Atlantic Richfield Company

Chuck Carmel Environmental Business Manager

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RECEIVED

2:27 pm, Nov 12, 2010

Alameda County Environmental Health

Re: Feasibility Study Report Atlantic Richfield Company Station #6113 785 East Stanley Boulevard, Livermore, California ACEH Case #RO0000393

"I declare, that to the best of my knowledge at the present time, that the information and/or recommendations contained in the attached document are true and correct.

Submitted by,

November 12, 2010

Im

Chuck Carmel Environmental Business Manager

Attachment



Prepared for:

Mr. Chuck Carmel Environmental Business Manager Atlantic Richfield Company P.O. Box 1257 San Ramon, California 94583

FEASIBILITY STUDY REPORT

Atlantic Richfield Company Station No. 6113 785 East Stanley Blvd. Livermore, Alameda County, California ACEH Case No. RO0000393

Prepared by:

BROADBENT & ASSOCIATES, INC. ENGINEERING, WATER RESOURCES & ENVIRONMENTAL 1324 Mangrove Ave., Suite 212 Chico, California 95926 (530) 566-1400 www.broadbentinc.com

November 12, 2010

Project No. 06-82-637



November 12, 2010

Project No. 06-82-637

Atlantic Richfield Company P.O. Box 1257 San Ramon, CA 94583 Submitted via ENFOS

Attn.: Mr. Chuck Carmel

Re: Feasibility Study Report, Atlantic Richfield Company Station No. 6113, 785 East Stanley Boulevard, Livermore, Alameda County, California; ACEH Case #RO0000393

Dear Mr. Carmel:

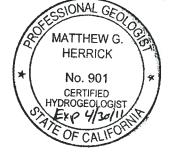
Broadbent & Associates, Inc. (BAI) is pleased to submit this *Feasibility Study Report* for Atlantic Richfield Company Station No. 6113 (herein referred to as Station #6113) located at 785 East Stanley Boulevard, Livermore, Alameda County, California (Site). This report was prepared in response to a directive letter from Mr. Paresh Khatri of Alameda County Environmental Health (ACEH) dated August 12, 2010.

Should you have questions or require additional information, please do not hesitate to contact us at (530) 566-1400.

Sincerely, BROADBENT & ASSOCIATES, INC.

Jason Duda Project Scientist

Matthew G. Herrick, P.G., C.HG. Senior Hydrogeologist



Enclosures

 cc: Mr. Paresh Khatri, ACEH (Submitted via ACEH ftp site)
 Mr. Paul M. Smith/Ms. Danielle Stefani, Livermore-Pleasanton Fire Department (submitted via GeoTracker)
 Electronic copy uploaded to GeoTracker

FEASIBILITY STUDY REPORT Atlantic Richfield Company Station No. 6113 785 East Stanley Boulevard, Livermore, California ACEH Case No. RO00000393

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FEASIBILITY STUDY REPORT Atlantic Richfield Company Station No. 6113 785 E. Stanley Boulevard., Livermore, California Fuel Leak Case No. RO00000393

1.0 INTRODUCTION

On behalf of the Atlantic Richfield Company, RM - a BP affiliated company, Broadbent & Associates, Inc. (BAI) has prepared this Feasibility Study Report for the Atlantic Richfield Company Station No. 6113, located at 785 E. Stanley Boulevard, Livermore, California (Site). This report was prepared in response to the request within the August 12, 2010 directive letter from Mr. Paresh Khatri of Alameda County Environmental Health (ACEH). The directive letter specifically requested the preparation of a Feasibility Study and Corrective Action Plan to evaluate possible cleanup alternatives for the Site. A copy of the ACEH letter is provided in Appendix A along with deadline extension approval correspondence. This report includes discussions on the site background and previous environmental activities, regional and Site geology and lithology, cleanup levels and goals, discussion of various remediation technologies, and the recommended alternative. Tables, figures, and appendices referenced within this report are provided following the conclusion of the document's text.

2.0 BACKGROUND INFORMATION

The Property is currently an active gasoline station and convenience store located at the southwestern corner of Murrieta Avenue and East Stanley Avenue in Livermore. The land use in the immediate vicinity of the Site is mixed commercial and residential. A site vicinity map is provided in Drawing 1.

On January 26, 1989, Pacific Environmental Group, Inc. (Pacific) oversaw the removal of one 280-gallon waste oil tank from the southern portion of the property, behind the location of the former station building. Soil samples (WO-1, WO-1, WOSW-N, and WOSW-N2) were collected from the excavation at depths ranging between approximately five and 8.5 feet below ground surface (bgs). Over-excavation occurred within the tank cavity following receipt of the initial soil sampling analytical data. The amount of soil removed during excavation activities was not stated within the report. A summary of analytical results and sampling locations from this investigation are provided in Appendix B.

In September 1989, Applied Geosystems installed three ground-water monitoring wells (MW-1, MW-2, and MW-3) on-site. Well locations, boring and well construction logs, and soil and ground-water analytical data from the installation activities are provided in Appendices B and C.

In February 1991, Applied Geosystems installed one ground-water monitoring well (MW-4) down-gradient of the former waste oil tank location. The well location, boring and well construction log, and soil and ground-water analytical data from the installation activities are provided in Appendices B and C.

In June and August 1992, RESNA Industries, Inc. (RESNA) installed five ground-water monitoring wells (MW-5 through MW-9) and two vapor extraction wells (VW-1 and VW-2), in order to evaluate the feasibility of vapor extraction as a soil remediation alternative. Boring

B-10 was also installed near the former waste oil tank but was not completed as a well. The well locations, boring and well construction logs, and soil and ground-water analytical data from the installation activities are provided in Appendices B and C.

In August 1992, RESNA conducted a vapor extraction test (VET) on-site utilizing VW-1, VW-2, and MW-5 as extraction wells and MW-3, MW-4, MW-5, MW-6, MW-7, and MW-9 as observation wells. Two potential soil zones for remedial efforts were identified during drilling and testing activities: Zone A comprised of low permeable silty clays, silty sands, and gravelly silts and clays occurring between approximately 20 and 50 feet bgs and Zone B comprised of permeable sandy gravel below approximately 50 feet bgs. Hydrocarbon concentrations obtained from the laboratory analyses of vapor samples suggest that residual hydrocarbon contamination is present within the vicinity of the gasoline USTs. The VET indicated that the estimated radius of influence (ROI) was approximately 15 to 20 feet for wells VW-1 and VW-2 screened within Zone A and approximately 75 feet within Zone B. RESNA concluded that soil vapor extraction would be a viable remedial method based on the results of the VET. Soil and vapor analytical data and vapor extraction testing data are provided in Appendix D.

Between December 1992 and March 1993, Roux Associates oversaw the removal and replacement of the underground product piping on-site. Soil samples collected after removal activities indicated the minor presence of hydrocarbon impacted soil. Hydrocarbons were not detected above laboratory reporting limits in the soil sample collected after over-excavation activities were conducted. Approximately 288 cubic yards of soil were disposed of at the Browning Ferris Industries Class III landfill in Livermore, California. During construction activities, underground infrastructure for the planned on-site vapor and groundwater treatment system were also installed. Soil sample locations and analytical data are provided in Appendix B.

In March 1993, RESNA installed one on-site groundwater monitor well (MW-10) within boring B-17 and two off-site groundwater monitor wells (MW-11 and MW-12) within borings B-18 and B-19, respectively. Soil boring and construction logs are provided in Appendices B and C.

In June 1993, RESNA installed two additional vapor extraction wells (VW-3 and VW-4) within borings B-13 and B-14. Soil analytical data and boring and construction logs are provided in Appendices B and C.

In July 1993, RESNA submitted a *Remedial Action Plan* that proposed the design and installation of a vapor extraction system as an interim remedial measure. The report also stated that future air sparge pilot testing would be conducted following installation of one air sparge well. RESNA stated that if the results of the pilot test were favorable, air sparge would be incorporated into the remediation system design. If results were unfavorable, a groundwater extraction and treatment system would be installed on-site. A report documenting installation of an air sparge well or completion of air sparge pilot testing was not located.

In December 1993, RESNA oversaw installation of a soil vapor extraction (SVE) system on-site. Due to an increase in groundwater elevations which submerged the SVE well screen intervals, the SVE system was not activated. A report documenting installation of the SVE system could not be found.

In December 2000, Cambria Environmental Technology, Inc. (Cambria) oversaw the abandonment of wells VW-3 and MW-5 in preparation for UST, dispenser island, and underground piping replacement. Abandonment of the wells was necessary due to their proximity to the UST complex and dispenser islands.

In January 2001, Cambria oversaw the removal and replacement of three USTs, associated underground piping, and dispenser islands at the Site. Soil samples were collected from beneath the product piping, dispenser islands and USTs. Hydrocarbon impacted soil was observed in several of the soil samples collected with the highest concentrations observed at the bottom of the UST excavation at approximately 17 to 18 feet bgs. Approximately 1,425 tons of soil was removed and disposed during the excavation activities. Sampling locations and laboratory analytical data are provided in Appendix B.

In November 2001, Cambria oversaw the installation of replacement groundwater monitor well MW-13. Soil analytical and the boring and well construction log are provided in Appendices B and C.

In 2006, URS oversaw the installation of a bio-sparge system on-site in accordance with a settlement agreement between Northern California River Watch and Atlantic Richfield Company. Mobile air injection events were initiated on wells MW-4, MW-13, and VW-1 at a frequency of approximately twice per month.

Wells MW-1 and MW-8 were properly abandoned in June 2008 and wells MW-3, MW-6, MW-10, and MW-13 were properly abandoned in September 2008. Abandonment of the wells were necessary prior to initiation of construction activities associated with the scheduled station raze and rebuild. Abandonment of wells MW-1 and MW-8 were required as these wells were within the footprint of the new station building. Abandonment of wells MW-6, MW-10, and MW-13 were necessary to allow for the widening of East Stanley Boulevard and abandonment of MW-3 was completed as the well was within the construction demolition area of the Property. Operation of the biosparge system was also discontinued in September 2008 in advance of station raze and rebuild activities. During raze and rebuild activities the remediation compound was relocated on the site and existing remediation system piping was extended to the new compound. Raze and rebuild construction activities were completed in 2009.

In March 2010, BAI oversaw installation of well RMW-13, which serves as a replacement for previously abandoned wells MW-6 and MW-13. The soil analytical data and boring and well construction logs are provided in Appendices B and C.

To date, a total of 18 ground-water monitoring and vapor extraction wells have been installed at the Site and in the Site vicinity. These include 14 ground-water monitoring wells, 12 of which are on-site (MW-1 through MW-10, MW-13, and RMW-13) and two off-site (MW-11 and MW-12). Four on-site vapor extraction wells (VW-1 through VW-4) have been installed on-site. Wells MW-1, MW-3, MW-5, MW-6, MW-10, MW-13, and VW-3 have been abandoned. A quarterly ground-water monitoring program was initiated at the Site in June 1990 and is ongoing with a modified sampling schedule. Since the first quarter of 1997, the monitoring program at the Site began operating on a semi-annual basis. Currently, wells MW-2, MW-4, MW-7, MW-9, MW-11, MW-12, RMW-13, VW-1, VW-2, and VW-4 are monitored semi-annually (second and

fourth quarters) and wells MW-4, MW-7, MW-11, MW-12, RMW-13, and VW-1 are sampled semi-annually (second and fourth quarters), while well MW-9 is sampled annually (fourth quarter). Ground-water analytical data are provided in Tables 1-3 and Appendix B. A Ground-Water Elevation Contour and Analytical Summary Map depicting current well locations and data from the Second Quarter 2010 ground-water monitoring event conducted on April 12, 2010 are provided as Drawing 2.

3.0 SITE GEOLOGY AND HYDROGEOLOGY

According to the California Groundwater, Bulletin 118 (California Department of Water Resources, January 2006), the Site is located within Livermore Valley, which lies about 40 miles east of San Francisco and 30 miles southwest of Stockton within a structural trough of the Diablo Range. The groundwater basin extends from the Pleasanton Ridge east to the Altamont Hills (about 14 miles) and from the Livermore Upland north to the Orinda Upland (about 3 miles). Surface drainage features include Arroyo Valley, Arroyo Mocho, and Arroyo las Positas as principal streams, with Alamo Creek, South San Ramon Creek, and Tassajara Creek as minor streams. The nearest surface water drainage to the Site is Arroyo Mocho, located adjacent to the south and east sides of the site. All streams converge on the west side of the basin to form Arroyo de la Laguna, which flows south and joins Alameda Creek in Sunol Valley. Some geologic structures restrict the lateral movement of groundwater, but the general groundwater gradient is to the west, then south towards Arroyo de la Laguna. Elevations within the basin range from about 600 ft in the east, near the Altamont Hills, to about 280 ft in the southwest, where Arroyo de la Laguna flows into Sunol Groundwater Basin. Average annual precipitation ranges from 16 inches on the valley floor to more than 20 inches along the southeast and northwest basin margins.

The entire floor of Livermore Valley and portions of the upland areas on all sides of the valley overlie groundwater-bearing materials. The materials are continental deposits from alluvial fans, outwash plains, and lakes. They include valley-fill materials, the Livermore Formation, and the Tassajara Formation. Under most conditions, the valley-fill and Livermore sediments yield adequate to large quantities of groundwater to all types of wells. The quality of water produced from these rocks ranges from poor to excellent, with most waters in the good to excellent range.

The Holocene age surficial valley-fill materials range in thickness from a few tens of feet to nearly 400 feet. They occur as stream channel deposits, alluvium, alluvial fan deposits, and terrace deposits, and are composed of unconsolidated sand, gravel, silt, and clay. In the central and southern portions of the valley, 50 to 80 percent of the valley-fill is comprised of aquifer material that yields significant quantities of water to wells. Clay deposits up to 40 feet thick cap the valley-fill in the western part of the Basin; where deep wells draw groundwater from underlying aquifer material. Several gravel extraction pits have been dug into the upper portions of the valley fill material near the central portion of the basin. Dewatering activities related to the mining change ground water flow patterns and locally limit the storage capacity of the basin. A gravel extraction pit complex is located approximately one mile west of the Site. Mining activities are scheduled to cease by 2030.

The Plio-Pleistocene Livermore Formation is primarily exposed over the south and southwest regions of the Livermore Valley groundwater basin, but occurs almost everywhere beneath the surface at depths up to 400 feet. This formation is up to 4,000 feet thick and consists of unconsolidated to semi-consolidated beds of gravel, sand, silt, and clay. Limey concretions are fairly common in its lower portion, and tuffaceous beds are present at its base. Erosion of Jurassic and Cretacious rocks to the south of the basin produced the coarse-grained Livermore Formation. These grains consist of black to red chert, micaceous sandstone, black shale, and quartizite. Deep wells in the eastern half of the basin produce from the Livermore Formation. Upland wells to the South have limited groundwater yields. Generally, yields are adequate for most irrigation, industrial, or municipal purposes.

The Site elevation is approximately 460 feet above mean sea level, where regional topography slopes to the west (USGS Topographic Map, Livermore Quadrangle – 7.5 Minute Series). The topography of the surrounding area is characterized by the Livermore valley and surrounding mountains. The regional surface and ground-water flow is generally to the west, towards San Francisco Bay. The historical ground-water flow direction at the Site has been generally to the north (Table 3). The hydraulic gradient has ranged between 0.008 to 0.031 feet per foot since 1995 (Table 3). During this same time period, depth-to-water measurements have varied significantly and ranged from approximately 11 to 44 feet bgs (Table 1).

The Site is typically underlain by silty sand, sand with clay, and clayey silt to depths to approximately 18 to 20 feet bgs. Geologic cross sections (Appendix C) show silty sand and silty gravel lenses from approximately 18 to 24 feet bgs. Sandy clays, sandy silts, and silty sands are encountered at depths of approximately 24 to 40 feet bgs beneath the Site. The lens of sandy clays, sandy silts, and silty sands is underlain by silty gravels, which extend to the total explored depth of all borings. Boring logs and historical geologic cross-sections are presented in Appendices C and E.

4.0 RISK ASSESSMENT

4.1 Site Conceptual Exposure Model

The Property is currently an active gasoline fueling station with a convenience store located at the southwestern corner of Stanley Boulevard and Murietta Boulevard in Livermore. The Site is open to the public. Station personnel, customers, and environmental professionals performing sampling or other relevant activities are allowed on-site. Review of historical investigation data indicates that the majority of soil and ground-water contamination associated with the Site is present at depths generally greater than eight feet bgs and is generally located near the USTs on the northeastern portion of the site. Public and general occupational exposure to residual sources of impacted soil and ground water is believed to be remote and/or of short duration.

4.2 Exposure Pathways

Potential exposure pathways associated with this Site include human inhalation, ingestion, and absorption risks by station personnel, customers, and environmental professionals. A remote but unknown potential exposure pathway might be human inhalation by tradesmen in the

underground utility installation and maintenance occupation. The likelihood of vapor migration has not been verified by a soil-gas investigation. However, the soil concentrations present in shallow soils would seem unlikely to present a viable exposure pathway of concern. Exposure pathways relating to current Site conditions and property use do not appear to be an issue at this time. However, future Site development could lead to an increased potential for vapor intrusion and increased human traffic.

4.3 Risk Assessment Status

A formal Risk Assessment has not been performed for this Site. Based on the geologic/ hydrogeologic characteristics and limited viable exposure pathways, consideration should be given to development of risk-based cleanup levels in lieu of strict adherence to Maximum Contaminant Levels for drinking water, Environmental Screening Levels, or California Human Health Screening Levels.

4.4 Identified Human Exceedances

Human exceedances are unknown at this time but unlikely due to the geologic/hydrogeologic characteristics and location of residual impacted soil and ground water.

4.5 Identified Ecological Exceedances

Ecological exceedances are unknown at this time but unlikely due to the geologic/hydrogeologic characteristics and location of residual impacted soil and ground water.

5.0 CLEANUP LEVELS AND GOALS

It is proposed to utilize the Environmental Screening Levels (ESLs) prepared by the San Francisco Bay Regional Water Quality Control Board (SFRWQCB) as the targeted cleanup levels for the Site. Based on current site conditions, the results of previous risk-based analyses conducted for the Site, and the fact that the City of Livermore does not have plans to use local shallow ground-water resources for drinking water purposes, the ESLs provide adequate guidelines for successful soil and ground-water cleanup at the Site. The table on the following page depicts current concentrations of the constituents of concern (COCs) along with their respective ESLs.

