1/93		11.41	173.20
	10/19/93		11.92	172.69
	4/25/94		10.94	173.67
	7/28/94		11.74	172.87
	10/13/94		15.31	169.30
	1/10/95		8.02	176.59
	4/19/95		9.97	174.64
	10/12/95		11.70	172.91
	4/12/96		10.33	174.28
	10/8/96		11.65	172.96
	4/9/97		10.93	173.68
	11/5/97		11.82	172.79

MW-4 abandoned December 1999.

Table 5
Summary of Groundwater Elevation Data
Former Unocal Service Station
20405 Redwood Road, Castro Valley, California

Well	Date Measured	Casing Elevation (Feet above MSL)	Depth to Groundwater (Feet)	Groundwater Elevation (Feet above MSL)
MW-5	4/27/92	183.62	11.72	171.90
	7/9/92		12.24	171.38
	10/8/92	183.92	13.24	170.68
	1/12/93		10.30	173.62
	3/4/93		10.53	173.39
	7/1/93		11.85	172.07
	10/19/93		12.32	171.60
	4/25/94		11.58	172.34
	07/94		U	-
	10/13/94		15.71	168.21
	01/95		U	-
	4/19/95		10.41	173.51
	10/12/95		12.12	171.80
	4/12/96		10.85	173.07
	10/8/96		12.00	171.92
	4/9/97		11.40	172.52
	11/5/97		12.19	171.73
	3/1/00		9.45	174.47
	09/00		U	-
	3/22/01		11.04	172.88
	8/23/01		11.06	172.86
	03/02		NS	-
	10/02		NS	-
	03/03		NS	-
	9/17/03		11.03	172.89
	11/20/08		11.80	172.12
	2/6/09		11.56	172.36
	8/25/09		11.90	172.02
	8/4/10		11.61	172.31
	1/7/11		10.45	173.47
	4/8/11		10.26	173.66
	10/13/11		11.53	172.39

Table 5
Summary of Groundwater Elevation Data
Former Unocal Service Station
20405 Redwood Road, Castro Valley, California

Well	Date Measured	Casing Elevation (Feet above MSL)	Depth to Groundwater (Feet)	Groundwater Elevation (Feet above MSL)
MW-6	4/27/92	U	11.90	171.80
	7/9/92	183.70	12.34	171.36
	10/8/92	183.96	13.3	170.66
	1/12/93	183.60	10.59	173.01
	3/4/93		10.86	172.74
	7/1/93		12.00	171.60
	10/19/93		12.48	171.12
	4/25/94		11.86	171.74
	07/94		U	-
	10/13/94		15.87	167.73
	01/95		U	-
	4/19/95		10.70	172.90
	10/12/95		12.32	171.28
	4/12/96		11.09	172.51
	10/8/96		12.19	171.41
	4/9/97		11.70	171.90
	11/5/97		12.33	171.27
	3/1/00		9.73	173.87
	09/00		U	-
	3/22/01		11.01	172.59
	8/23/01		11.21	172.39
	03/02		U	-
	10/02		U	-
	03/03		U	-
	9/17/03		11.50	172.10
	11/20/08		12.10	171.50
	2/6/09		11.83	171.77
	8/25/09		Dry	-
	8/4/10		12.85	170.75
	1/7/11		10.75	172.85
	4/8/11		10.59	173.01
	10/13/11		11.81	171.79

Table 5
Summary of Groundwater Elevation Data
Former Unocal Service Station
20405 Redwood Road, Castro Valley, California