	Soil		Ground Wate	r
сос	Concentration (a)	ESL (b)	Concentration (c)	ESL (d)
	mg/kg	mg/kg	µg/L	µg/L
GRO	1,900	180	63,000	210
Benzene	2.1	2	7,800	46
Toluene	0.13	9.3	200	130
Ethylbenzene	22	4.7	1,600	43
Total Xylenes	52	8.4	6,400	100
MTBE	0.28	N/E	1,500	N/E

Notes:

(a) Soil concentrations based on highest observed values from RMW-13 installation in March of 2010.

(b) Applicable ESLs are from Table D, Deep Soils where ground water is not a current or potential drinking water source.

(c) Ground-water concentrations based on highest observed values from Second Quarter 2010 sampling event.

(d) Applicable ESLs are from Table F-1b, Groundwater Screening Levels where ground water is not a current or potential drinking water source.

mg/kg = milligrams per kilogram

µg/L = micrograms per liter

6.0 FEASIBILITY STUDY

6.1 Screening of Remediation Technologies

Several potential full-scale remediation technologies described within the Remediation Technologies Screening Matrix and Reference Guide, 4th Edition (Federal Remediation Technologies Roundtable, 2002) were evaluated to identify feasible remediation alternatives for the conditions and impacts at the Site. The Federal Remediation Technologies Roundtable is a working group including the Federal Environmental Protection Agency, Department of Defense, Department of Energy, Department of the Air Force, Department of the Interior, Department of the Army, Department of the Navy, and National Aeronautics and Space Administration. Of the approximately 60 remediation technologies described, eight remediation technologies were screened for viability in this section. In addition to the technologies listed, a No-Action option was evaluated. The No-Action option is typically included in feasibility studies to represent the baseline action for comparison purposes. The technologies assessed in this initial screening are listed in the matrix on the following page. Also presented is the media each technology would address.

	Media					
Remediation Technology	Soil	Water				
No Action						
Excavation	Х					
Soil Vapor Extraction	Х					
Dual-Phase Extraction and Treatment	Х	Х				
Chemical Oxidation	Х	Х				
Enhanced Bioremediation	Х	Х				
Air Sparging	(X)	Х				
Ground Water Extraction and Treatment		Х				
Monitored Natural Attenuation		Х				

Summary of Remediation Technologies Evaluated

6.1.1 <u>No Action</u>

Based on the hydrocarbon concentration trends in ground water, the no action option is not expected to be acceptable to ACEH. The no-action option is retained as a baseline for comparison.

6.1.2 <u>Excavation</u>

With excavation, contaminated material is physically removed and transported to permitted off-site treatment and/or disposal facilities. Factors that limit the applicability and effectiveness of the general process include:

- Generation of fugitive emissions may be a problem during operations.
- The distance from the contaminated site to the nearest disposal facility with the required permit(s) will affect cost.
- Depth and composition of the media requiring excavation must be considered.
- Transportation of the soil through populated areas may affect community acceptability.

At this time, minimal deeper soil impacts have been observed at the Site, potentially beyond the reach of conventional excavating equipment. Excavation would not address the concentrations of hydrocarbons in ground water at the Site. Additionally, the location of soil and groundwater impacts would neccessitate removal and replacement of the UST system and fuel lines. Excavation is therefore screened from consideration at this time.

6.1.3 Soil Vapor Extraction

Soil Vapor Extraction (SVE) is an in situ unsaturated (vadose) zone soil remediation technology in which a vacuum is applied to the soil to induce the controlled flow of air and remove volatile contaminants from the soil. The gas leaving the soil may be treated to recover or destroy the contaminants, depending on local and state air discharge regulations. Vertical extraction vents are typically used at depths of five feet or greater and have been successfully applied as deep as 300 feet. Horizontal extraction vents (installed in trenches or horizontal borings) can be used as warranted by contaminant zone geometry, drill rig access, or other site-specific factors. For the soil surface, geomembrane covers are often placed over the soil surface to prevent short circuiting and to increase the radius of influence of the wells. Ground-water depression pumps may be used to reduce ground water upwelling induced by the vacuum or to increase the depth of the vadose zone. Air

injection is effective for facilitating extraction of deep contamination, contamination in low permeability soils, and contamination in the saturated zone. The duration of operation and maintenance for in situ SVE is typically medium- to long-term.

Factors that may limit the applicability and effectiveness of the process include:

- Soil that has a high percentage of fines and a high degree of saturation will require higher vacuums (increasing costs) and/or hindering the operation of the in situ SVE system.
- Large screened intervals are required in extraction wells for soil with highly variable permeabilities or stratification, which otherwise may result in uneven delivery of gas flow from the contaminated regions.
- Soil that has high organic content or is extremely dry has a high sorption capacity for VOCs, which results in reduced removal rates.
- Exhaust air from in situ SVE system may require treatment to eliminate possible harm to the public and the environment.
- As a result of off-gas treatment, residual liquids may require treatment/disposal. Spent activated carbon will require regeneration or disposal.
- SVE is not effective in the saturated zone. However, lowering the water table can expose more media to SVE (this may address concerns regarding LNAPLs).

Pilot testing conducted by RESNA indicates that wells utilized for SVE could have sufficient ROI to recover vapors in the soils at the Site. Additionally, high influent concentrations recovered during pilot testing indicate that SVE technology is effective at recovering adsorbed hydrocarbons from soil. However, the pilot testing was conducted at a time when the depth to water in the wells was significantly lower than current conditions. The screen intervals of most of the remedial wells onsite have recently been submerged. SVE alone will not be retained for further consideration and evaluation due to highly variable water levels at the Site and screen intervals at times set below the expected depth to water, which has the potential to severely reduce SVE performance. Additionally, SVE alone is not able to directly address hydrocarbon impacts to the groundwater at the Site.

6.1.4 <u>Dual-Phase Extraction and Treatment</u>

Dual-Phase Extraction (DPE), also known as multi-phase extraction and vacuum enhanced extraction, is a technology that uses a high vacuum system to remove various combinations of contaminated ground water, separate-phase petroleum hydrocarbons, and hydrocarbon vapor from the subsurface. Extracted liquids and vapors are treated and collected for disposal, or re-injected to the subsurface (where permissible under applicable state laws). In DPE systems for liquid/vapor treatment, a high vacuum system is used to remove liquid and gas from low permeability or heterogeneous formations. The vacuum extraction well includes a screened section in the zone of contaminated soils and ground water. It removes contaminants from above and below the water table. The system lowers the water table around the well, exposing more of the formation. Contaminants in the newly exposed vadose zone are then accessible to vapor extraction. Once above ground, the extracted vapors or liquid-phase organics and ground water are separated and treated.

Factors that may limit the applicability and effectiveness of the process include:

• Site geology and contaminant characteristics/distribution.

- Combination with complementary technologies (e.g., pump-and-treat) may be required to recover ground water from high yielding aquifers.
- DPE requires both water treatment and vapor treatment.
- Soil type determines permeability, which is the primary cost driver. DPE works best for permeable sand-silt mixtures. Impermeable (clayey) or excessively permeable (gravel/sand) soils are more recalcitrant.

The critical factor that limits the applicability and effectiveness of this process at the Site is the presence of low permeability soils. Although this factor may limit the ability of the system to recover soil vapor and groundwater, the relatively small source zone may effectively be remediated with this technology. Due to the impermeable nature of the Site soils, DPE system performance could be enhanced by the addition of a sparging system to drive additional adsorbed hydrocarbons into the extraction wells. Therefore, DPE will be retained for further evaluation and comparison of viable treatment alternatives.

6.1.5 <u>In-Situ Chemical Oxidation</u>

In-situ chemical oxidation encompasses a wide range of technologies, including liquid chemical oxidant injection (e.g., hydrogen peroxide) and injection of air or ozone into the subsurface. The objective is to increase the oxygen content of ground water and enhance the rate of aerobic degradation of organic contaminants by naturally occurring microbes. For best results, factors that must be considered include redox conditions, saturation rates, presence of nutrient trace elements, pH, temperature, and permeability of the subsurface materials. In-situ chemical oxidation is a full-scale technology.

The following general factors may limit the applicability and effectiveness of the process:

- A ground-water circulation system may need to be created so that contaminants do not escape from zones of active biodegradation.
- Where the subsurface is heterogeneous, it is difficult to circulate the oxygenated solution throughout every portion of the contaminated zone. Higher permeability zones are cleaned up much faster because ground water flow rates are greater.
- High iron content in subsurface materials can rapidly reduce concentrations of oxygenated solutions.
- Amended hydrogen peroxide can be consumed very rapidly near the injection well, which can create two significant problems: biological growth can be limited to the region near the injection well, limiting adequate contamination/micro-organism contact throughout the contaminated zone; and biofouling of wells can retard the input of nutrients.
- A surface treatment system, such as air stripping or carbon adsorption, may be required to treat extracted ground water prior to re-injection or disposal.

In-situ chemical oxidation is a potentially effective treatment technology for the Site and will be retained for further evaluation and comparison of viable treatment alternatives.

6.1.6 <u>Enhanced Bioremediation</u>

Enhanced bioremediation is a process in which indigenous or inoculated micro-organisms (e.g., fungi, bacteria, and other microbes) degrade (metabolize) organic contaminants found in soil and/or ground water, converting them to innocuous end products. Nutrients, oxygen, or other amendments may be used to enhance bioremediation and contaminant desorption from subsurface materials. In the presence of sufficient oxygen (aerobic conditions), and other nutrient elements, microorganisms will ultimately convert many organic contaminants to carbon dioxide, water, and microbial cell mass.

Enhanced bioremediation typically involves the percolation or injection of ground water or uncontaminated water mixed with nutrients and saturated with dissolved oxygen. Sometimes acclimated microorganisms (bioaugmentation) and/or another oxygen source such as hydrogen peroxide is also added. An infiltration gallery is typically used for shallow contaminated soils, and injection wells are used for deeper contaminated soils and ground water.

In the absence of oxygen (anaerobic conditions), the organic contaminants will be ultimately metabolized to methane, limited amounts of carbon dioxide, and trace amounts of hydrogen gas. Under sulfate-reduction conditions, sulfate is converted to sulfide or elemental sulfur. Under nitrate-reduction conditions, dinitrogen gas is ultimately produced.

Enhanced bioremediation may be classified as a long-term technology which may take several years for cleanup of a plume. However, factors that may limit the applicability and effectiveness of the process include:

- Cleanup goals may not be attained if the soil matrix prohibits contaminant-microorganism contact.
- The circulation of water-based solutions through the soil may increase contaminant mobility and increase contaminant mobility and concentrations of the underlying ground water.
- Preferential colonization by microbes may occur causing clogging of nutrient and water injection wells.
- Preferential flow paths may severely decrease contaminant contact between injected fluids and contaminants through the contaminated zones. System is not optimal for clay, highly layered, or heterogeneous subsurface environments because of oxygen (or other electron acceptor) transfer limitations.
- Concentrations of hydrogen peroxide greater than 100-200 ppm in ground water inhibit the activity of microorganisms.

Enhanced Bioremediation is a potentially effective treatment technology for the Site and will be retained for further evaluation and comparison of viable treatment alternatives.

6.1.7 <u>Air Sparging</u>

Air sparging is an in situ technology in which air is injected through a contaminated aquifer. Injected air traverses horizontally and vertically in channels through the soil column, creating an underground stripper that removes contaminants by volatilization. This injected air helps flush (bubble) the contaminants up into the unsaturated zone where a vapor extraction system is usually implemented in conjunction with air sparging to remove the generated vapor phase contamination. This technology is designed to operated at high flow rates to maintain increased contact between ground water and soil and strip more ground water by sparging. Oxygen added to contaminated ground water and vadose zone soils can also enhance biodegradation of contaminants below and above the water table. Air sparging has a medium to long duration which may last, generally, up to a few years.

Factors that may limit the applicability and effectiveness of the process include:

- Air flow through the saturated zone may not be uniform, which implies that there can be uncontrolled movement of potentially dangerous vapors.
- Depth of contaminants and specific site geology must be considered.
- Air injection wells must be designed for site-specific conditions.
- Soil heterogeneity may cause some zones to be relatively unaffected.

The predominant clayey silt layer from ten feet bgs to below ground water at the Site is thought to reduce the likely effectiveness of air sparging at the Site. Although not optimum due to the presence of clays at the Site, air sparging will be retained for further consideration and evaluation.

6.1.8 Ground-Water Extraction and Treatment

In Ground Water Extraction and Treatment (GWET), ground water is pumped through a series of canisters containing activated carbon to which dissolved organic contaminants adsorb. This technology requires periodic replacement or regeneration of saturated carbon. Costs are typically high if used as the primary treatment on waste streams with high contaminant concentration levels. GWET will not directly address hydrocarbon impacts to the soils at the site. Therefore, GWET will not be retained for further evaluation based on poor cost-effectiveness and cleanup effiency when compared to other technologies.

6.1.9 Monitored Natural Attenuation

Monitored Natural Attenuation (MNA) is sometimes referred to as Intrinsic Remediation, Bioattenuation, or Intrinsic Bioremediation. Natural subsurface processes such as dilution, volatilization, biodegradation, adsorption, and chemical reactions with subsurface materials are allowed to reduce contaminant concentrations to acceptable levels. MNA is not a "technology" per se, and there is significant debate among technical experts about its use at impacted sites. Consideration of this option usually requires modeling and evaluation of contaminant degradation rates and pathways and predicting contaminant concentration at down-gradient receptor points. The primary objective of site modeling is to demonstrate that natural processes of contaminant degradation will reduce concentrations below regulatory standards or risk-based levels before potential exposure pathways are completed. In addition, long-term monitoring must be conducted throughout the process to confirm that degradation is proceeding at rates consistent with meeting cleanup objectives.

Monitored natural attenuation is not the same as "no action," although it is often perceived as such. CERCLA requires the evaluation of a "no action" alternative but does not require evaluation of natural attenuation. MNA is considered on a case-by-case basis, and guidance on its use is still evolving.

Compared with other remediation technologies, natural attenuation has the following advantages:

- Less generation or transfer of remediation wastes;
- Less intrusive as few surface structures are required;
- May be applied to all or part of a given site, depending on site conditions and cleanup objectives;
- MNA may be used in conjunction with, or as a follow-up to, other (active) remedial measures;
- Overall cost will likely be lower than active remediation.

Factors that may limit applicability and effectiveness include:

- Data used as input parameters for modeling need to be collected;
- MNA is not appropriate where imminent site risks are present;
- Contaminants may migrate before they are degraded;
- Institutional controls may be required, and the site may not be available for reuse until contaminant levels are reduced;
- If free product exists, it may have to be removed;
- Long-term monitoring and associated costs;
- Longer time frames may be required to achieve remediation objectives, compared to active remediation;
- The hydrologic and geochemical conditions amenable to MNA are likely to change over time and could result in renewed mobility of previously stabilized contaminants and may adversely impact remedial effectiveness; and
- More extensive outreach efforts may be required in order to gain public acceptance of MNA.

Based on the hydrocarbon concentration trends in ground water at the Site, a remediation strategy that employs monitored natural attenuation (MNA) would not be expected to be acceptable to ACEH unless implemented in conjunction with an active form of remediation or unless MNA-specific monitoring indicates that natural attenuation processes are occurring at the Site. MNA is retained for possible combination with other active technologies.

6.2 Alternatives Evaluation and Costs

Based on the initial technology screening above, the following technologies have been retained to assemble the alternatives that will be evaluated:

- Alternative 1: No Action
- Alternative 2: Dual-Phase Extraction and Treatment
- Alternative 3: In-Situ Oxidation
- Alternative 4: Enhanced Bioremediation
- Alternative 5: Air Sparging
- Alternative 6: Monitored Natural Attenuation

Using the *Remediation Technologies Screening Matrix and Reference Guide*, each of the alternatives were evaluated against the following screening factors:

- **Relative Costs?** Design, construction, and operation and maintenance (O&M) costs of the core process that defines each technology, exclusive of mobilization, demobilization, and pre- and post-treatment costs. Above average means a low degree of genral costs relative to other options. Average means an average degree of general costs relative to other options. Below average means a high degree of general costs relative to the other options.
- **Capital Intensive?** Is the technology capital-intensive, with significant costs for design and construction? Above average means low degree of capital investment. Average means average degree of capital investment. Below average means high degree of capital investment.
- **O&M Intensive?** Is the technology O&M-intensive, with significant costs for labor, operation, maintenance, and repair? Above average means low degree of O&M intensity. Average means average degree of O&M intensity. Below average means high degree of O&M intensity.
- **System Reliability/Maintainability?** The expected range of demonstrated reliability and maintenance relative to other effective technologies. Above average means high reliability and low maintenance. Average means average reliability and average maintenance. Below average means low reliability and high maintenance.
- **Time?** Time required to clean up a "standard" site using the technology. Above average means less than one year for in situ soils and less than three years for ground water. Average means one to three years for in situ soils and three to ten years for ground water. Below average means more than three years for in situ soil and more than ten years for ground water.

The following table presents relative ratings per screening factor for the five alternatives retained from the screening process above. The relative ratings are from the previously referenced *Remediation Technologies Screening Matrix and Reference Guide*.

Technology	Relative Cost	Capital Intensive	O&M Intensive	System Reliability / Maintainability	Time
No Action	Above	Below	Above	Above Average	Below
	Average	Average	Average		Average
Dual Phase Extraction	Average	Below	Below	Average	Average
		Average	Average		
In-Situ Chemical Oxidation	Average	Average	Below	Average	Above
			Average		Average
Enhanced Bioremediation	Above	Average	Below	Average	Unknown
	Average		Average		
Air Sparging	Above	Above	Above	Above	Above
	Average	Average	Average	Average	Average
Monitored Natural Attenuation	Above	Average	Below	Average	Unknown
	Average	_	Average	_	

6.3 Recommended Remedial Alternative

Based on the Site conditions, remedial objectives, the petroleum hydrocarbon mass remaining in soil and ground water and review of the remediation technologies screening matrices, Dual Phase Extraction appears to be the most cost effective and appropriate remedial alternative for Station #6113. As documented above, the data collected to date indicate that residual impacted soil and ground water that potentially warrant remedial efforts are only present in a small area on the northeastern portion of the property in the general vicinity of the USTs. However, the location and presence of the UST system greatly limit the ability to access and remediate this portion of the property. For safety reasons, drilling or excavation cannot be completed within ten feet of any UST system component. Drawing 3 depicts the portion of the property that is not available to drill or excavate.

It is proposed to conduct a multiple day pilot study utilizing a mobile DPE system connected to existing well RMW-13, which currently contains the highest ground water concentrations observed at the Site. Following ACEH approval of this recommendation, a detailed work plan describing the proposed mobile DPE pilot test will be completed. If the DPE pilot test is successful, mobile DPE events could be utilized at the site as an interim remedial measure. A formal Corrective Action Plan could also be presented following completion of the DPE pilot test.

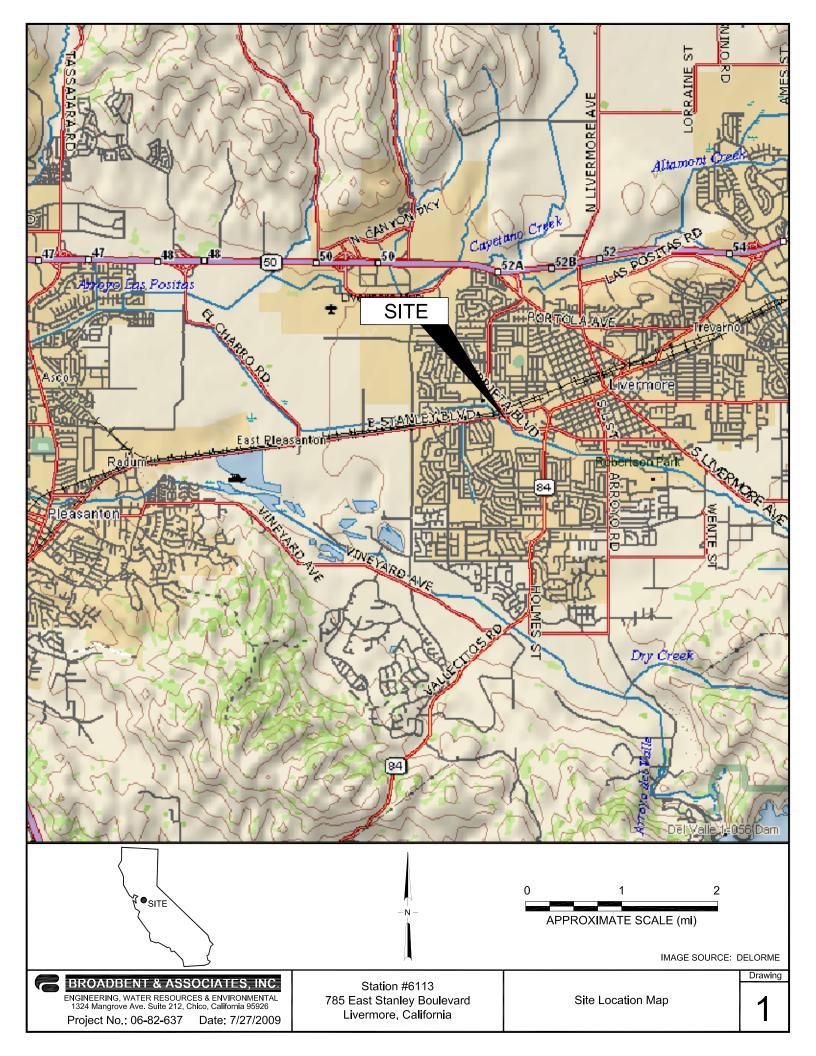
7.0 CLOSURE

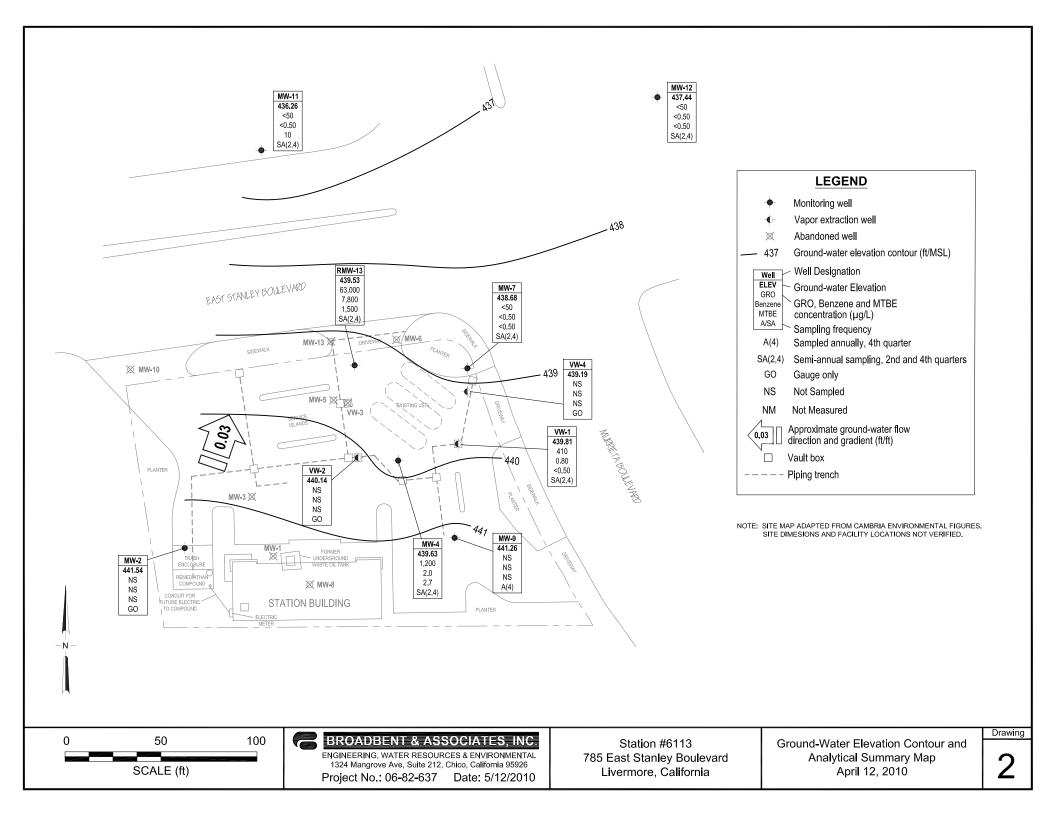
The findings presented in this document are based upon: observations of field personnel from previous consultants, the points investigated, and results of analytical tests performed by various laboratories. Our services were performed in accordance with the generally accepted standard of practice at the time this document was written. No other warranty, expressed or implied was made. This report has been prepared for the exclusive use of BP. It is possible that variations in soil or ground-water conditions could exist beyond points explored in this investigation. Also changes in site conditions could occur in the future due to variations in rainfall, temperature, regional water usage, or other factors.

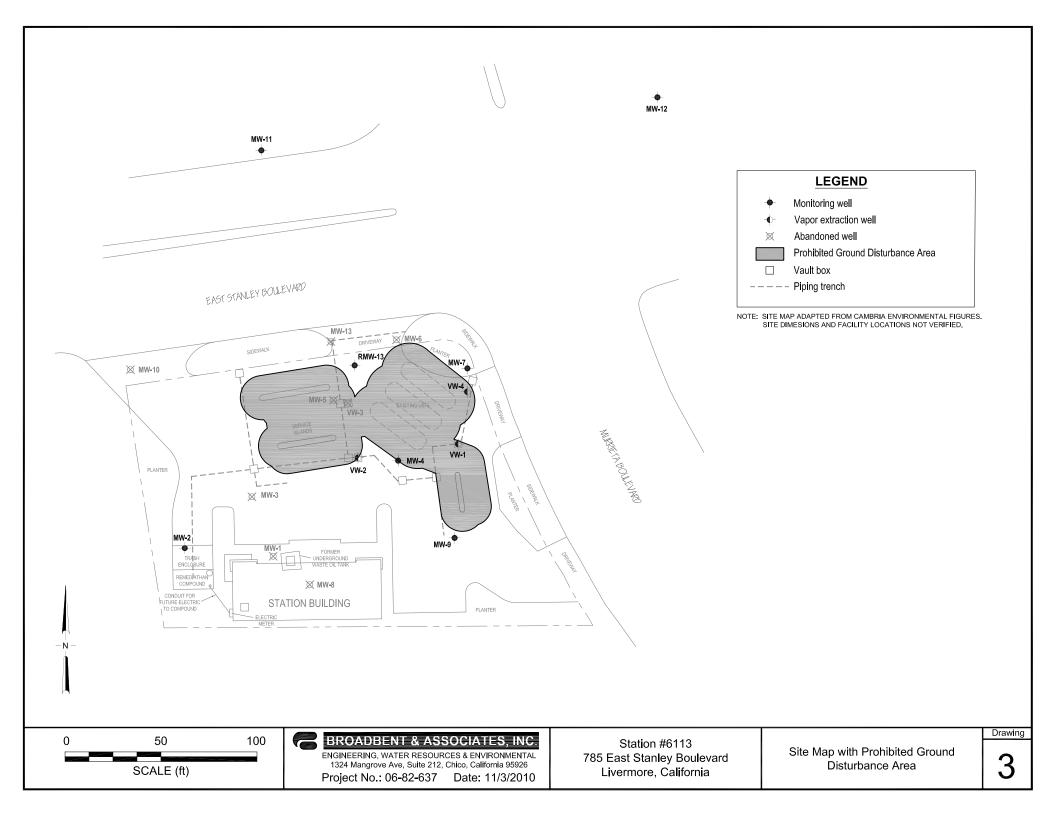
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		Top of Bottom of Water Level Concentrations in (µg/L)													
Well and			тос	Screen	Screen	DTW	Elevation	GRO/		concentra	Ethyl-	Total		DO	
Sample Date	P/NP	Comments	(feet)	(ft bgs)	(ft bgs)	(feet)	(feet)	TPHg	Benzene	Toluene	Benzene	Xylenes	MTBE	(mg/L)	pН
MW-1															
3/23/1995		e	457.04	29.0	44.0	14.12	442.92								
5/31/1995		e	457.04	29.0	44.0	14.45	442.59								
8/31/1995		e	457.04	29.0	44.0	17.12	439.92								
11/28/1995			457.04	29.0	44.0	16.34	440.70	<50	< 0.5	< 0.5	< 0.5	< 0.5	<3		
2/22/1996		e	457.04	29.0	44.0	13.23	443.81								
5/23/1996		e	457.04	29.0	44.0	14.02	443.02								
8/8/1996		e	457.04	29.0	44.0	16.13	440.91								
11/7/1996			457.04	29.0	44.0	17.28	439.76	<50	< 0.5	< 0.5	< 0.5	< 0.5	<3		
3/27/1997		e	457.04	29.0	44.0	14.91	442.13								
5/19/1997		e	457.04	29.0	44.0	16.47	440.57								
5/18/1998		e	457.04	29.0	44.0	14.69	442.35								
11/2/1998			457.04	29.0	44.0	25.94	431.10	<50	<0.5	< 0.5	< 0.5	<0.5	<3		
6/4/1999		e	457.04	29.0	44.0	17.38	439.66								
11/11/1999	Р		457.04	29.0	44.0	18.63	438.41	<50	< 0.5	<0.5	< 0.5	<1	<3	1.03	
6/20/2000		e	457.04	29.0	44.0	17.09	439.95							3.1	
8/29/2000		e	457.04	29.0	44.0	18.20	438.84							2.66	
11/29/2000	Р		457.04	29.0	44.0	20.30	436.74	<50.0	< 0.500	< 0.500	< 0.500	1.36	<2.50	0.71	
5/2/2001		e	457.04	29.0	44.0	22.39	434.65								
8/15/2001		e	457.04	29.0	44.0	24.97	432.07								
10/5/2001	Р		457.04	29.0	44.0	25.09	431.95	<50	< 0.50	< 0.50	< 0.50	< 0.50	<2.5	0.78	
1/21/2002		e	457.04	29.0	44.0	24.58	432.46								
4/26/2002		e	457.04	29.0	44.0	24.19	432.85								
10/7/2002			457.04	29.0	44.0	20.13	436.91	<50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	1.8	
05/01/2003		r	457.04	29.0	44.0	17.98	439.06								
10/27/2005			459.41	29.0	44.0	18.45	440.96								
04/12/2006			459.41	29.0	44.0	15.18	444.23								
10/31/2006			459.41	29.0	44.0	19.18	440.23								
4/19/2007			459.41	29.0	44.0	23.20	436.21								
10/16/2007			459.41	29.0	44.0	38.28	421.13								
4/24/2008			459.41	29.0	44.0	25.97	433.44								
6/18/2008		k		29.0	44.0										

Table 1. Summary of Ground-Water Monitoring Data: Relative Water Elevations and Laboratory Analyses

ARCO Service Station #6113, 785 East Stanley Blvd., Livermore, CA

Top of Bottom of Water Level Concentrations in (µg/L) Well and TOC DTW Elevation GRO/ Ethyl-DO Screen Screen Total Toluene Sample Date P/NP Comments (feet) (ft bgs) (ft bgs) (feet) (feet) TPHg Benzene Benzene **Xylenes** MTBE (mg/L)pН MW-1 MW-2 3/23/1995 457.74 28.0 38.0 14.15 443.59 ---------------------------5/31/1995 457.74 28.0 38.0 14.67 443.07 e ------------------------8/31/1995 457.74 38.0 17.24 440.50 --e 28.0 ------------------------11/28/1995 457.74 28.0 38.0 16.40 441.34 < 50 < 0.5 < 0.5 < 0.5 < 0.5 <3 ---------2/22/1996 e 457.74 28.0 38.0 13.55 444.19 ---------------------------443.45 5/23/1996 457.74 28.0 38.0 14.29 -e -----------------------8/8/1996 457.74 28.0 38.0 16.19 441.55 --e ------------------------38.0 11/7/1996 457.74 28.0 17.50 440.24 65 0.6 7.4 2.1 12 5 ---------3/27/1997 457.74 28.0 38.0 442.42 15.32 --e ------------------------5/19/1997 457.74 28.0 38.0 16.62 441.12 e -------------------------5/18/1998 457.74 28.0 38.0 15.12 442.62 -----e --------------------11/2/1998 457.74 28.0 38.0 431.08 26.66 < 50 < 0.5 < 0.5 < 0.5 < 0.5 <3 --------6/4/1999 457.74 28.0 38.0 17.74 440.00 e ---------------------------11/11/1999 457.74 28.0 38.0 18.75 438.99 Р < 50 < 0.5 < 0.5 <3 0.82 < 0.5 <1 --6/20/2000 457.74 28.0 38.0 17.21 440.53 2.6 e ------------------------8/29/2000 457.74 28.0 38.0 439.49 18.25 2.65 -e ------------------11/29/2000 457.74 28.0 437.05 Р 38.0 20.69 < 50.0 < 0.500 0.581 0.827 4.38 < 2.50 0.88 ---5/2/2001 457.74 28.0 38.0 22.69 435.05 e -----------------------8/15/2001 457.74 28.0 38.0 25.15 432.59 e --------------------------10/5/2001 Р 457.74 28.0 38.0 25.22 432.52 < 50 < 0.50 < 0.50< 0.50 < 0.50 <2.5 0.8 --1/21/2002 28.0 433.04 e 457.74 38.0 24.70 -------------------------4/26/2002 457.74 28.0 38.0 433.21 --e 24.53 ----------------------10/7/2002 457.74 28.0 38.0 438.29 ---19.45 < 50 < 0.50 < 0.50 < 0.50 < 0.50 < 0.50 1.5 ---05/01/2003 457.74 28.0 38.0 18.18 439.56 --r -----------------------10/27/2005 460.07 28.0 38.0 --t ------------------------------04/12/2006 460.07 28.0 38.0 15.30 444.77 -----------------------10/31/2006 28.0 440.59 460.07 38.0 19.48 ---------------------------4/19/2007 --460.07 28.0 38.0 23.85 436.22 ---------------------460.07 10/16/2007 28.0 38.0 36.78 423.29 --------------------------

ARCO Service Station #6113, 785 East Stanley Blvd., Livermore, CA

Top of Bottom of Water Level Concentrations in (µg/L) Well and TOC DTW Elevation GRO/ Ethyl-DO Screen Screen Total Toluene Sample Date P/NP Comments (feet) (ft bgs) (ft bgs) (feet) (feet) TPHg Benzene Benzene **Xylenes** MTBE (mg/L)pН MW-2 Cont. 4/24/2008 460.07 28.0 38.0 26.38 433.69 ---------------------------10/15/2008 460.07 28.0 38.0 37.21 422.86 -----------------------4/28/2009 460.07 28.0 426.77 38.0 33.30 ---------------------------11/9/2009 438.20 460.07 28.0 38.0 21.87 ------------------------4/12/2010 460.07 28.0 38.0 18.53 441.54 --------------------------MW-3 456.97 442.84 3/23/1995 e 28.5 38.5 14.13 ---------------------------5/31/1995 456.97 28.5 38.5 14.46 442.51 --e ---------------------38.5 8/31/1995 e 456.97 28.5 17.06 439.91 ---------------------------11/28/1995 456.97 28.5 38.5 440.70 16.27 < 50 < 0.5 < 0.5 < 0.5 < 0.5 <3 --------2/22/1996 456.97 28.5 38.5 13.14 443.83 -----------e ---------------28.5 38.5 13.95 443.02 5/23/1996 456.97 --e ------------------------8/8/1996 456.97 28.5 38.5 440.94 16.03 --e ------------------------11/7/1996 456.97 28.5 38.5 17.26 439.71 0.9 < 50 < 0.5 < 0.5 1.5 <3 --------3/27/1997 14.85 442.12 456.97 28.5 38.5 -----------e ---------------5/19/1997 456.97 28.5 38.5 16.40 440.57 --e ------------------------5/18/1998 456.97 28.5 38.5 14.66 442.31 --e ------------------------38.5 11/2/1998 456.97 28.5 25.85 431.12 <1,000 <10 <10 <10 <10 1,700 ---------6/4/1999 456.97 28.5 38.5 17.35 439.62 e ---------------------------28.5 38.5 11/11/1999 Р 456.97 18.58 438.39 <50 < 0.5 < 0.5 < 0.5 <1 <3 0.79 ---6/20/2000 456.97 28.5 38.5 17.03 439.94 ---------2.8 -----e ---------8/29/2000 456.97 28.5 38.5 18.25 438.72 3.39 --e --------------------11/29/2000 456.97 28.5 38.5 436.70 < 0.500 20.27 < 50.0 < 0.500 1.08 3.34 < 2.50 0.67 ------5/2/2001 38.5 434.64 456.97 28.5 22.33 --e ----------------------8/15/2001 456.97 28.5 38.5 25.03 431.94 --e -----------------------10/5/2001 Р 456.97 28.5 38.5 25.17 431.80 < 50 < 0.50 < 0.50< 0.50 < 0.50 <2.5 0.79 --1/21/2002 432.18 456.97 28.5 38.5 24.79 --e ------------------------38.5 4/26/2002 456.97 28.5 24.27 432.70 -e -------------------10/7/2002 28.5 38.5 ---456.97 20.20 436.77 < 50 < 0.50 < 0.50 < 0.50< 0.50< 0.50 1.2 ---05/01/2003 456.97 28.5 38.5 18.27 438.70 c, e --------------------------