Well	Date Measured	Casing Elevation (Feet above MSL)	Depth to Groundwater (Feet)	Groundwater Elevation (Feet above MSL)
MW-7	4/27/92	182.52	10.97	171.55
	7/9/92		11.43	171.09
	10/8/92	182.78	12.40	170.38
	11/30/92		12.00	170.78
	1/12/93		9.51	173.27
	01/93		U	-
	3/4/93		9.88	172.90
	7/1/93		11.07	171.71
	10/19/93		11.55	171.23
	1/12/94	182.42	11.36	171.06
	4/25/94		10.85	171.57
	7/28/94		NS	-
	10/13/94		NS	-
	01/95		U	-
	4/19/95		9.66	172.76
	10/12/95		11.34	171.08
	4/12/96		10.06	172.36
	10/8/96		11.16	171.26
	4/9/97		11.70	170.72
	11/5/97		11.36	171.06
	3/1/00		8.72	173.70
	09/00		U	-
	3/22/01		10.04	172.38
	8/23/01		10.18	172.24
	03/02		U	-
	10/02		IA	-
	03/03		IA	-
	9/17/03		IA	-
	11/20/08		11.05	171.37
	2/6/09		10.76	171.66
	8/25/09		IA	-
	8/4/10		10.76	171.66
	1/7/11		9.67	172.25
	4/8/11		9.49	172.93
	10/13/11		IA	-

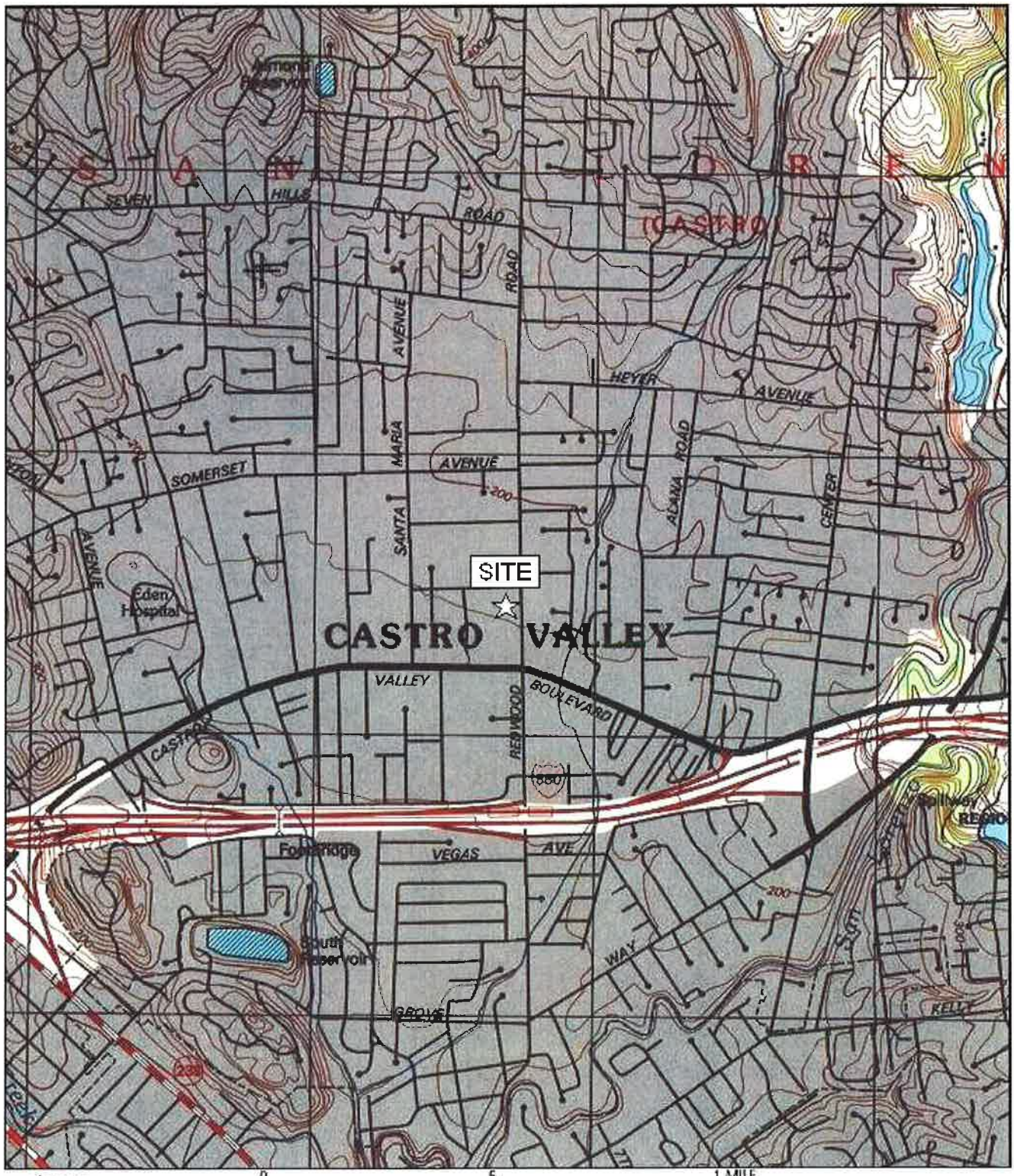
Notes:
IA: Well Inaccessible
CNL: Could not locate well
NS: Well Not Sampled
U: Data Unavailable
-: Unable to calculate elevation