ARCO Service Station #6113, 785 East Stanley Blvd., Livermore, CA

				Top of	Bottom of		Water Level			Concentra	tions in (µ	g/L)			
Well and			тос	Screen	Screen	DTW	Elevation	GRO/			Ethyl-	Total		DO	
Sample Date	P/NP	Comments	(feet)	(ft bgs)	(ft bgs)	(feet)	(feet)	TPHg	Benzene	Toluene	Benzene	Xylenes	MTBE	(mg/L)	pН
MW-3 Cont.															
10/03/2003	Р	d	456.97	28.5	38.5	20.07	436.90	<50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	5.2	7.3
04/06/2004		е	459.32	28.5	38.5	17.24	442.08								
10/28/2004	Р		459.32	28.5	38.5	19.38	439.94	<50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	8.1	7.3
04/13/2005			459.32	28.5	38.5	16.02	443.30								
10/27/2005		t	459.32	28.5	38.5										
04/12/2006			459.32	28.5	38.5	15.12	444.20								
10/31/2006	Р		459.32	28.5	38.5	19.14	440.18	400	5.5	< 0.50	5.5	9.6	22		7.64
4/19/2007			459.32	28.5	38.5	23.07	436.25								
10/16/2007		f	459.32	28.5	38.5										
4/24/2008			459.32	28.5	38.5	25.65	433.67								
9/10/2008		k	459.32	28.5	38.5										
MW-4															
3/23/1995			456.55	21.0	27.0	15.39	441.16	210	2.1	0.6	0.8	2.1			
5/31/1995			456.55	21.0	27.0	15.32	441.23	190	1.6	< 0.5	0.7	0.9			
8/31/1995			456.55	21.0	27.0	17.86	438.69	160	1.2	0.7	< 0.5	<2	<3		
11/28/1995			456.55	21.0	27.0	17.18	439.37	150	0.7	< 0.5	0.7	1.4	<3		
2/22/1996			456.55	21.0	27.0	14.80	441.75	100	< 0.5	< 0.5	<0.6	0.8	<3		
5/23/1996			456.55	21.0	27.0	14.43	442.12	86	< 0.5	< 0.5	< 0.5	<0.7	<3		
8/8/1996			456.55	21.0	27.0	16.80	439.75	98	< 0.5	< 0.5	< 0.5	1.3	<3		
11/7/1996			456.55	21.0	27.0	17.90	438.65	140	< 0.5	< 0.5	<0.9	1.3	<3		
3/27/1997			456.55	21.0	27.0	15.22	441.33	<50	1.1	< 0.5	< 0.5	1.6	<3		
5/19/1997			456.55	21.0	27.0	16.98	439.57	62	< 0.5	< 0.5	< 0.5	0.6	<3		
5/18/1998			456.55	21.0	27.0	14.99	441.56	<50	< 0.5	< 0.5	< 0.5	< 0.5	64		
11/2/1998			456.55	21.0	27.0	25.29	431.26	74	< 0.5	< 0.5	< 0.5	<0.5	96		
6/4/1999	Р		456.55	21.0	27.0	17.95	438.60	100	< 0.5	< 0.5	< 0.5	< 0.5	38		
11/11/1999	Р		456.55	21.0	27.0	19.25	437.30	88	<0.5	< 0.5	< 0.5	<1	10	0.77	
6/20/2000		q	456.55	21.0	27.0			<50.0	< 0.500	< 0.500	< 0.500	< 0.500	62.3		
6/20/2000	Р		456.55	21.0	27.0	17.79	438.76	<50.0	< 0.500	< 0.500	< 0.500	<0.500	82.4	1.3	
8/29/2000	Р		456.55	21.0	27.0	18.90	437.65	56	< 0.500	< 0.500	< 0.500	< 0.500	47.9	0.97	
11/29/2000	Р	8	456.55	21.0	27.0	20.50	436.05	<50.0	< 0.500	< 0.500	< 0.500	< 0.500	9.88/10.4	0.59	

ARCO Service Station #6113, 785 East Stanley Blvd., Livermore, CA

				Top of	Bottom of	,	Water Level		,	Concentra	tions in (µ	σ/I.)			
Well and			тос	Screen	Screen	DTW	Elevation	GRO/			Ethyl-	Total		DO	
Sample Date	P/NP	Comments	(feet)	(ft bgs)	(ft bgs)	(feet)	(feet)	TPHg	Benzene	Toluene	Benzene	Xylenes	MTBE	(mg/L)	pН
MW-4 Cont.															
5/2/2001	Р	q, s	456.55	21.0	27.0	22.65	433.90	<50.0	< 0.500	< 0.500	< 0.500	< 0.500	61.1/70.9	0.74	
5/2/2001		S	456.55	21.0	27.0			<50.0	< 0.500	< 0.500	< 0.500	< 0.500	59.4/68.4		
8/15/2001		f	456.55	21.0	27.0										
10/5/2001		f	456.55	21.0	27.0										
1/21/2002		f	456.55	21.0	27.0										
4/26/2002	Р		456.55	21.0	27.0	20.15	436.40	110	< 0.50	< 0.50	< 0.50	< 0.50	150	0.21	
10/7/2002	Р	а	456.55	21.0	27.0	20.76	435.79	96	< 0.50	< 0.50	0.54	< 0.50	260	1.0	
05/01/2003	Р	с	456.55	21.0	27.0	19.67	436.88	120	1.3	< 0.50	< 0.50	< 0.50	86	1.7	
10/03/2003	Р	d	456.55	21.0	27.0	20.23	436.32	<50	< 0.50	< 0.50	< 0.50	< 0.50	22	13.5	6.8
04/06/2004	Р		458.88	21.0	27.0	18.13	440.75	96	< 0.50	< 0.50	< 0.50	< 0.50	17	1.6	6.8
10/28/2004	Р		458.88	21.0	27.0	20.02	438.86	<50	< 0.50	< 0.50	< 0.50	< 0.50	4.5	1.2	6.7
04/13/2005	Р		458.88	21.0	27.0	16.68	442.20	<50	< 0.50	< 0.50	< 0.50	< 0.50	2.8	0.8	6.7
10/27/2005	Р		458.88	21.0	27.0	19.05	439.83	400	14	< 0.50	11	1.8	22	1.0	6.9
04/12/2006	Р		458.88	21.0	27.0	15.47	443.41	100	< 0.50	< 0.50	< 0.50	< 0.50	1.9	1.6	7.2
10/31/2006	Р		458.88	21.0	27.0	19.67	439.21	<50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		7.63
4/19/2007	NP		458.88	21.0	27.0	22.72	436.16	<50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	2.92	7.36
10/16/2007		f	458.88	21.0	27.0										
4/24/2008		f	458.88	21.0	27.0										
10/15/2008		f	458.88	21.0	27.0										
4/28/2009		f	458.88	21.0	27.0										
11/9/2009	NP	x (GRO)	458.88	21.0	27.0	22.73	436.15	270	4.6	< 0.50	< 0.50	< 0.50	3.1		
4/12/2010	Р		458.88	21.0	27.0	19.25	439.63	1,200	2.0	<0.50	<0.50	<0.50	2.7	0.81	6.87
MW-5															
3/23/1995			455.84	43.0	63.0	13.97	441.87	68	4.2	3.4	2.3	12			
5/31/1995		g	455.84	43.0	63.0										
8/31/1995		g	455.84	43.0	63.0										
11/28/1995			455.84	43.0	63.0	16.46	439.38	960	41	24	38	210	<5		
2/22/1996		f	455.84	43.0	63.0	13.34	442.50								
5/23/1996			455.84	43.0	63.0	14.36	441.48	7,100	440	180	270	1,700	<50		
8/8/1996		f	455.84	43.0	63.0	16.38	439.46								

ARCO Service Station #6113, 785 East Stanley Blvd., Livermore, CA

				Top of	Bottom of		Water Level			Concentra	tions in (µ	g/L)			
Well and			тос	Screen	Screen	DTW	Elevation	GRO/			Ethyl-	Total		DO	
Sample Date	P/NP	Comments	(feet)	(ft bgs)	(ft bgs)	(feet)	(feet)	TPHg	Benzene	Toluene	Benzene	Xylenes	MTBE	(mg/L)	pН
MW-5 Cont.															
11/7/1996			455.84	43.0	63.0	17.26	438.58	5,600	230	86	210	1,100	<80		
3/27/1997		f	455.84	43.0	63.0	15.95	439.89								
5/19/1997			455.84	43.0	63.0	16.64	439.20	7,600	480	140	400	1,200	<40		
5/18/1998			455.84	43.0	63.0	14.75	441.09	990	46	13	45	180	4		
11/2/1998			455.84	43.0	63.0	27.83	428.01	14,000	690	140	550	2,200	100		
6/4/1999	Р		455.84	43.0	63.0	17.47	438.37	8,300	690	370	90	440	1,400		
11/11/1999	Р		455.84	43.0	63.0	18.80	437.04	18,000	900	190	1,100	3,200	72	0.86	
6/20/2000	Р		455.84	43.0	63.0	17.14	438.70	10,200	618	122	832	2,020	<50.0	1.6	
8/29/2000	Р		455.84	43.0	63.0	18.60	437.24	12,300	436	166	711	2,120	517	0.79	
11/29/2000	Р	s	455.84	43.0	63.0	20.57	435.27	26,000	491	149	1,090	3,810	671/<20.0	0.51	
5/2/2001		k		43.0	63.0										
MW-6															
3/23/1995			454.93	48.0	68.0	13.38	441.55	<50	1.5	< 0.5	< 0.5	0.9			
5/31/1995			454.93	48.0	68.0	13.96	440.97	<50	<0.5	< 0.5	< 0.5	< 0.5			
8/31/1995			454.93	48.0	68.0	16.71	438.22	150	9	1.8	4	12	<3		
11/28/1995			454.93	48.0	68.0	15.65	439.28	<50	0.6	< 0.5	< 0.5	0.8	<3		
2/22/1996			454.93	48.0	68.0	12.53	442.40	<50	1.9	< 0.5	0.8	2.1	<3		
5/23/1996			454.93	48.0	68.0	13.24	441.69	<50	<0.5	< 0.5	< 0.5	< 0.5	<3		
8/8/1996			454.93	48.0	68.0	16.65	438.28	<50	0.5	< 0.5	< 0.5	0.5	<3		
11/7/1996			454.93	48.0	68.0	16.65	438.28	110	5.3	1.3	3.1	6.6	<3		
3/27/1997			454.93	48.0	68.0	14.25	440.68	<50	2.3	< 0.5	0.9	3.5	4		
5/19/1997			454.93	48.0	68.0	15.87	439.06	<50	< 0.5	< 0.5	< 0.5	< 0.5	<3		
5/18/1998			454.93	48.0	68.0	14.00	440.93	<50	< 0.5	< 0.5	< 0.5	< 0.5	<3		
11/2/1998			454.93	48.0	68.0	24.95	429.98	<50	1.2	< 0.5	< 0.5	< 0.5	3		
6/4/1999	Р		454.93	48.0	68.0	16.68	438.25	310	41	3.8	11	19	33		
11/11/1999	Р		454.93	48.0	68.0	16.12	438.81	<50	0.5	<0.5	<0.5	<1	<3	0.92	
6/20/2000	Р		454.93	48.0	68.0	16.63	438.30	<50.0	< 0.500	< 0.500	< 0.500	< 0.500	17.3	1.9	
8/29/2000		q	454.93	48.0	68.0			<50.0	< 0.500	< 0.500	< 0.500	< 0.500	<2.50		
8/29/2000	Р		454.93	48.0	68.0	17.91	437.02	<50.0	< 0.500	0.551	< 0.500	< 0.500	<2.50	1.67	
11/29/2000	Р		454.93	48.0	68.0	20.30	434.63	<50.0	< 0.500	< 0.500	< 0.500	1.03	<2.50	0.79	

ARCO Service Station #6113, 785 East Stanley Blvd., Livermore, CA

								,		C (. /T.)			
Well and			тос	Top of Screen	Bottom of Screen	DTW	Water Level Elevation	GRO/		Concentra	tions in (µ Ethyl-	g/L) Total		DO	
Sample Date	P/NP	Comments	(feet)	(ft bgs)	(ft bgs)	(feet)	(feet)	TPHg	Benzene	Toluene	Benzene	Xylenes	MTBE	(mg/L)	pН
MW-6 Cont.															
5/2/2001	Р	S	454.93	48.0	68.0	22.20	432.73	3,230	1,300	33.6	89.4	136	1,810/2,310	0.95	
8/15/2001	Р	8	454.93	48.0	68.0	27.95	426.98	<50	< 0.50	< 0.50	< 0.50	< 0.50	21/25	0.63	
10/5/2001	Р		454.93	48.0	68.0	28.05	426.88	<50	< 0.50	< 0.50	< 0.50	< 0.50	<2.5	0.85	
1/21/2002	Р		454.93	48.0	68.0	26.81	428.12	<50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0	0.91	
4/26/2002	Р		454.93	48.0	68.0	26.27	428.66	<50	< 0.50	< 0.50	< 0.50	< 0.50	17	0.75	
10/7/2002	Р	а	454.93	48.0	68.0	20.05	434.88	60	13	1.7	1.7	3.5	8	2.8	
05/01/2003	Р	с	454.93	48.0	68.0	17.62	437.31	<50	5.4	< 0.50	0.63	1.3	12	1.6	
10/03/2003	Р	d	454.93	48.0	68.0	19.62	435.31	80	2.6	<2.5	<2.5	<2.5	120	5.1	6.9
04/06/2004	Р		457.24	48.0	68.0	16.88	440.36	<2,500	<25	<25	<25	<25	1,700	4.1	7.0
10/28/2004	Р		457.24	48.0	68.0	19.20	438.04	3,200	<25	<25	<25	<25	3,100	6.8	6.9
04/13/2005	Р		457.24	48.0	68.0	15.15	442.09	<5,000	<50	<50	<50	<50	3,900	3.9	7.0
10/27/2005	Р		457.24	48.0	68.0	18.12	439.12	<5,000	<50	<50	<50	<50	2,900	3.15	7.0
04/12/2006	Р		457.24	48.0	68.0	15.32	441.92	<5,000	<50	<50	<50	<50	3,400	4.3	7.6
10/31/2006	Р	u, v	457.24	48.0	68.0	18.85	438.39	2,700	<25	<25	<25	<25	3,400		10.36
4/19/2007	Р	v	457.24	48.0	68.0	22.25	434.99	970	<25	<25	<25	<25	2,200	5.54	10.52
10/16/2007	Р	v, w (MTBE)	457.24	48.0	68.0	37.17	420.07	2,700	240	<25	50	55	2,600	4.56	10.26
4/24/2008	Р		457.24	48.0	68.0	24.55	432.69	15,000	5,300	200	620	470	4,200	2.15	6.90
9/10/2008		k	457.24	48.0	68.0										
MW-7															
3/23/1995			454.92	48.0	68.0	13.29	441.63	<50	< 0.5	< 0.5	< 0.5	< 0.5			
5/31/1995			454.92	48.0	68.0	13.72	441.20	<50	< 0.5	< 0.5	< 0.5	< 0.5			
8/31/1995			454.92	48.0	68.0	16.53	438.39	<50	< 0.5	< 0.5	< 0.5	1.2	<3		
11/28/1995			454.92	48.0	68.0	15.50	439.42	<50	< 0.5	< 0.5	< 0.5	< 0.5	<3		
2/22/1996			454.92	48.0	68.0	12.30	442.62	<50	< 0.5	< 0.5	< 0.5	< 0.5	<3		
5/23/1996			454.92	48.0	68.0	13.02	441.90	<50	< 0.5	< 0.5	< 0.5	< 0.5	<3		
8/8/1996		m	454.92	48.0	68.0										
11/7/1996			454.92	48.0	68.0	16.50	438.42	<50	< 0.5	< 0.5	< 0.5	0.8	<3		
3/27/1997			454.92	48.0	68.0	14.22	440.70	<50	< 0.5	< 0.5	< 0.5	< 0.5	<3		
5/19/1997			454.92	48.0	68.0	15.74	439.18	<50	<0.5	<0.5	< 0.5	< 0.5	<3		
5/18/1998			454.92	48.0	68.0	13.82	441.10	<50	< 0.5	< 0.5	< 0.5	< 0.5	<3		

 Table 1. Summary of Ground-Water Monitoring Data: Relative Water Elevations and Laboratory Analyses

ARCO Service Station #6113, 785 East Stanley Blvd., Livermore, CA

Top of Bottom of Water Level Concentrations in (µg/L) Well and TOC DTW Elevation GRO/ Ethyl-DO Screen Screen Total Sample Date P/NP Comments (feet) (ft bgs) (ft bgs) (feet) (feet) TPHg Benzene Toluene Benzene **X**vlenes MTBE (mg/L)pН MW-7 Cont. 11/2/1998 454.92 48.0 68.0 24.80 430.12 <50 < 0.5 < 0.5 < 0.5 < 0.5 4 ---------6/4/1999 Р 454.92 48.0 68.0 16.55 438.37 < 50 < 0.5 < 0.5 < 0.5 < 0.5 <3 -----454.92 48.0 11/11/1999 Р 68.0 18.02 436.90 < 50 < 0.5 < 0.5 < 0.5 <1 <3 1.03 ---454.92 48.0 438.42 < 0.500 6/20/2000 Р 68.0 16.50 < 50.0 < 0.500 < 0.500 < 0.500 < 2.50 1.3 --8/29/2000 454.92 48.0 < 0.500 <2.50 Ρ 68.0 17.80 437.12 <50.0 < 0.500 < 0.500 < 0.500 1.67 ---11/29/2000 Р 454.92 48.0 68.0 19.61 435.31 < 50.0 < 0.500 < 0.500 < 0.500 < 0.500 < 2.50 0.51 ---5/2/2001 Р 454.92 48.0 68.0 22.05 432.87 <50.0 < 0.500 < 0.500 < 0.500 < 0.500 <2.50/2.66 0.9 --s 48.0 8/15/2001 Р 454.92 68.0 27.55 427.37 < 50 < 0.50< 0.50< 0.50< 0.50 <2.5 0.84 --10/5/2001 Р 454.92 48.0 68.0 27.59 427.33 < 50 < 0.50 < 0.50 < 0.50 < 0.50 <2.5 0.62 ---68.0 428.42 1/21/2002 Р 454.92 48.0 26.50 < 50 < 0.50< 0.50< 0.50< 0.50 15/21 0.65 s ---4/26/2002 Р 454.92 48.0 68.0 26.22 428.70 <50 < 0.50< 0.50 < 0.50 < 0.50 18 0.61 ---10/7/2002 454.92 48.0 434.88 0.77 68.0 20.04 < 50 1.2 < 0.50 < 0.5041 4.8 ------05/01/2003 Ρ с 454.92 48.0 68.0 17.47 437.45 <50 < 0.50 < 0.50 < 0.50 0.5 43 2.7 ---10/03/2003 454.92 48.0 19.55 435.37 7.1 Р d 68.0 < 50 <1.0 <1.0 <1.0 <1.0 49 5.7 04/06/2004 Р 457.17 48.0 68.0 16.60 440.57 < 50 < 0.50 < 0.50 < 0.50 0.75 0.76 0.7 7.0 10/28/2004 Р 457.17 48.0 68.0 19.17 438.00 < 50 < 0.50< 0.50 < 0.50 < 0.50 14 6.9 6.7 04/13/2005 48.0 Р 457.17 68.0 14.84 442.33 <50 < 0.50 < 0.50 < 0.50 < 0.50 1.7 2.3 6.9 10/27/2005 439.79 < 0.50 7.0 Р 457.17 48.0 68.0 17.38 < 50 < 0.50< 0.50< 0.502.3 2.16 04/12/2006 442.33 Р 457.17 48.0 68.0 14.84 <50 < 0.50 < 0.50 < 0.50 < 0.50 1.1 3.0 7.2 10/31/2006 457.17 48.0 438.43 < 0.50 7.55 Р 68.0 18.74 < 50 < 0.50 < 0.50< 0.50< 0.50 ---4/19/2007 Р 457.17 48.0 68.0 22.11 435.06 <50 < 0.50 < 0.50 < 0.50 < 0.50 < 0.50 4.37 7.60 10/16/2007 Р 457.17 48.0 37.23 419.94 < 0.50 24 4.87 8.02 68.0 140 68 6.8 5.0 4/24/2008 Р 457.17 48.0 68.0 24.47 432.70 <50 < 0.50 0.99 < 0.50 < 0.50 22 1.96 7.24 7.14 10/15/2008 Р 457.17 48.0 68.0 43.40 413.77 < 50 < 0.50 < 0.50< 0.50 < 0.50 8.2 2.31 4/28/2009 457.17 48.0 425.04 6.93 Р 68.0 32.13 <50 < 0.50 < 0.50 < 0.50 < 0.50 < 0.50 3.78 11/9/2009 Р 457.17 48.0 68.0 22.15 435.02 < 50 < 0.50 < 0.50< 0.50 < 0.50 < 0.50 1.3 6.8 4/12/2010 Р 457.17 48.0 < 0.50 < 0.50 7.55 68.0 18.49 438.68 <50 < 0.50 <0.50 < 0.50 ---**MW-8** 3/23/1995 --e 456.97 47.0 67.0 11.55 445.42 ---------5/31/1995 456.97 47.0 67.0 12.37 444.60 --e -----------------------

ARCO Service Station #6113, 785 East Stanley Blvd., Livermore, CA

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Well and			тос	Top of Screen	Bottom of Screen	DTW	Water Level Elevation	GRO/		Concentra	tions in (µ; Ethyl-	g/L) Total		DO	
Sample Date	P/NP	Comments	(feet)	(ft bgs)	(ft bgs)	(feet)	(feet)	GKO/ TPHg	Benzene	Toluene	Benzene	Xylenes	MTBE	(mg/L)	рН
			()	(8-)	(()	()	8						(P
MW-8 Cont.															
8/31/1995		е	456.97	47.0	67.0	15.68	441.29								
11/28/1995			456.97	47.0	67.0	14.15	442.82	<50	< 0.5	< 0.5	< 0.5	< 0.5	<3		
2/22/1996		e	456.97	47.0	67.0	10.97	446.00								
5/23/1996		e	456.97	47.0	67.0	11.90	445.07								
8/8/1996		e	456.97	47.0	67.0	13.85	443.12								
11/7/1996			456.97	47.0	67.0	15.08	441.89	<50	< 0.5	< 0.5	< 0.5	< 0.5	<3		
3/27/1997		e	456.97	47.0	67.0	12.96	444.01								
5/19/1997		е	456.97	47.0	67.0	14.35	442.62								
5/18/1998		e	456.97	47.0	67.0	12.97	444.00								
11/2/1998			456.97	47.0	67.0	26.01	430.96	<50	< 0.5	< 0.5	< 0.5	< 0.5	<3		
6/4/1999		e	456.97	47.0	67.0	15.53	441.44								
11/11/1999	Р		456.97	47.0	67.0	16.67	440.30	<50	<0.5	< 0.5	< 0.5	<1	<3	1.01	
6/20/2000		e	456.97	47.0	67.0	15.29	441.68							2.4	
8/29/2000		е	456.97	47.0	67.0	16.59	440.38							3.37	
11/29/2000	Р		456.97	47.0	67.0	19.80	437.17	<50.0	< 0.500	< 0.500	< 0.500	0.772	<2.50	1.35	
5/2/2001		е	456.97	47.0	67.0	22.12	434.85								
8/15/2001		e	456.97	47.0	67.0	27.63	429.34								
10/5/2001	Р		456.97	47.0	67.0	27.65	429.32	<50	< 0.50	< 0.50	< 0.50	<0.50	<2.5	1.07	
1/21/2002		e	456.97	47.0	67.0	26.73	430.24								
4/26/2002		e	456.97	47.0	67.0	26.39	430.58								
10/7/2002			456.97	47.0	67.0	18.43	438.54	<50	< 0.50	< 0.50	< 0.50	0.86	< 0.50	4.2	
05/01/2003		r	456.97	47.0	67.0	16.47	440.50								
10/27/2005			456.97	47.0	67.0	17.14	439.83								
04/12/2006			456.97	47.0	67.0	14.08	442.89								
10/31/2006			456.97	47.0	67.0	18.12	438.85								
4/19/2007			456.97	47.0	67.0	22.39	434.58								
10/16/2007			456.97	47.0	67.0	38.18	418.79								
4/24/2008			456.97	47.0	67.0	25.43	431.54								
6/18/2008		k		47.0	67.0										
MW-9															
															I

 Table 1. Summary of Ground-Water Monitoring Data: Relative Water Elevations and Laboratory Analyses

ARCO Service Station #6113, 785 East Stanley Blvd., Livermore, CA

	Top of Bottom of														
				Top of	Bottom of		Water Level		1	Concentra	tions in (µ	g/L)			
Well and			TOC	Screen	Screen	DTW	Elevation	GRO/			Ethyl-	Total		DO	
Sample Date	P/NP	Comments	(feet)	(ft bgs)	(ft bgs)	(feet)	(feet)	TPHg	Benzene	Toluene	Benzene	Xylenes	MTBE	(mg/L)	pН
MW-9 Cont.															
3/23/1995		e	456.18	48.0	68.0	13.18	443.00								
5/31/1995		e	456.18	48.0	68.0	12.66	443.52								
8/31/1995		e	456.18	48.0	68.0	14.40	441.78								
11/28/1995			456.18	48.0	68.0	14.26	441.92	<50	< 0.5	<0.5	< 0.5	< 0.5	<3		
2/22/1996		e	456.18	48.0	68.0	12.05	444.13								
5/23/1996		e	456.18	48.0	68.0	12.07	444.11								
8/8/1996		e	456.18	48.0	68.0	14.12	442.06								
11/7/1996			456.18	48.0	68.0	15.42	440.76	<50	< 0.5	< 0.5	< 0.5	<0.5	<3		
3/27/1997		e	456.18	48.0	68.0	13.01	443.17								
5/19/1997		е	456.18	48.0	68.0	14.60	441.58								
5/18/1998		e	456.18	48.0	68.0	12.60	443.58								
11/2/1998		е	456.18	48.0	68.0	25.08	431.10								
6/4/1999	Р		456.18	48.0	68.0	15.87	440.31	<50	< 0.5	< 0.5	< 0.5	< 0.5	<3		
11/11/1999	Р		456.18	48.0	68.0	17.02	439.16	<50	< 0.5	< 0.5	< 0.5	<1	<3	0.96	
6/20/2000		e	456.18	48.0	68.0	15.54	440.64							2.1	
8/29/2000		е	456.18	48.0	68.0	16.81	439.37							2.59	
11/29/2000	Р		456.18	48.0	68.0	18.81	437.37	<50.0	< 0.500	< 0.500	< 0.500	< 0.500	<2.50	0.81	
5/2/2001		е	456.18	48.0	68.0	22.09	434.09								
8/15/2001		e	456.18	48.0	68.0	27.59	428.59								
10/5/2001	Р		456.18	48.0	68.0	27.63	428.55	<50	< 0.50	< 0.50	< 0.50	<0.50	<2.5	0.93	
10/5/2001		q	456.18	48.0	68.0	27.63	428.55	<50	< 0.50	< 0.50	< 0.50	< 0.50	<2.5		
1/21/2002		е	456.18	48.0	68.0	26.77	429.41								
4/26/2002		e	456.18	48.0	68.0	26.41	429.77								
10/7/2002	Р		456.18	48.0	68.0	18.85	437.33	<50	< 0.50	< 0.50	< 0.50	<0.50	< 0.50	2.6	
05/01/2003		c, e	456.18	48.0	68.0	17.84	438.34								
10/03/2003	Р	d	456.18	48.0	68.0	18.69	437.49	<50	1.1	0.57	< 0.50	< 0.50	< 0.50	4.9	6.8
04/06/2004		e	458.55	48.0	68.0	16.08	442.47								
10/28/2004	Р		458.55	48.0	68.0	18.35	440.20	<50	< 0.50	< 0.50	< 0.50	<0.50	< 0.50	6.8	6.9
04/13/2005		e	458.55	48.0	68.0	14.09	444.46								
10/27/2005	Р		458.55	48.0	68.0	17.41	441.14	<50	0.51	< 0.50	< 0.50	<0.50	1.4	2.56	7.0
04/12/2006			458.55	48.0	68.0	14.18	444.37								

 Table 1. Summary of Ground-Water Monitoring Data: Relative Water Elevations and Laboratory Analyses

ARCO Service Station #6113, 785 East Stanley Blvd., Livermore, CA

			Top of Bottom of Water Level Concentrations in (µg/L)												
***			TOG	-		DEN		GDQ/		Concentra				DO	
Well and Sample Date	P/NP	Comments	TOC (feet)	Screen (ft bgs)	Screen (ft bgs)	DTW (feet)	Elevation (feet)	GRO/ TPHg	Benzene	Toluene	Ethyl- Benzene	Total Xylenes	MTBE	DO (mg/L)	nH
-	1/111	Comments	(ieee)	(10 085)	(it bgs)	(iect)	(ieee)		Denizene	Tolucile	Demzene	nyienes	MIDL	(iiig/ 12)	P-1
MW-9 Cont.															
10/31/2006	Р		458.55	48.0	68.0	17.97	440.58	<50	< 0.50	< 0.50	< 0.50	<0.50	< 0.50		7.46
4/19/2007			458.55	48.0	68.0	22.37	436.18								
10/16/2007	Р		458.55	48.0	68.0	37.75	420.80	<50	0.83	< 0.50	< 0.50	<0.50	< 0.50	1.27	7.59
4/24/2008			458.55	48.0	68.0	24.89	433.66								
10/15/2008	Р		458.55	48.0	68.0	44.16	414.39	<50	< 0.50	< 0.50	< 0.50	<0.50	< 0.50	1.14	7.08
4/28/2009			458.55	48.0	68.0	32.61	425.94								
11/9/2009	Р		458.55	48.0	68.0	20.69	437.86	<50	< 0.50	< 0.50	< 0.50	<0.50	< 0.50	3.33	6.82
4/12/2010			458.55	48.0	68.0	17.29	441.26								
MW-10															
3/23/1995		е	456.85	32.0	52.0	14.86	441.99								
5/31/1995		е	456.85	32.0	52.0	15.63	441.22								
8/31/1995		e	456.85	32.0	52.0	14.40	442.45								
11/28/1995			456.85	32.0	52.0	17.24	439.61	<50	<0.5	< 0.5	< 0.5	<0.5	<3		
2/22/1996		e	456.85	32.0	52.0	14.30	442.55								
5/23/1996		е	456.85	32.0	52.0	14.93	441.92								
8/8/1996		e	456.85	32.0	52.0	17.20	439.65								
11/7/1996			456.85	32.0	52.0	18.25	438.60	<50	<0.5	< 0.5	< 0.5	<0.5	<3		
3/27/1997		e	456.85	32.0	52.0	15.77	441.08								
5/19/1997		е	456.85	32.0	52.0	17.38	439.47								
5/18/1998		e	456.85	32.0	52.0	15.47	441.38								
11/2/1998			456.85	32.0	52.0	26.94	429.91	<50	< 0.5	< 0.5	< 0.5	<0.5	<3		
6/4/1999		е	456.85	32.0	52.0	17.19	439.66								
11/11/1999	Р		456.85	32.0	52.0	19.35	437.50	<50	< 0.5	<0.5	< 0.5	<1	<3	0.68	
6/20/2000		е	456.85	32.0	52.0	17.92	438.93							2.9	
8/29/2000		е	456.85	32.0	52.0	19.15	437.70							1.54	
11/29/2000	Р		456.85	32.0	52.0	21.30	435.55	<50.0	< 0.500	< 0.500	< 0.500	< 0.500	<2.50	0.95	
5/2/2001		е	456.85	32.0	52.0	29.95	426.90								
8/15/2001		e	456.85	32.0	52.0	30.74	426.11								
10/5/2001	Р		456.85	32.0	52.0	30.95	425.90	<50	< 0.50	< 0.50	< 0.50	<0.50	<2.5	0.89	
1/21/2002		e	456.85	32.0	52.0	28.97	427.88								

 Table 1. Summary of Ground-Water Monitoring Data: Relative Water Elevations and Laboratory Analyses

ARCO Service Station #6113, 785 East Stanley Blvd., Livermore, CA

				Top of	Bottom of		Water I evel	ater Level Concentrations in (μg/L)								
Well and			тос	Screen	Screen	DTW	Elevation	GRO/			Ethyl-	Total	վ	DO		
Sample Date	P/NP	Comments	(feet)	(ft bgs)	(ft bgs)	(feet)	(feet)	TPHg	Benzene	Toluene	Benzene	Xylenes	MTBE	(mg/L)	pН	
MW-10 Cont.																
4/26/2002		е	456.85	32.0	52.0	28.50	428.35									
10/7/2002			456.85	32.0	52.0	21.15	435.70	<50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	3.0		
05/01/2003		c, e	456.85	32.0	52.0	18.90	437.95									
10/03/2003	Р	d	456.85	32.0	52.0	20.64	436.21	<50	< 0.50	< 0.50	< 0.50	<0.50	< 0.50	2.4	7.1	
04/06/2004		e	459.20	32.0	52.0	17.99	441.21									
10/28/2004	Р		459.20	32.0	52.0	20.27	438.93	<50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	5.9	7.1	
04/13/2005		e	459.20	32.0	52.0	16.25	442.95									
10/27/2005	Р		459.20	32.0	52.0	19.03	440.17	<50	< 0.50	< 0.50	< 0.50	<0.50	< 0.50	3.38	7.2	
04/12/2006			459.20	32.0	52.0	14.95	444.25									
10/31/2006	Р		459.20	32.0	52.0	20.20	439.00	<50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		7.30	
4/19/2007			459.20	32.0	52.0	24.00	435.20									
10/16/2007	NP		459.20	32.0	52.0	38.99	420.21	<50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	2.20	7.36	
4/24/2008			459.20	32.0	52.0	26.62	432.58									
9/10/2008		k	459.20	32.0	52.0											
MW-11																
3/23/1995			455.07	38.0	45.0	17.34	437.73									
5/31/1995			455.07	38.0	45.0	16.68	438.39	<50	< 0.5	< 0.5	< 0.5	< 0.5				
8/31/1995		h	455.07	38.0	45.0	20.20	434.87									
11/28/1995			455.07	38.0	45.0	17.80	437.27	<50	<0.5	< 0.5	< 0.5	< 0.5	<3			
2/22/1996		h	455.07	38.0	45.0	15.97	439.10									
5/23/1996			455.07	38.0	45.0	15.50	439.57	<50	< 0.5	< 0.5	< 0.5	< 0.5	<3			
8/8/1996		h	455.07	38.0	45.0	17.77	437.30									
11/7/1996			455.07	38.0	45.0	17.45	437.62	<50	<0.5	< 0.5	< 0.5	< 0.5	<3			
3/27/1997		h	455.07	38.0	45.0	15.77	439.30									
5/19/1997			455.07	38.0	45.0	16.80	438.27	<50	1.1	4.5	< 0.5	2.2	<3			
5/18/1998			455.07	38.0	45.0	15.38	439.69	<50	< 0.5	< 0.5	< 0.5	< 0.5	<3			
11/2/1998			455.07	38.0	45.0	24.15	430.92	<50	< 0.5	< 0.5	< 0.5	< 0.5	<3			
6/4/1999	Р		455.07	38.0	45.0	18.39	436.68	<50	<0.5	< 0.5	< 0.5	< 0.5	<3			
11/11/1999	Р		455.07	38.0	45.0	18.62	436.45	<50	<0.5	<0.5	< 0.5	<1	<3	1.01		
6/20/2000	Р		455.07	38.0	45.0	17.82	437.25	<50.0	0.631	< 0.500	< 0.500	< 0.500	<2.50	4.1		

 Table 1. Summary of Ground-Water Monitoring Data: Relative Water Elevations and Laboratory Analyses