Table 6
Summary of Groundwater Flow Direction and Gradient Data
Former Unocal Service Station
20405 Redwood Road, Castro Valley, California

Date	Flow Direction	Gradient (Feet/Foot)
11/1/92	Southeast	0.006
1/27/93	Southeast	0.01
3/4/93	Southeast	0.01
7/1/93	Southeast	0.01
10/19/93	South	0.005
1/12/94	South	0.001
5/13/94	Southwest	0.007
10/13/94	South	0.001
1/31/95	South	0.002
5/17/95	South	0.009
10/30/95	South	0.007
4/12/96	South	0.008
11/5/96	South	0.008
4/9/97	South	0.01
8/23/01	South	0.008
9/17/03	Southeast	0.01
11/20/08	Southeast	0.01
2/5/09	South-southeast	0.01
8/25/09	-	-
8/4/10	East-southeast	0.01
1/7/11	South-southeast	0.02
4/8/11	South-southeast	0.01
10/13/11	South-southeast	0.01

Notes:
-: Unable to calculate flow direction

FIGURES



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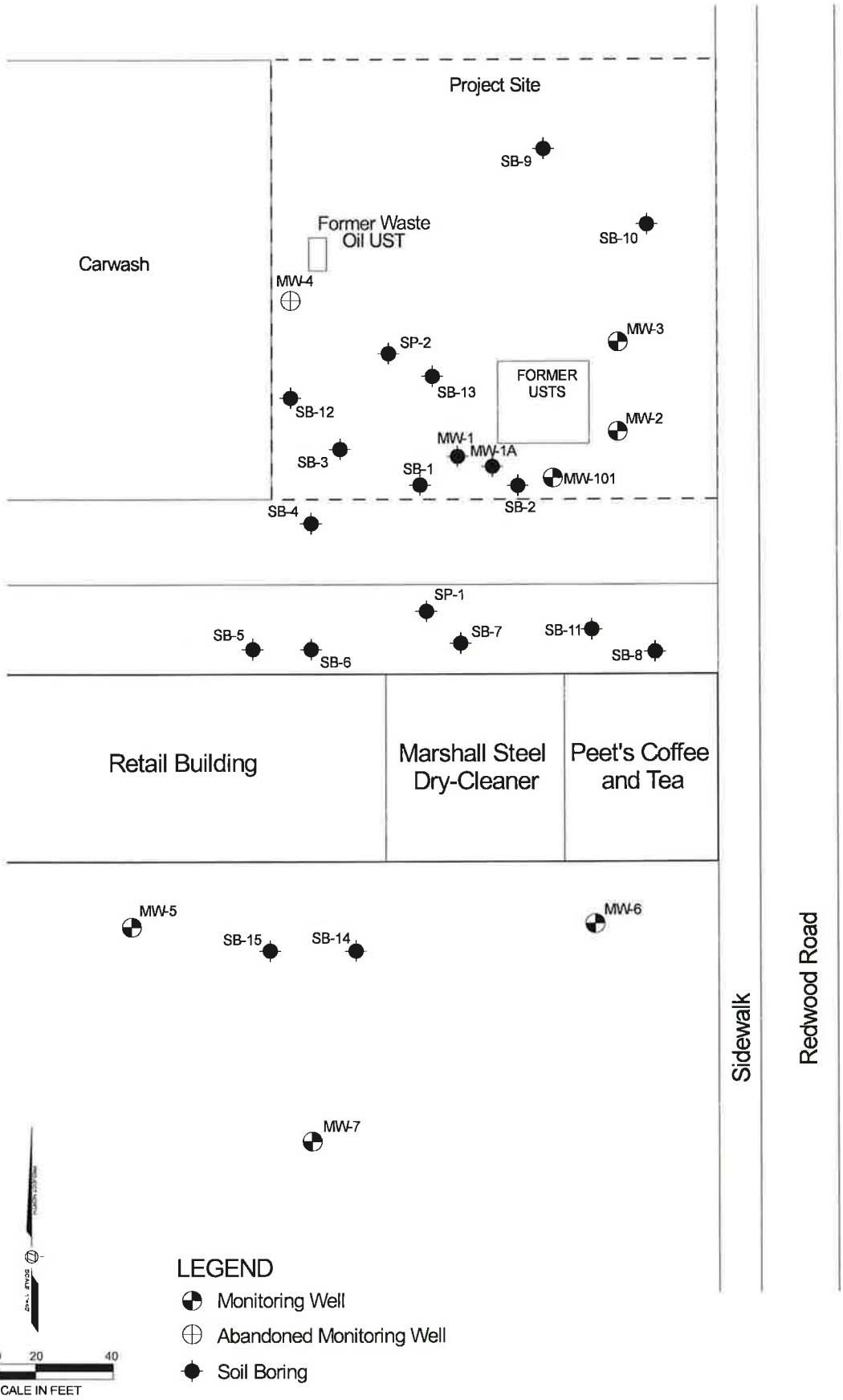
SITE VICINITY