ARCO Service Station #6113, 785 East Stanley Blvd., Livermore, CA

				AKCO Service		, 700 Eu			1010, 011						
				Top of	Bottom of		Water Level		1	Concentra	tions in (µ				
Well and	DAID		TOC	Screen	Screen	DTW	Elevation	GRO/	D		Ethyl-	Total	MEDE	DO	
Sample Date	P/NP	Comments	(feet)	(ft bgs)	(ft bgs)	(feet)	(feet)	TPHg	Benzene	Toluene	Benzene	Xylenes	MTBE	(mg/L)	рН
MW-11 Cont.															
8/29/2000		h	455.07	38.0	45.0	19.50	435.57								
11/29/2000	Р		455.07	38.0	45.0	20.60	434.47	<50.0	< 0.500	< 0.500	< 0.500	1.63	<2.50	0.97	
5/2/2001	Р		455.07	38.0	45.0	22.42	432.65	<50.0	< 0.500	< 0.500	< 0.500	< 0.500	<2.50	1.04	
8/15/2001		h	455.07	38.0	45.0	27.41	427.66								
10/5/2001	Р		455.07	38.0	45.0	27.59	427.48	<50	< 0.50	< 0.50	< 0.50	< 0.50	<2.5	1.05	
1/21/2002		h	455.07	38.0	45.0	26.75	428.32								
4/26/2002	Р		455.07	38.0	45.0	26.50	428.57	<50	< 0.50	< 0.50	< 0.50	<0.50	<2.5	0.47	
10/7/2002			455.07	38.0	45.0	20.79	434.28	<50	< 0.50	< 0.50	< 0.50	<0.50	1.0	1.4	
05/01/2003	Р	с	455.07	38.0	45.0	20.55	434.52	<50	< 0.50	< 0.50	< 0.50	<0.50	1.5	3.2	
10/03/2003	Р	d	455.07	38.0	45.0	20.58	434.49	<50	< 0.50	< 0.50	< 0.50	<0.50	3.1	3.0	7.1
04/06/2004	Р		457.40	38.0	45.0	17.52	439.88	<50	< 0.50	< 0.50	< 0.50	<0.50	14	5.1	6.7
10/28/2004	Р		457.40	38.0	45.0	20.32	437.08	<50	< 0.50	< 0.50	< 0.50	<0.50	29	1.3	7.2
04/13/2005	Р		457.40	38.0	45.0	16.20	441.20	<50	< 0.50	< 0.50	< 0.50	<0.50	3.7	2.8	7.0
10/27/2005	Р		457.40	38.0	45.0	21.98	435.42	<50	< 0.50	< 0.50	< 0.50	<0.50	21	1.04	7.2
04/12/2006		Well inaccessible m	457.40	38.0	45.0										
10/31/2006			457.40	38.0	45.0										
4/19/2007	Р		457.40	38.0	45.0	22.38	435.02	<50	< 0.50	< 0.50	< 0.50	< 0.50	12	7.11	7.57
10/16/2007	Р		457.40	38.0	45.0	37.11	420.29	<50	< 0.50	< 0.50	< 0.50	<0.50	6.6	0.60	7.57
4/24/2008	Р		457.40	38.0	45.0	26.10	431.30	<50	< 0.50	< 0.50	< 0.50	<0.50	17	1.83	7.26
10/15/2008			457.40	38.0	45.0	43.34	414.06								
4/28/2009	Р		457.40	38.0	45.0	32.85	424.55	<50	< 0.50	< 0.50	< 0.50	<0.50	5.3	5.89	7.23
11/9/2009	Р		457.40	38.0	45.0	22.99	434.41	<50	< 0.50	< 0.50	< 0.50	<0.50	12	0.72	7.0
4/12/2010	Р		457.40	38.0	45.0	21.14	436.26	<50	<0.50	<0.50	<0.50	<0.50	10	2.03	7.25
MW-12															
3/23/1995		h	455.04	18.0	34.5	15.54	439.50								
5/31/1995			455.04	18.0	34.5	15.66	439.38	<50	< 0.5	< 0.5	< 0.5	<0.5			
8/31/1995		h	455.04	18.0	34.5	18.23	436.81								
11/28/1995			455.04	18.0	34.5	17.53	437.51	<50	<0.5	<0.5	< 0.5	<0.5	<3		
2/22/1996		h	455.04	18.0	34.5	14.45	440.59								
5/23/1996			455.04	18.0	34.5	14.88	440.16	<50	<0.5	<0.5	< 0.5	<0.5	<3		
		l						20						1	I

Table 1. Summary of Ground-Water Monitoring Data: Relative Water Elevations and Laboratory Analyses

ARCO Service Station #6113, 785 East Stanley Blvd., Livermore, CA

						,	st Stancy Dive								
			-	Top of	Bottom of		Water Level	~~~ ~ /		Concentra					
Well and	P/NP	Commonto	TOC (feet)	Screen	Screen (ft has)	DTW (feat)	Elevation (fact)	GRO/ TPHg	Benzene	Toluene	Ethyl-	Total Vylenes	MTBE	DO (mg/I)	nII
Sample Date	r/INF	Comments	(feet)	(ft bgs)	(ft bgs)	(feet)	(feet)	тгпд	Belizelle	Toluelle	Benzene	Xylenes	MIDE	(mg/L)	pН
MW-12 Cont.															
8/8/1996		h	455.04	18.0	34.5	17.30	437.74								
11/7/1996			455.04	18.0	34.5	18.30	436.74	<50	< 0.5	< 0.5	< 0.5	< 0.5	<3		
3/27/1997		h	455.04	18.0	34.5	15.69	439.35								
5/19/1997			455.04	18.0	34.5	17.41	437.63	<50	< 0.5	< 0.5	< 0.5	< 0.5	<3		
5/18/1998			455.04	18.0	34.5	15.21	439.83	<50	<0.5	< 0.5	< 0.5	< 0.5	<3		
11/2/1998		m	455.04	18.0	34.5										
6/4/1999		m	455.04	18.0	34.5										
11/11/1999		m	455.04	18.0	34.5										
6/20/2000		m	455.04	18.0	34.5										
8/29/2000		m	455.04	18.0	34.5										
11/29/2000		m	455.04	18.0	34.5										
5/2/2001		m	455.04	18.0	34.5										
8/15/2001		m	455.04	18.0	34.5										
10/5/2001		m	455.04	18.0	34.5										
1/21/2002		m	455.04	18.0	34.5										
4/26/2002		m	455.04	18.0	34.5										
10/7/2002		m	455.04	18.0	34.5										
05/01/2003		c, m	455.04	18.0	34.5										
10/03/2003		m	455.04	18.0	34.5										
04/06/2004	Р		457.37	18.0	34.5	18.14	439.23	<50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	2.4	6.4
10/28/2004	Р		457.37	18.0	34.5	20.66	436.71	<50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	1.7	6.8
04/13/2005	Р		457.37	18.0	34.5	16.25	441.12	<50	< 0.50	< 0.50	< 0.50	0.55	< 0.50	1.9	7.5
10/27/2005	Р		457.37	18.0	34.5	19.77	437.60	<50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	1.81	7.0
04/12/2006	Р		457.37	18.0	34.5	16.08	441.29	<50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	2.6	7.2
10/31/2006			457.37	18.0	34.5										
4/19/2007	NP		457.37	18.0	34.5	22.34	435.03	<50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	4.66	7.28
10/16/2007		f	457.37	18.0	34.5										
4/24/2008		m	457.37	18.0	34.5										
10/15/2008		f	457.37	18.0	34.5										
4/28/2009	NP		457.37	18.0	34.5	32.21	425.16	<50	< 0.50	< 0.50	< 0.50	< 0.50	1.4	7.68	6.63
11/9/2009	NP		457.37	18.0	34.5	23.74	433.63	<50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		

 Table 1. Summary of Ground-Water Monitoring Data: Relative Water Elevations and Laboratory Analyses

ARCO Service Station #6113, 785 East Stanley Blvd., Livermore, CA

				Top of	Bottom of		Water Level			Concentra	tions in (µ	g/[_)			
Well and Sample Date	P/NP	Comments	TOC (feet)	Screen (ft bgs)	Screen (ft bgs)	DTW (feet)	Elevation (feet)	GRO/ TPHg	Benzene	Toluene	Ethyl- Benzene	Total Xylenes	MTBE	DO (mg/L)	рН
MW-12 Cont.															
4/12/2010	NP		457.37	18.0	34.5	19.93	437.44	<50	<0.50	<0.50	<0.50	<0.50	<0.50		7.18
MW-13															
1/21/2002	Р					24.61		15,000	160	68	1,700	3,200	4,900/5,200	0.71	
4/26/2002	Р					24.20		17,000	98	<100	1,700	3,400	1,600	0.6	
10/7/2002		b				20.12		14,000	510	<50	2,200	2,300	2,800	0.8	
05/01/2003	Р	с				17.82		21,000	230	<50	1,900	2,300	1,600	1.9	
10/03/2003	Р	d				19.91		19,000	570	55	1,900	2,300	2,400	0.8	6.9
04/06/2004	Р		457.91			17.14	440.77	15,000	470	35	1,600	1,300	1,800	2.0	6.7
10/28/2004	Р		457.91			18.83	439.08	18,000	350	<25	1,900	1,800	1,800	0.8	6.7
04/13/2005	Р		457.91			15.23	442.68	9,700	110	<25	860	280	920	0.9	6.9
10/27/2005	Р		457.91			18.45	439.46	11,000	120	12	1,500	450	580	0.75	6.8
04/12/2006	Р		457.91			15.06	442.85	4,700	65	<10	450	69	470	1.2	6.8
10/31/2006	Р		457.91			19.06	438.85	15,000	150	<25	1,700	400	710		6.87
4/19/2007	NP		457.91			22.21	435.70	14,000	60	<25	1,800	640	330	1.44	7.09
10/16/2007		f	457.91												
4/24/2008	NP		457.91			24.68	433.23	1,400	4.5	1.1	9.4	15	49	2.78	7.25
9/10/2008		k	457.91												
RMW-13															
4/12/2010	NP	у	458.03	15	35	18.50	439.53	63,000	7,800	200	1,600	6,400	1,500	2.47	7.21
VW-1															
8/29/2000	Р			24	45	17.40		2,360	27.6	11.6	26.3	33.2	110	4.47	
11/29/2000	Р			24.0	45	18.75		<50.0	< 0.500	< 0.500	< 0.500	< 0.500	<2.50	0.46	
5/2/2001				24.0	45	21.59									
8/15/2001	Р	s		24.0	45	24.62		1,200	6.3	4.3	1.7	1.3	20/17		
8/15/2001		q		24.0	45			1,200	6.2	4.1	1.8	1.1	20/17		
10/5/2001	Р	8		24.0	45	24.75		1,500	140	55	28	82	610/660	0.71	
1/21/2002	Р	s		24.0	45	24.59		6,700	810	350	270	1,100	2,600/3,400	0.69	
1/21/2002		q, s		24.0	45			8,000	770	320	96	1,100	2,500/3,200		
4/26/2002	Р			24.0	45	24.27		370	26	2.1	6.6	1.7	48	0.5	

 Table 1. Summary of Ground-Water Monitoring Data: Relative Water Elevations and Laboratory Analyses

ARCO Service Station #6113, 785 East Stanley Blvd., Livermore, CA

				The fit					,	a ,		(())			
Well and			тос	Top of Screen	Bottom of Screen	DTW	Water Level Elevation	GRO/		Concentra	tions in (µ; Ethyl-	g/L) Total		DO	
Sample Date	P/NP	Comments	(feet)	(ft bgs)	(ft bgs)	(feet)	(feet)	TPHg	Benzene	Toluene	Benzene	Xylenes	MTBE	(mg/L)	pН
VW-1 Cont.					_							-			
4/26/2002		a		24.0	45			350	24	1.6	5.9	1.6	45		
10/7/2002	P	q b		24.0	45	19.20		410	24	2.2	8	4.3	88	1.7	
05/01/2003	P	с		24.0	45	16.60		240	6.4	<0.50	3.3	1.3	36	1.7	
10/03/2003	P	d		24.0	45	18.82		180	1.5	<0.50	0.69	<0.50	12	1.1	7.3
04/06/2004	P	u	457.08	24.0	45	15.78	441.30	300	2.2	<0.50	3.0	1.3	13	2.4	7.2
10/28/2004	P		457.08	24.0	45	18.33	438.75	210	< 0.50	< 0.50	0.67	<0.50	< 0.50	1.2	7.1
04/13/2005	P		457.08	24.0	45	14.02	443.06	740	1.8	< 0.50	3.6	1.1	9.6	2.4	7.1
10/27/2005	Р		457.08	24.0	45	17.65	439.43	1,500	78	73	36	81	13	1.64	7.3
04/12/2006	Р		457.08	24.0	45	13.89	443.19	230	1.4	< 0.50	2.2	0.76	1.6	1.4	7.3
10/31/2006	Р		457.08	24.0	45	17.87	439.21	80	< 0.50	< 0.50	2.3	0.82	< 0.50		7.76
4/19/2007	Р		457.08	24.0	45	21.09	435.99	250	1.6	< 0.50	4.7	1.3	3.0	1.15	7.66
10/16/2007	NP		457.08	24.0	45	37.10	419.98	12,000	2,300	1,900	860	2,800	150	2.65	7.61
4/24/2008	NP		457.08	24.0	45	24.40	432.68	<50	< 0.50	< 0.50	< 0.50	< 0.50	4.5	4.95	7.47
10/15/2008			457.08	24.0	45	43.07	414.01								
4/28/2009	NP		457.08	24.0	45	31.06	426.02	3,500	140	2.8	25	4.0	19	6.38	7.02
11/9/2009	Р	x (GRO)	457.08	24.0	45	21.12	435.96	230	1.8	< 0.50	< 0.50	< 0.50	1.1	2.28	6.95
4/12/2010	Р		457.08	24.0	45	17.27	439.81	410	0.80	<0.50	<0.50	<0.50	<0.50	3.38	7.21
VW-2															
8/29/2000		g		28	49.5										
11/29/2000		g		28	49.5										
5/2/2001				28	49.5										
10/5/2001		g		28	49.5										
1/21/2002		g		28	49.5										
4/26/2002		m		28	49.5										
10/7/2002		g		28	49.5										
05/01/2003		c, g		28	49.5										
10/03/2003		Well inaccessible g		28	49.5										
04/06/2004			458.64	28	49.5	16.96	441.68								
10/28/2004			458.64	28	49.5	19.35	439.29								
04/13/2005			458.64	28	49.5	15.51	443.13								

 Table 1. Summary of Ground-Water Monitoring Data: Relative Water Elevations and Laboratory Analyses

ARCO Service Station #6113, 785 East Stanley Blvd., Livermore, CA

				Top of	Bottom of		Water Level			Concentra	tions in (µ	g/L)			
Well and Sample Date	P/NP	Comments	TOC (feet)	Screen (ft bgs)	Screen (ft bgs)	DTW (feet)	Elevation (feet)	GRO/ TPHg	Benzene	Toluene	Ethyl- Benzene	Total Xylenes	MTBE	DO (mg/L)	рН
VW-2 Cont.															
10/27/2005			458.64	28	49.5	18.50	440.14								
04/12/2006			458.64	28	49.5	14.92	443.72								
10/31/2006			458.64	28	49.5	19.01	439.63								
4/19/2007			458.64	28	49.5	22.52	436.12								
10/16/2007			458.64	28	49.5	38.58	420.06								
4/24/2008			458.64	28	49.5	24.91	433.73								
10/15/2008			458.64	28	49.5	43.31	415.33								
4/28/2009			458.64	28	49.5	32.56	426.08								
11/9/2009			458.64	28	49.5	22.38	436.26								
4/12/2010			458.64	28	49.5	18.50	440.14								
VW-3															
8/29/2000	Р			15.5	24	17.93		25,400	3,540	10,600	1,280	43,000	44,700		
11/29/2000	Р	s		15.5	24	19.75		54,200	9,450	1,870	2,350	9,400	12,300/15,100	0.47	
5/2/2001		k		15.5	24										
VW-4															
8/29/2000		g		17	30										
11/29/2000	Р	s		17	30	19.45		37,500	4,510	206	2,100	9,030	6,770/7,880	0.42	
11/29/2000		q, s		17	30			36,100	3,700	206	1,850	7,890	6,430/8,460		
5/2/2001				17	30	21.66									
8/15/2001				17	30										
10/5/2001		f		17	30										
1/21/2002		f		17	30										
4/26/2002		f		17	30										
10/7/2002				17	30	19.25									
05/01/2003		с		17	30	17.29									
10/03/2003	Р	d, n		17	30	19.10		48,000	3,300	1,700	3,600	21,000	1,600	10.5	6.7
04/06/2004			456.99	17	30	18.05	438.94								
10/28/2004			456.99	17	30	18.71	438.28								
04/13/2005			456.99	17	30	14.62	442.37								

 Table 1. Summary of Ground-Water Monitoring Data: Relative Water Elevations and Laboratory Analyses

ARCO Service Station #6113, 785 East Stanley Blvd., Livermore, CA

				Top of	Bottom of		Water Level			Concentra	tions in (µ	g/L)			
Well and			TOC	Screen	Screen	DTW	Elevation	GRO/			Ethyl-	Total		DO	
Sample Date	P/NP	Comments	(feet)	(ft bgs)	(ft bgs)	(feet)	(feet)	TPHg	Benzene	Toluene	Benzene	Xylenes	MTBE	(mg/L)	pН
VW-4 Cont.															
10/27/2005			456.99	17	30	18.00	438.99								
04/12/2006			456.99	17	30	14.42	442.57								
10/31/2006			456.99	17	30	18.30	438.69								
4/19/2007			456.99	17	30	20.91	436.08								
10/16/2007		f	456.99	17	30										
4/24/2008			456.99	17	30	23.40	433.59								
10/15/2008		f	456.99	17	30										
4/28/2009		f	456.99	17	30										
11/9/2009			456.99	17	30	21.65	435.34								
4/12/2010			456.99	17	30	17.80	439.19								

Table 1. Summary of Ground-Water Monitoring Data: Relative Water Elevations and Laboratory Analyses

ARCO Service Station #6113	, 785 East Stanley Blvd., Livermore,	CA

ABBREVIATIONS & SYMBOLS:

- -- = Not analyzed/applicable/measured/available
- < = Not detected at or above specified laboratory reporting limit
- DO = Dissolved oxygen
- DTW = Depth to water in ft bgs
- GRO = Gasoline range organics
- GWE = Groundwater elevation measured in ft
- mg/L = Milligrams per liter
- MTBE = Methyl tert-butyl ether
- NP = Well not purged prior to sampling
- P = Well purged prior to sampling
- TOC = Top of casing measured in ft
- TPH-g = Total petroleum hydrocarbons as gasoline
- $\mu g/L = Micrograms per liter$

FOOTNOTES:

- a = Hydrocarbon pattern is present in the requested fuel quantitation range but does not resemble the pattern of the requested fuel.
- b = Chromatogram Pattern: C6-C10.
- c = TPH-g, benzene, toluene, ethylbenzene, and total xylenes (BTEX), and MTBE analyzed using EPA Method 8260B beginning second quarter 2003 (05/01/03).
- d = This sample was analyzed 3 days after the EPA recommended holding time. The results may still be useful for their intended purpose.
- e = Well sampled annually in the fourth quarter.
- f = Well dry.
- g = Well inaccessible.
- h = Well sampled semi-annually in second and fourth quarters.
- k = Well abandoned.
- m = Unable to locate well.
- n = Sheen in well.
- q = Duplicate sample.
- r = Well removed from sampling schedule.
- s = Original sample analyzed by 8021B and confirmation by 8260.
- t = Bolts securing well box cover stripped at head. Unable to sample well.
- u = Hydrocarbon result partly due to individ. peak(s) in quant. range.
- v = pH measurement is believed to be erroneous.
- w = Sample > 4x spike concentration.
- x = Quantitation of unknown hydrocarbon(s) in sample based on gasoline.
- y = Replacement well for abandoned wells MW-6 and MW-13 installed on 3/11/2010, and surveyed on 4/23/2010.

NOTES:

Beginning in the second quarter 2003 (05/01/03) TPH-g and BTEX were analyzed using EPA Method 8260B, and MTBE was analyzed by EPA Method 8260B beginning in fourth quarter 2002. Prior to 05/01/03, TPH-g was analyzed by EPA Method 8015; BTEX by EPA Method 8021B (EPA method 8020 before 11/11/99); and MTBE by EPA Method 8021B. (EPA method 8020 before 11/11/99). Any MTBE detection by 8021B was confirmed by EPA Method 8260 beginning third quarter 2000 (08-29-00 results).

Beginning in the fourth quarter 2003, the laboratory modified the reported analyte list. TPH-g was changed to GRO. The resulting data may be impacted by the potential of non-TPH-g analytes within the requested fuel range resulting in a higher concentration being reported.

Beginning in the second quarter 2004, the carbon range for GRO was changed from C6-C10 to C4-C12.

Wells were resurveyed to NAVD '88 datum by URS Corporation on March 8, 2004.

Values for DO and pH were obtained through field measurements.

GRO analysis was completed by EPA method 8260B (C4-C12) for samples collected from the time period April 2006 through February 4, 2008. The analysis for GRO was changed to EPA method 8015B (C6-C12) for samples collected from the time period February 5, 2008 through the present.

Note: The data within this table collected prior to April 2006 was provided to Broadbent & Associates, Inc. by Atlantic Richfield Company and their previous consultants. Broadbent & Associates, Inc. has not verified the accuracy of this information.

ARCO Service Station #6113, 785 East Stanley Blvd., Livermore, CA

Well and				Concentrati	ons in (µg/L)				
Sample Date	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	Comments
MW-1									
10/7/2002	<40	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
MW-2									
10/7/2002	<40	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
MW-3									
10/7/2002	<40	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/03/2003	<100	<20	< 0.50	<1.0	<1.0	<1.0	< 0.50	< 0.50	a
10/28/2004	<100	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/31/2006	<300	<20	22	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
MW-4									
10/7/2002	<400	<200	260	<5.0	<5.0	<5.0	<5.0	<5.0	
5/1/2003	<100	25	86	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/03/2003	<100	<20	22	<1.0	<1.0	<1.0	< 0.50	< 0.50	a
04/06/2004	<100	<20	17	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/28/2004	<100	<20	4.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
04/13/2005	<100	<20	2.8	<0.50	< 0.50	< 0.50	< 0.50	<0.50	
10/27/2005	<100	<20	22	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
04/12/2006	<300	<20	1.9	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	b
10/31/2006	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
4/19/2007	<300	<20	< 0.50	< 0.50	< 0.50	0.66	< 0.50	< 0.50	
11/9/2009	<300	12	3.1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
4/12/2010	<300	<10	2.7	<0.50	<0.50	<0.50	<0.50	<0.50	
MW-6									
10/7/2002	<40	<20	8	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
5/1/2003	<100	<20	12	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/03/2003	<500	<100	120	<5.0	<5.0	<5.0	<2.5	<2.5	а
04/06/2004	<5,000	<1,000	1,700	<25	<25	<25	<25	<25	
10/28/2004	<5,000	<1,000	3,100	<25	<25	<25	<25	<25	
04/13/2005	<10,000	<2,000	3,900	<50	<50	<50	<50	<50	
10/27/2005	<10,000	<2,000	2,900	<50	<50	<50	<50	<50	b

ARCO Service Station #6113, 785 East Stanley	ev Blvd., Livermore, C	A
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Well and				Concentrati	ons in (µg/L)				
Sample Date	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	Comments
MW-6 Cont.									
04/12/2006	<30,000	<2,000	3,400	<50	<50	<50	<50	<50	b
10/31/2006	<15,000	<1,000	3,400	<25	<25	<25	<25	<25	b
4/19/2007	<15,000	<1,000	2,200	<25	<25	<25	<25	<25	
10/16/2007	<15,000	<1,000	2,600	<25	<25	<25	<25	<25	c (MTBE)
4/24/2008	<6,000	1,500	4,200	<10	<10	<10	<10	<10	
MW-7									
10/7/2002	<40	<20	41	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
5/1/2003	<100	<20	43	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/03/2003	<200	<40	49	<2.0	<2.0	<2.0	<1.0	<1.0	a
04/06/2004	<100	<20	0.76	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/28/2004	<100	<20	14	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
04/13/2005	<100	<20	1.7	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/27/2005	<100	<20	2.3	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	b
04/12/2006	<300	<20	1.1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	b
10/31/2006	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	b
4/19/2007	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/16/2007	<300	<20	24	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
4/24/2008	<300	<10	22	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/15/2008	<300	<10	8.2	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
4/28/2009	<300	<10	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	d
11/9/2009	<300	<10	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
4/12/2010	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
MW-8									
10/7/2002	<40	<20	<0.50	< 0.50	<0.50	< 0.50	< 0.50	<0.50	
MW-9									
10/7/2002	<40	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/03/2003	<100	<20	< 0.50	<1.0	<1.0	<1.0	<0.50	< 0.50	a
10/28/2004	<100	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/27/2005	<100	<20	1.4	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	b
10/31/2006	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	b

ARCO Service Station #6113, 785 East Stanley	ev Blvd., Livermore, C	A
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Well and				Concentratio	ons in (µg/L)				
Sample Date	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	Comments
MW-9 Cont.									
10/16/2007	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/15/2008	<300	<10	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
11/9/2009	<300	<10	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
MW-10									
10/7/2002	<40	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/03/2003	<100	<20	< 0.50	<1.0	<1.0	<1.0	< 0.50	< 0.50	a
10/28/2004	<100	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/27/2005	<100	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/31/2006	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	b
10/16/2007	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
MW-11									
10/7/2002	<40	<20	1.0	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
5/1/2003	<100	<20		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/03/2003	<100	<20	3.1	<1.0	<1.0	<1.0	< 0.50	< 0.50	a
04/06/2004	<100	<20	14	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/28/2004	<100	<20	29	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
04/13/2005	<100	<20	3.7	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/27/2005	<100	<20	21	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
04/12/2006									Well inaccessible
4/19/2007	<300	<20	12	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/16/2007	<300	<20	6.6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
4/24/2008	<300	<10	17	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
4/28/2009	<300	<10	5.3	< 0.50	< 0.50	< 0.50	<0.50	< 0.50	d
11/9/2009	<300	<10	12	< 0.50	< 0.50	< 0.50	<0.50	< 0.50	
4/12/2010	<300	<10	10	<0.50	<0.50	<0.50	<0.50	<0.50	
MW-12									
04/06/2004	<100	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/28/2004	<100	<20	< 0.50	< 0.50	< 0.50	< 0.50	<0.50	< 0.50	
04/13/2005	<100	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/27/2005	<100	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	

Well and				Concentratio	ons in (µg/L)				
Sample Date	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	Comments
MW-12 Cont.									
04/12/2006	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	b
4/19/2007	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
4/28/2009	<300	<10	1.4	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	d
11/9/2009	<300	<10	<0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
4/12/2010	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	< 0.50	
MW-13									
10/7/2002	<4,000	<2,000	2,800	<50	<50	<50	<50	<50	
5/1/2003	<10,000	<2,000		<50	<50	<50	<50	<50	
10/03/2003	<10,000	<2,000	2,400	<100	<100	<100	<50	<50	а
04/06/2004	<5,000	<1,000	1,800	<25	<25	<25	<25	<25	
10/28/2004	<5,000	<1,000	1,800	<25	<25	<25	<25	<25	
04/13/2005	<5,000	<1,000	920	<25	<25	<25	<25	<25	
10/27/2005	<2,000	<400	580	<10	<10	<10	<10	<10	
04/12/2006	<6,000	<400	470	<10	<10	<10	<10	<10	b
10/31/2006	<15,000	<1,000	710	<25	<25	<25	<25	<25	b
4/19/2007	<15,000	<1,000	330	<25	<25	<25	<25	<25	
4/24/2008	<300	14	49	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
RMW-13									
4/12/2010	<75,000	<2,500	1,500	<120	<120	<120	<120	<120	
VW-1									
10/7/2002	<80	<40		<1.0	<1.0	<1.0	<1.0	<1.0	
5/1/2003	<100	<20		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/03/2003	<100	<20	12	<1.0	<1.0	<1.0	< 0.50	< 0.50	a
04/06/2004	<100	<20	13	< 0.50	< 0.50	< 0.50	<0.50	< 0.50	
10/28/2004	<100	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
04/13/2005	<100	<20	9.6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
10/27/2005	<100	<20	13	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
04/12/2006	<300	<20	1.6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	b
10/31/2006	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	b
4/19/2007	<300	<20	3.0	<0.50	<0.50	<0.50	<0.50	<0.50	

Well and				Concentratio	ons in (µg/L)							
Sample Date	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	Comments			
VW-1 Cont.												
10/16/2007	<15,000	<1,000	150	<25	<25	<25	<25	<25	b			
4/24/2008	<300	<10	4.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50				
4/28/2009	<300	<10	19	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	d			
11/9/2009	<300	<10	1.1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50				
4/12/2010	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50				
VW-2												
10/03/2003									Well inaccessible			
VW-4												
10/03/2003	<100,000	<20,000	1,600	<1,000	<1,000	<1,000	<500	<500	a			

ARCO Service Station #6113, 785 East Stanley Blvd., Livermore, CA

ABBREVIATIONS & SYMBOLS:

-- = Not analyzed/applicable/measured/available < = Not detected at or above specified laboratory reporting limit 1,2-DCA = 1,2-Dichloroethane DIPE = Di-isopropyl ether EDB = 1,2-Dibromoethane ETBE = Ethyl tert-butyl ether MTBE = Methyl tert-butyl ether TAME = tert-Amyl methyl ether TBA = tert-Butyl alcohol µg/L = Micrograms per Liter

FOOTNOTES:

a = This sample was analyzed 3 days after the EPA recommended holding time. The results may still be useful for their intended purpose.

b = Calibration verification for ethanol was within method limits but outside contract limits.

c = Sample > 4x spike concentration.

d = Calibrtn. verif. recov. Below method CL for TAME.

NOTES:

All volatile organic compounds analyzed using EPA Method 8260B.

Note: The data within this table collected prior to April 2006 was provided to Broadbent & Associates, Inc. by Atlantic Richfield Company and their previous consultants. Broadbent & Associates, Inc. has not verified the accuracy of this information.

Date Sampled	Approximate Flow Direction	Approximate Hydraulic Gradient
3/23/1995	Northwest	0.035
5/31/1995	North-Northwest	0.028
8/31/1995	North-Northwest	0.03
11/28/1995	North-Northwest	0.025
2/22/1996	North-Northwest	0.031
5/23/1996	North-Northwest	0.025
8/8/1996	North	0.019
11/7/1996	North-Northeast	0.019
3/27/1997	North-Northwest	0.021
5/19/1997	North	0.019
5/18/1998	North	0.02
11/2/1998	North	0.02
6/4/1999	North	0.02
11/11/1999	North	0.03
6/20/2000	North-Northeast	0.014
8/29/2000	North-Northeast	0.013
11/29/2000	North-Northwest	0.026
5/2/2001	Northeast	0.026
8/15/2001	Northeast	0.047
10/5/2001	Northeast	0.031
1/21/2002	Northeast	0.033
4/26/2002	Northeast	0.031
10/7/2002	Northeast	0.017
5/1/2003	North-Northeast	0.011
10/3/2003	North-Northeast	0.016
4/6/2004	North-Northeast	0.013
10/28/2004	North-Northeast	0.014
4/13/2005	North-Northwest	0.02
10/27/2005	North-Northwest	0.01 to 0.03
4/12/2006	Northeast	0.01
10/31/2006	Northeast	0.014
4/19/2007	Northeast	0.013
10/16/2007	Northeast	0.031
4/24/2008	North-Northwest	0.013
10/15/2008	Northeast	0.070
4/28/2009	Northeast	0.008
11/9/2009	Northeast	0.02
4/12/2010	North-Northeast	0.03

Table 4. Historical Ground-Water Flow Direction and GradientARCO Service Station #6113, 785 East Stanley Blvd., Livermore, CA

Note: The data within this table collected prior to April 2006 was provided to Broadbent & Associates, Inc. by Atlantic Richfield Company and their previous consultants. Broadbent & Associates, Inc. has not verified the accuracy of this information.

APPENDIX A

Recent Regulatory Correspondence

ALAMEDA COUNTY HEALTH CARE SERVICES

ALEX BRISCOE. Director



ENVIRONMENTAL HEALTH DEPARTMENT ENVIRONMENTAL PROTECTION 1131 Harbor Bay Parkway, Suite 250 Alameda, CA 94502-6577 (510) 567-6700 FAX (510) 337-9335

August 12, 2010

Charles Carmel (Sent via E-mail to: <u>charles.carmel@bp.com</u>) Atlantic Richfield Company (A BP Affiliated Company) P.O. Box 1257 San Ramon, CA 94583

AGENCY

Omid Enterprises, Inc. c/o Abbas Farahbakhsh 8110 Blackwood Lane Roseville, CA 95747-9745

Subject: Feasibility Study/Corrective Action Plan for Fuel Leak Case No. RO0000393 and GeoTracker Global ID T0600100111, ARCO #06113, 785 East Stanley Boulevard, Livermore, CA 94550

Dear Messrs. Carmel and Farahbakhsh:

Thank you for the recently submitted document entitled, "Replacement Well Installation and Second Quarter 2010 Ground-Water Monitoring Report," dated May 14, 2010, which was prepared by Broadbent & Associates, Inc. (BAI) for the subject site. Alameda County Environmental Health (ACEH) staff has reviewed the case file including the above-mentioned report for the above-referenced site. Due to station raze and rebuild, monitoring wells MW-6 and MW-13 were decommissioned and now replaced with well RMW-13. Soil sample analytical results detected TPH-g and benzene at concentrations of 1,900 mg/kg and 2.1 mg/kg, respectively in soil sample RMW13@21.0-21.5. Groundwater sample analytical results detected TPH-g and benzene at concentrations of 63,000 μ g/L and 7,800 μ g/L, respectively in a groundwater sample collected from replacement well RMW-13. Soil and groundwater sample analytical results indicate that the site poses a potential risk to human health and the environment.

ACEH requests that you address the following technical comments and send us the technical reports described below.

TECHNICAL COMMENTS

 Feasibility Study/Corrective Action Plan – Since elevated concentrations of contaminants indicate that a residual source exists at the site, a Feasibility Study/Corrective Action Plan (FS/CAP) prepared in accordance with Title 23, California Code of Regulations, Section 2725 appears necessary to evaluate remedial alternatives to cleanup the site. The FS/CAP must include a concise background of soil and groundwater investigations performed in connection with this case and an assessment of the residual impacts of the chemicals of concern (COCs) for the site and the surrounding area where the unauthorized release has migrated or may migrate. The FS/CAP should also include, but not limited to, a detailed description of site lithology, including soil permeability, and most importantly, contamination cleanup levels and cleanup goals, in accordance with the San Francisco Regional Water Quality Control Board Basin Plan for all COCs and for the appropriate groundwater designation. Please note that soil cleanup levels should ultimately (within a reasonable timeframe) achieve water quality objectives (cleanup goals) for groundwater in accordance with San Francisco Regional Water Quality Control Board Basin Plan. Please propose appropriate cleanup levels, cleanup goals, and the duration needed to achieve the cleanup goals, in accordance with 23 CCR Section 2725, 2726, and 2727 in the FS/CAP.

The FS/CAP must evaluate at least three viable alternatives for remedying or mitigating the actual or potential adverse effects of the unauthorized release(s) besides the 'no action' and 'monitored natural attenuation' remedial alternatives. Each alternative shall be evaluated not only for cost-effectiveness but also its timeframe to reach cleanup levels and cleanup goals, and ultimately the Responsible Party must propose the most cost-effective corrective action.

NOTIFICATION OF FIELDWORK ACTIVITIES

Please schedule and complete the fieldwork activities by the date specified below and provide ACEH with at least three (3) business days notification prior to conducting the fieldwork.

TECHNICAL REPORT REQUEST

Please submit technical reports to ACEH (Attention: Paresh Khatri), according to the following schedule:

- October 11, 2010 Feasibility Study/Corrective Action Plan
- **Due within 30 Days of Sampling** Semi-annual Monitoring Report (4th Quarter 2010)
- **Due within 30 Days of Sampling** Semi-annual Monitoring Report (2nd Quarter 2010)

Thank you for your cooperation. Should you have any questions or concerns regarding this correspondence or your case, please call me at (510) 777-2478 or send me an electronic mail message at paresh.khatri@acgov.org.