FORMER UNOCAL SERVICE STATION
20405 REDWOOD ROAD
CASTRO VALLEY, CALIFORNIA

FIGURE 1

PROJECT: E0805401S



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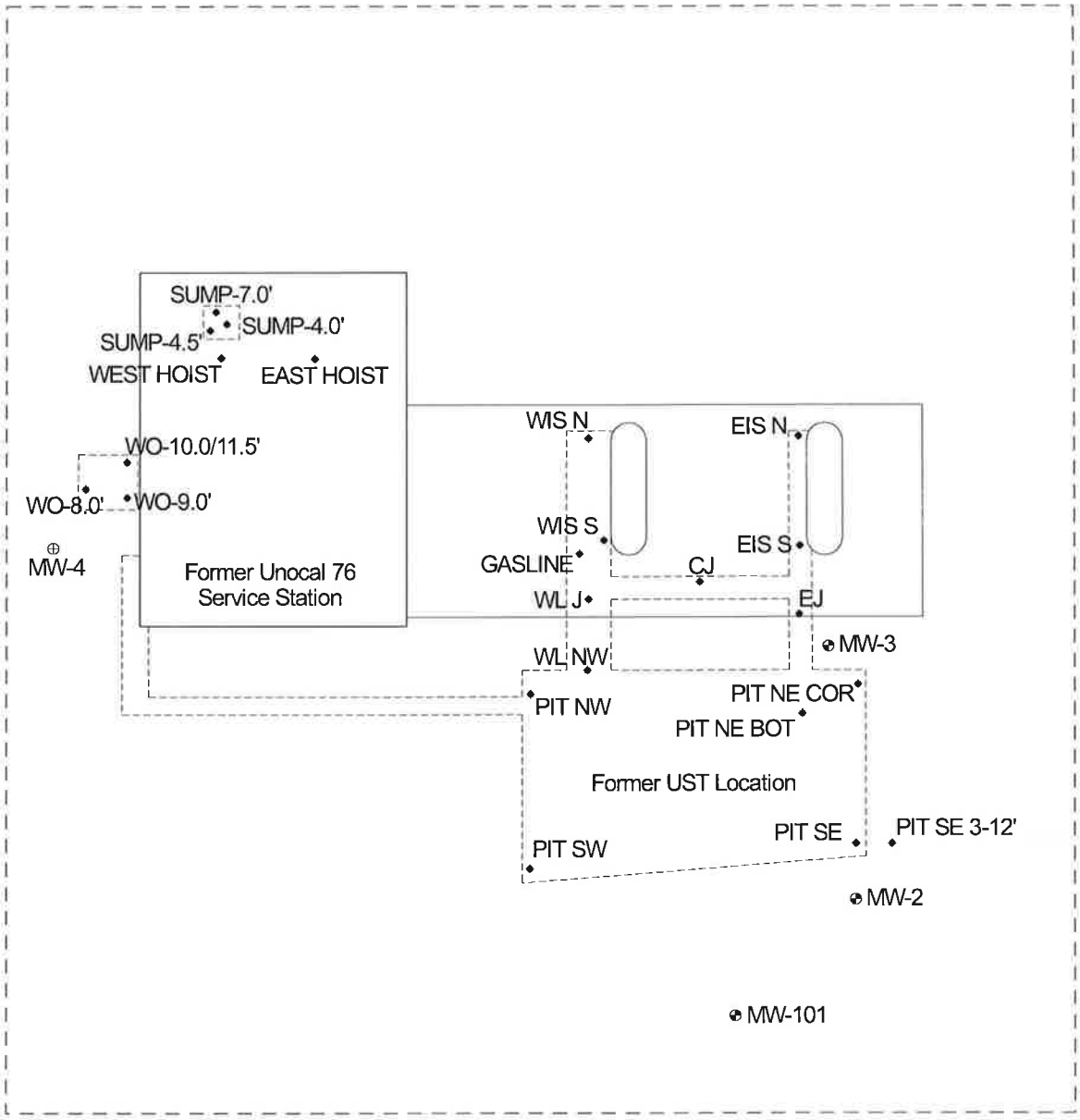
SITE PLAN

FORMER UNOCAL SERVICE STATION
20405 REDWOOD ROAD
CASTRO VALLEY, CALIFORNIA

FIGURE 2

PROJECT: E0805401S

DATE: 1/6/10



0 5 10 20
SCALE IN FEET

LEGEND	
◆	Soil Sample Location
⬚	Approximate Extent of Excavation
◉	Monitoring Well Location
⊕	Abandoned Monitoring Well Location

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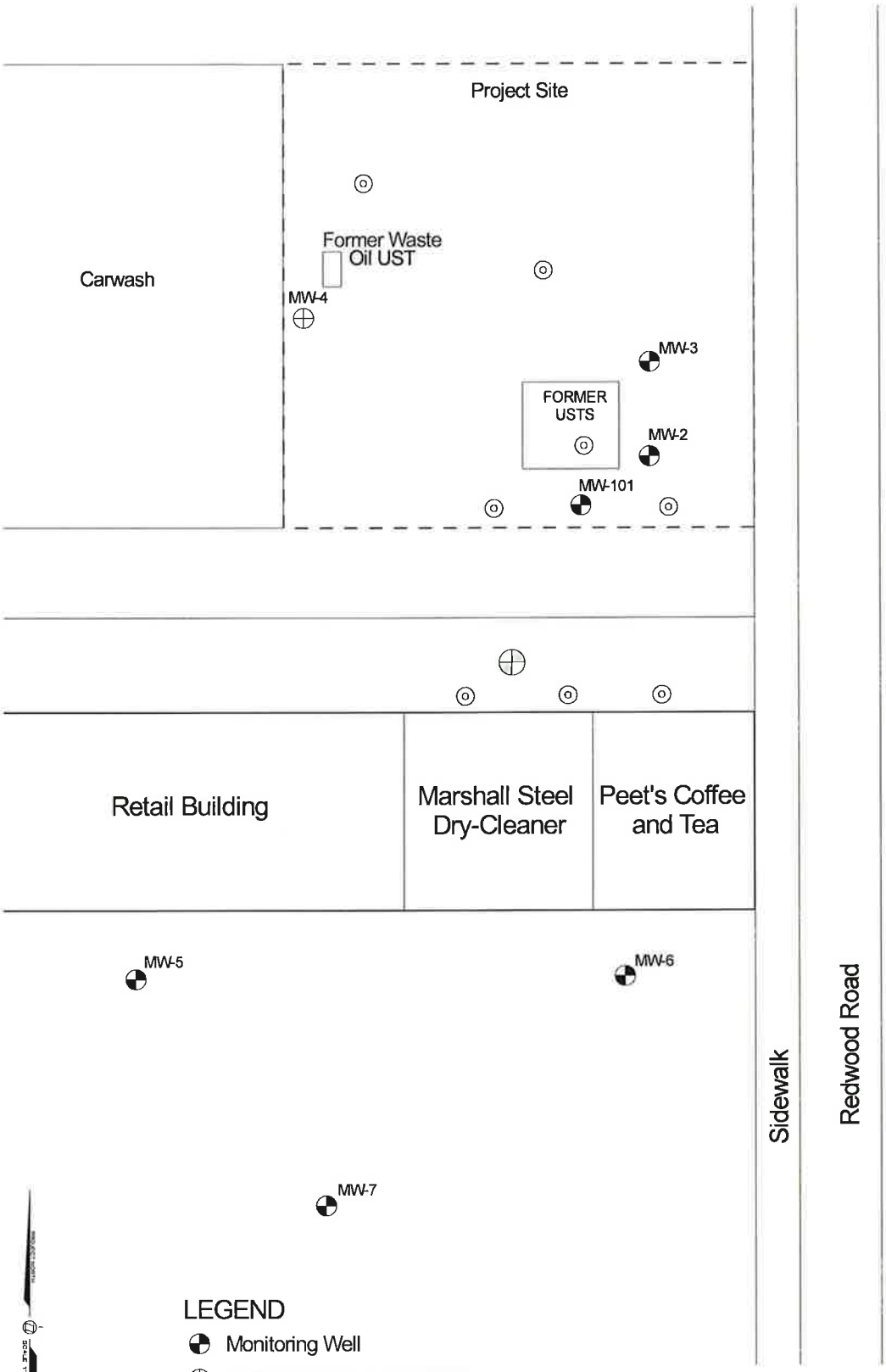
EXTENT OF EXCAVATIONS AND EXCAVATION SOIL SAMPLE LOCATIONS

FORMER UNOCAL SERVICE STATION
20405 REDWOOD ROAD
CASTRO VALLEY, CALIFORNIA

FIGURE 3

PROJECT: E0805401S

DATE: 2/12/09



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Proposed Sampling and Well Locations

FORMER UNOCAL SERVICE STATION
20405 REDWOOD ROAD
CASTRO VALLEY, CALIFORNIA

FIGURE 4

PROJECT: E0805401S

DATE: 1/20/12

APPENDIX A

STANDARD OPERATING PROCEDURE
SOIL GAS SAMPLING USING USEPA METHOD TO-15

1.0 SCOPE AND APPLICATION

This standard operating procedure (SOP) for soil gas sampling describes the procedures to collect soil gas samples for the analysis of volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method TO-15 (TO-15). The TO-15 method uses one- or six-liter Summa passivated stainless-steel canisters. The whole-air sample will be analyzed for VOCs using a quadruple or ion-trap gas chromatograph/mass spectrometer (GC/MS) system to provide compound detection limits of 0.5 parts per billion volume (ppbv) or lower.

The following sections list the necessary equipment and provide detailed instructions for collecting soil gas samples from previously-installed permanent or temporary soil gas probes.

2.0 EQUIPMENT LIST

The equipment required for soil gas sample collection is presented below:

- One-liter, certified-clean Summa canisters (one for each sample to be collected).
- Six-liter Summa canisters for line purging.
- Laboratory-provided, pre-cleaned sampling manifolds (one for each sample to be collected). The manifolds provided by Air Toxics, Ltd. have built-in flow restrictors that are calibrated to 167 mL/min., in-line particulate filters and pressure gauges.
- Helium gas canister.
- Field helium detector.
- Plastic shroud.
- Chain-of-custody forms.
- Field sample logs.
- Crescent wrenches (at least two).

3.0 SAMPLING CARE

Care shall be used during all aspects of sample collection to ensure that sampling error is minimized and high-quality data are obtained. For example, the technician should pay close attention to sample train connections during equipment set-up to reduce the chance of leakage during purging and sampling. Also, field personnel shall avoid actions that could potentially cause sample contamination, such as setting up equipment next to a running vehicle, using permanent marking pens during sampling, and wearing freshly dry-cleaned clothing or personal fragrances. To minimize the chance of cross-contamination between samples, do not reuse tubing or manifolds.

4.0 PROCEDURES

Prior to collecting the soil vapor samples, the following information, obtained from a suitable source, shall be recorded on the field sampling logs:

- wind speed and direction;
- ambient temperature;
- barometric pressure; and
- relative humidity.

Sample Apparatus Set-Up:

Connect a six-liter Summa purge canister and a one-liter certified-clean Summa sample canister to the sampling manifold. Figure VI-1 shows the general make-up of the sampling apparatus.

Sample Apparatus Leak Check:

Confirm that there is a brass cap secured at the inlet of the manifold creating an air tight train and make sure all connections are tight and Summa canisters cannot twist or wiggle in relation to the sampling manifold. Open the manifold valve above the purge canister, and quickly open and close the purge canister valve. Watch the needle on the pressure gauge for approximately 30 seconds. If the needle on the gauge drops, the sample train is not airtight. If this occurs, refit and/or tighten the connections, and conduct the leak check procedure again.

Purging Procedure:

Once the sample train is airtight, remove the brass cap from the manifold inlet, connect the tubing from the sample port using a compression fitting and ferrule. Once the connection is secure, open the manifold valve and the purge canister valve one-half turn. The line will not purge faster than at a rate of 167mL/min.

Once the desired purge volume is met (approximately two to three tubing-volumes), close both the manifold valve and the purge canister valve. If sampling at multiple locations, the purge canister can be disconnected from the manifold and used to begin purging the next sample location without compromising the sample.

Shroud Set-Up:

Helium gas will be used as a tracer gas compound during the soil gas sampling process to evaluate potential leakage of atmospheric air into the Summa canisters. After the purging is complete, place shroud over the borehole and sampling apparatus, making sure all connections, including the manifold, are enclosed within the shroud. The shroud opening should maintain close contact to the ground surface while sampling.

Place tubing from the helium canister into the shroud through the injection port in the shroud. Open the helium canister valve so that helium starts filling up the shroud. Insert the helium meter probe into the helium meter monitoring port in the shroud.

Sample Collection:

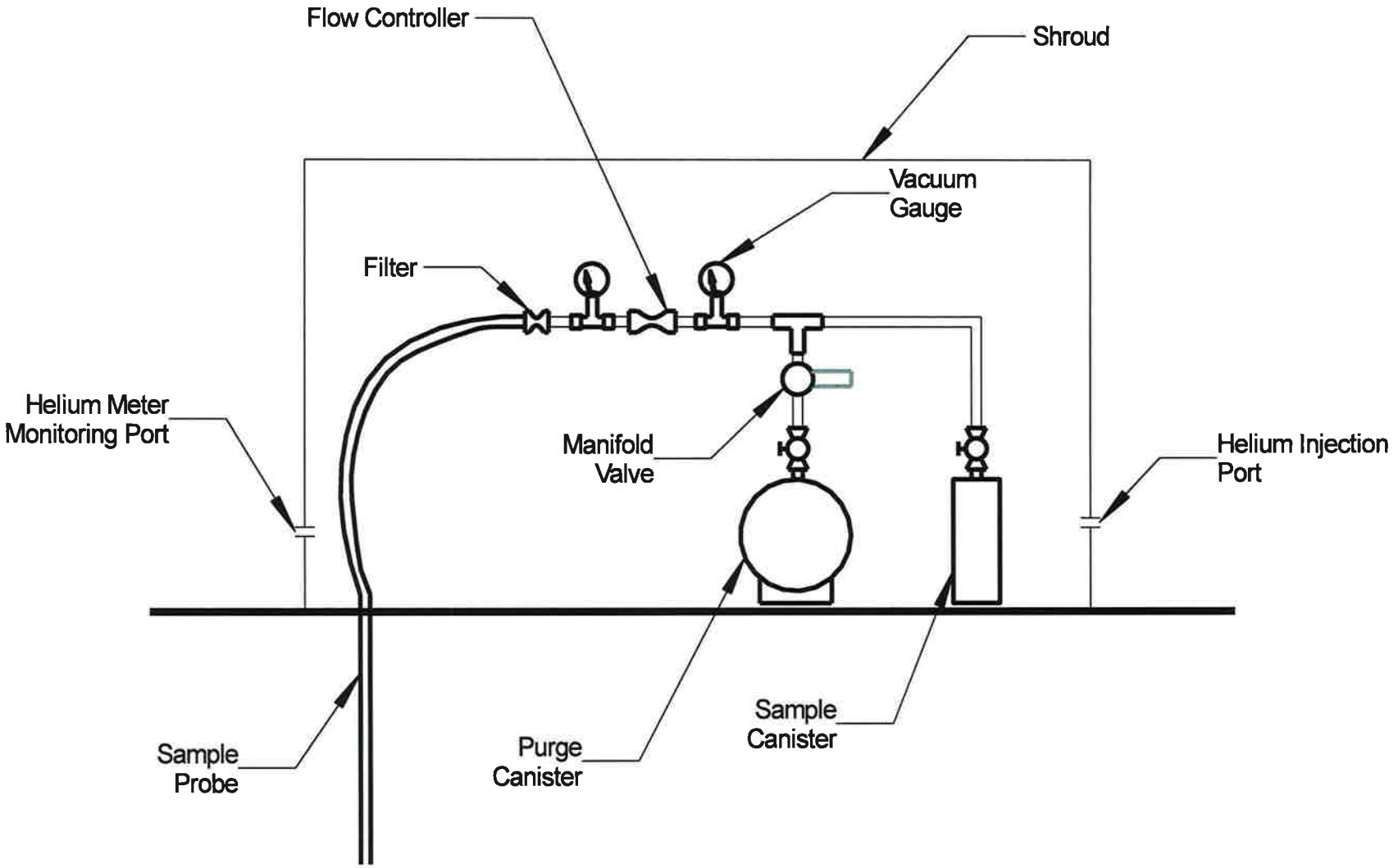
Double check that the manifold valve is closed and that all connections are still secure. Open the sample canister valve to begin sample collection. Monitor the sampling progress periodically. Record the helium concentration within the shroud by reading the field helium detector every minute. When the vacuum gauge downstream of the flow controller reaches approximately two inches of mercury (in. Hg), sampling is complete. Record the final vacuum of the sample canister by recording the reading on this gauge. Close the valve on the sample canister.

Disconnect the sample apparatus from the sample port tubing. Disconnect the sample canister from the manifold.. Replace and tighten the brass cap on to the sample canister inlet.

Fill out the canister sample tag with the sample ID, date and time of collection, and project name and number. Record the sample information on the chain-of-custody form.. Package the canisters and flow controllers in the shipping container supplied by the laboratory for delivery to the laboratory. The Summa canisters do not require preservation with ice or refrigeration during shipment.

5.0 DATA RECORDING AND MANAGEMENT

Measurements shall be recorded on the field sampling logs at the time of measurement with notations of project name, sample date, sample start and finish time, sample location, helium concentrations within the shroud, canister serial number, flow controller serial number, initial vacuum reading, and final pressure reading. Field sampling logs and chain-of-custody records will be referenced in the project report submitted to the Agencies.



BSK Associates Engineers & Laboratories

SOIL GAS SAMPLING EQUIPMENT SETUP

FIGURE 1

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