Sincerely,

Paresh C. Khatri Hazardous Materials Specialist Messrs. Carmel and Farahbakhsh RO0000393 August 12, 2010, Page 3

Enclosure: Responsible Party(ies) Legal Requirements/Obligations ACEH Electronic Report Upload (ftp) Instructions

Matt Herrick, Broadbent & Associates, 1324 Mangrove Ave., Suite 212, Chico, CA 95926 (Sent via E-mail to: <u>mherrick@broadbentinc.com</u>)
Danielle Stefani, Livermore Pleasanton Fire Department, 3560 Nevada St, Pleasanton, CA 94566
Cheryl Dizon (QIC 8021), Zone 7 Water Agency, 100 North Canyons Pkwy, Livermore, CA 94551 (Sent via e-mail to: <u>cdizon@zone7water.com</u>)
Donna Drogos, ACEH (Sent via E-mail to: <u>donna.drogos@acgov.org</u>)
Paresh Khatri, ACEH (Sent via E-mail to: <u>paresh.khatri@acgov.org</u>)
GeoTracker
File

Responsible Party(ies) Legal Requirements/Obligations

REPORT REQUESTS

These reports are being requested pursuant to California Health and Safety Code Section 25296.10. 23 CCR Sections 2652 through 2654, and 2721 through 2728 outline the responsibilities of a responsible party in response to an unauthorized release from a petroleum UST system, and require your compliance with this request.

ELECTRONIC SUBMITTAL OF REPORTS

ACEH's Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of reports in electronic form. The electronic copy replaces paper copies and is expected to be used for all public information requests, regulatory review, and compliance/enforcement activities. Instructions for submission of electronic documents to the Alameda County Environmental Cleanup Oversight Program FTP site are provided on the attached "Electronic Report Upload Instructions." Submission of reports to the Alameda County FTP site is an addition to existing requirements for electronic submittal of information to the State Water Resources Control Board (SWRCB) GeoTracker website. In September 2004, the SWRCB adopted regulations that require electronic submittal of information for all groundwater cleanup programs. For several years, responsible parties for cleanup of leaks from underground storage tanks (USTs) have been required to submit groundwater analytical data, surveyed locations of monitoring wells, and <u>other</u> data to the GeoTracker database over the Internet. Beginning July 1, 2005, these same reporting requirements were added to Spills, Leaks, Investigations, and Cleanup (SLIC) sites. Beginning July 1, 2005, electronic submittal of a complete copy of all reports for all sites is required in GeoTracker (in PDF format). Please visit the SWRCB website for more information on these requirements (<u>http://www.swrcb.ca.gov/ust/electronic_submittal/report_rqmts.shtml</u>.

PERJURY STATEMENT

All work plans, technical reports, or technical documents submitted to ACEH must be accompanied by a cover letter from the responsible party that states, at a minimum, the following: "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." This letter must be signed by an officer or legally authorized representative of your company. Please include a cover letter satisfying these requirements with all future reports and technical documents submitted for this fuel leak case.

PROFESSIONAL CERTIFICATION & CONCLUSIONS/RECOMMENDATIONS

The California Business and Professions Code (Sections 6735, 6835, and 7835.1) requires that work plans and technical or implementation reports containing geologic or engineering evaluations and/or judgments be performed under the direction of an appropriately registered or certified professional. For your submittal to be considered a valid technical report, you are to present site specific data, data interpretations, and recommendations prepared by an appropriately licensed professional and include the professional registration stamp, signature, and statement of professional certification. Please ensure all that all technical reports submitted for this fuel leak case meet this requirement.

UNDERGROUND STORAGE TANK CLEANUP FUND

Please note that delays in investigation, later reports, or enforcement actions may result in your becoming ineligible to receive grant money from the state's Underground Storage Tank Cleanup Fund (Senate Bill 2004) to reimburse you for the cost of cleanup.

AGENCY OVERSIGHT

If it appears as though significant delays are occurring or reports are not submitted as requested, we will consider referring your case to the Regional Board or other appropriate agency, including the County District Attorney, for possible enforcement actions. California Health and Safety Code, Section 25299.76 authorizes enforcement including administrative action or monetary penalties of up to \$10,000 per day for each day of violation.

Alamada County Environmental Cleanup	REVISION DATE: July 20, 2010		
Alameda County Environmental Cleanup Oversight Programs	ISSUE DATE: July 5, 2005		
(LOP and SLIC)	PREVIOUS REVISIONS: October 31, 2005; December 16, 2005; March 27, 2009; July 8, 2010		
SECTION: Miscellaneous Administrative Topics & Procedures	SUBJECT: Electronic Report Upload (ftp) Instructions		

The Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of all reports in electronic form to the county's ftp site. Paper copies of reports will no longer be accepted. The electronic copy replaces the paper copy and will be used for all public information requests, regulatory review, and compliance/enforcement activities.

REQUIREMENTS

- Please <u>do not</u> submit reports as attachments to electronic mail.
- Entire report including cover letter must be submitted to the ftp site as a single portable document format (PDF) with no password protection.
- It is **preferable** that reports be converted to PDF format from their original format, (e.g., Microsoft Word) rather than scanned.
- Signature pages and perjury statements must be included and have either original or electronic signature.
- <u>Do not</u> password protect the document. Once indexed and inserted into the correct electronic case file, the document will be secured in compliance with the County's current security standards and a password.
 Documents with password protection will not be accepted.
- Each page in the PDF document should be rotated in the direction that will make it easiest to read on a computer monitor.
- Reports must be named and saved using the following naming convention: RO#_Report Name_Year-Month-Date (e.g., RO#5555_WorkPlan_2005-06-14)

Submission Instructions

- 1) Obtain User Name and Password:
 - a) Contact the Alameda County Environmental Health Department to obtain a User Name and Password to upload files to the ftp site.
 - i) Send an e-mail to <u>dehloptoxic@acgov.org</u>
 - b) In the subject line of your request, be sure to include "ftp PASSWORD REQUEST" and in the body of your request, include the Contact Information, Site Addresses, and the Case Numbers (RO# available in Geotracker) you will be posting for.
- 2) Upload Files to the ftp Site
 - a) Using Internet Explorer (IE4+), go to <u>ftp://alcoftp1.acgov.org</u>
 - (i) Note: Netscape, Safari, and Firefox browsers will not open the FTP site.
 - b) Click on Page located on the Command bar on upper right side of window, and then scroll down to Open FTP Site in Windows Explorer.
 - c) Enter your User Name and Password. (Note: Both are Case Sensitive.)
 - d) Open "My Computer" on your computer and navigate to the file(s) you wish to upload to the ftp site.
 - e) With both "My Computer" and the ftp site open in separate windows, drag and drop the file(s) from "My Computer" to the ftp window.
- 3) Send E-mail Notifications to the Environmental Cleanup Oversight Programs
 - a) Send email to <u>dehloptoxic@acgov.org</u> notify us that you have placed a report on our ftp site.
 - b) Copy your Caseworker on the e-mail. Your Caseworker's e-mail address is the entire first name then a period and entire last name @acgov.org. (e.g., firstname.lastname@acgov.org)
 - c) The subject line of the e-mail must start with the RO# followed by **Report Upload**. (e.g., Subject: RO1234 Report Upload) If site is a new case without an RO#, use the street address instead.
 - d) If your document meets the above requirements and you follow the submission instructions, you will receive a notification by email indicating that your document was successfully uploaded to the ftp site.

Jason Duda

From:Khatri, Paresh, Env. Health [paresh.khatri@acgov.org]Sent:Tuesday, October 05, 2010 8:14 AMTo:'Jason Duda'Cc:'Matt Herrick'Subject:RE: BP Station # 6113 (RO 393) - FS/CAP Extension Request

Hello Jason,

Your request for a submittal extension is acceptable.

Sincerely,

Paresh C. Khatri Hazardous Materials Specialist Alameda County Environmental Health Local Oversight Program 1131 Harbor Bay Parkway Alameda, CA 94502-6577

Phone: (510) 777-2478 Fax: (510) 337-9335

E-mail: Paresh.Khatri@acgov.org

http://www.acgov.org/aceh/lop/lop.htm

<u>Confidentiality Notice</u>: This e-mail message, including any attachments, is for the sole use of intended recipient (s) and may contain confidential and protected information. Any unauthorized review, use, disclosure, or distribution is prohibited. If you are not the intended recipient, please contact the sender by reply e-mail and destroy all copies of the original message.

From: Jason Duda [mailto:jduda@broadbentinc.com]
Sent: Monday, October 04, 2010 10:58 AM
To: Khatri, Paresh, Env. Health
Cc: 'Matt Herrick'
Subject: BP Station # 6113 (RO 393) - FS/CAP Extension Request

Hello Paresh,

We would like to request an extension for the submittal of the Feasibility Study/Corrective Action Plan Report for BP Station #6113 (RO 393), which currently has a due date of October 11, 2010. Due to our current workload and BP's new procedures which require technical reports and/or work plans to be reviewed by two different groups within the company prior to submittal, we would like to request a revised due date of November 12, 2010 in order to adequately prepare an appropriate report. Please respond via email if this is acceptable. Thank you. Take care.

Jason R. Duda • Project Scientist

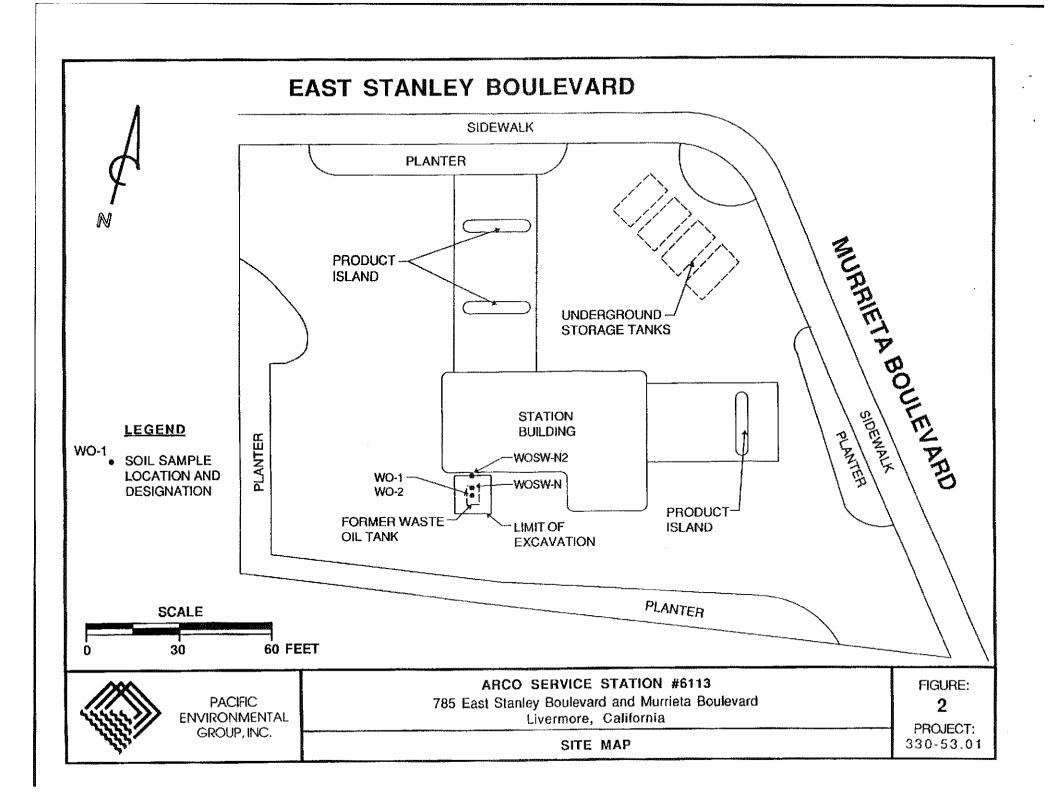
BROADBENT & ASSOCIATES, INC.

ENGINEERING, WATER RESOURCES & ENVIRONMENTAL

1324 Mangrove Avenue, Suite #212 • Chico, California 95926 office 530.566.1400 • mobile 530.592.6822 • fax 530.566.1401 jduda@broadbentinc.com

APPENDIX B

Historical Soil and Ground-Water Data



Project No. 330-53.01 April 25, 1989 Page 5

TABLE 1

Summary of Analytical Results Low Boiling Hydrocarbons, High Boiling Hydrocarbons, Oil & Grease Soil Samples From Waste Oil Tank Excavation Results in Parts per Million - Dry Soil Basis

Sample	L Depth (ft.)	<u>ow Boiling Hydrocarbons</u> Gasoline	<u>High Boiling Hyd</u> Diesel	<u>rocarbons</u> 011	<u>Oil & Grease</u>
W0-1	7 1/2	<5.	160.*	60.	660.
W0-2	8 1/2	NT	<10.	<10.	<10.
WOSW-N	5	<5.	490.*	790.	1,700.
WOSW-N2	7	NT	30.*	800.	1,100.

NT = Not tested.

* = Chromatographic pattern of compounds detected and calculated as diesel does not match that of the diesel standard used for calibration.

highlighted anyles taken after additional coil execution on 2/3/39

Project No. 330-53.01 April 25, 1989 Page 6

TABLE 2

Summary of Analytical Results Volatile Organic Compounds, Semi-volatile Organic Compounds, Metals Soil Samples from Waste Oil Tank Excavation Results in Parts per Million - Dry Soil Basis

.....

	<u>W0-1</u>	WOSW-N	Designated Level*
Volatile Organic			
Compounds	ND	ND	
<u>compounds</u>	212		
Semi-volatile			
<u>Organic Compounds</u>			
Phenanthrene	14.	15.	28,000.
Anthracene	3.9	3.5	28,000.
Flouranthene	21.	15.	42.
Pyrene	19.	13.	28,000.
Benzo(a) anthracene	7.2	5.0	not established
Chrysene	7.2	5.0	28,000.
Benzo(b)flouranthene	4.4	ND .	28,000.
Benzo(k) flouranthene	4.4	ND	28,000.
Benzo(a) pyrene	ND	3.4	28,000.
All other tested compounds	ND	ND	
Metals			
Cadmium	ND	ND	100.
Chromium	35.	61.	500.
Lead	18.	16.	500.
Zinc	36.	43.	200,000.

ND = None detected. See enclosed Certified Analytical Report for detection limits.

 Levels to protect drinking water when compounds occur in a solid, for a hypothetical "average" site. Converted to parts per million. Source: "Water Quality Goals and Hazardous and Designated Levels for Chemical Constituents," California Regional Water Quality Control Board (prepared by Jon Marshack), September 1986.

Working To Restore Nature

December 21, 1992 69028.07

TABLE 3 CUMULATIVE RESULTS OF LABORATORY ANALYSES OF SOIL SAMPLES ARCO Station 6113 785 East Stanley Boulevard Livermore, California (Page 1 of 3) TOG TPHg TPHa Т Έ х в Sample September 1989 < 0.005 < 0.005 < 0.005 < 0.005 <1.0 <10 <30 S-1414-B1 <30 <10 S-3414-B1 < 0.005 < 0.005 < 0.005 < 0.005 <1.0 <1.0 <10 <30 S-4415-B1 < 0.005 < 0.005 < 0.005 < 0.005 <10 <50 S-19-B2 < 0.005 < 0.005 < 0.005 < 0.005 <1.0 <10 <50 < 0.005 < 0.005 < 0.005 < 0.005 <1.0 S-34-B2 <50 < 0.005 < 0.005 < 0.005 < 0.005 <1.0 <10 S-41-B2 <50 < 0.005 <1.0 <10 < 0.005 < 0.005 < 0.005 S-14-B3 <50 <10 S-34-B3 < 0.005 < 0.005 < 0.005 < 0.005 <1.0 < 0.005 <1.0 <10 <50 S-3712-B3 < 0.005 < 0.005 < 0.005 February 1991 <10 <\$0 < 0.005 <1.0 < 0.005 < 0.005 < 0.005 S-1415-B4 <50 < 10 S-1914-B4 < 0.005 < 0.005 < 0.005 < 0.005 <1.0 <10 <50 < 0.005 <1.0 0.008 < 0.005 < 0.005 S-29-B4 <10 NA S-0221-SP(A-D) < 0.005 < 0.005 < 0.005 < 0.005 <1.0 June 1992 NA NA < 0.005 < 0.005 < 0.005 < 0.005 <1.0 S-101/5-B5 NA 1,200 NA 2.0 13 67 S-2014-B5 1.4 NA NA 150 0.30 1.1 6.0 S-3014-B5 1.1 NA 150 230 NA S-4014-B5 17 32 14 NA <1.0 NA < 0.005 < 0.005 < 0.005 S-5014-B5 0.012 <1.0 NA. NA < 0.005 < 0.005 S-10%-B6 < 0.005 < 0.005 NA < 0.005 <1.0 NA < 0.005 < 0.005 < 0.005 S-2014-B6 NA NA 0.45 0.079 0.035 0.15 23 S-301/3-B6 NA NA < 0.005 1.9 < 0.005 S-451/s-B6 0.70 0.021 NA 0.056 < 0.005 < 0.005 0.006 <1.0 NA S-501/-B6

Additional Subsurface Investigation and VET ARCO Station 6113, Livermore, California

< 0.005

0.43

0.094

0.009

< 0.005

< 0.005

< 0.005

0.043

0.022

< 0.005 < 0.005 < 0.005 < 0.005

< 0.005

0.35

< 0.005

< 0.005

0.42

< 0.005

< 0.005

< 0.005

1.3

0.20

< 0.005

0.22

< 0.005

< 0.005

< 0.005

25

0.023

< 0.005

< 0.005

< 0.005

21

< 0.005

< 0.005

<1.0

1.6

<1.0

<1.0

<1.0

68

<1.0

1.1

21

NA

See notes on Page 3 of 3.

S-1015-B7

S-2014-B7

S-3015-B7

S-4015-B7

S-5015-B7

S-1014-B8

S-201/2-B8

S-3014-B8

S-451/-B8



Additional Subsurface Investigation and VET ARCO Station 6113, Livermore, California

December 21, 1992 69028.07

CUMULATIVE RESULTS OF LABORATORY ANALYSES OF SOIL SAMPLES ARCO Station 6113 785 East Stanley Boulevard Livermore, California (Page 2 of 3)											
Sample	ß	т	E	x	TPHg	TPHd	TOG				
S-814-B9	< 0.005	< 0.005	< 0.005	< 0.005	<1.0	< 1.0	< 30				
S-2014-B9	< 0.005	< 0.005	< 0.005	< 0.005	<1.0	< 1.0	74				
S-301/2-B9	< 0.005	< 0.005	< 0.005	< 0.005	<1.0	< 1.0	<30				
S-4014-B9	< 0.005	< 0.005	< 0.005	< 0.005	<1.0	< 1.0	< 30				
S-5014-B9	< 0.005	< 0.005	< 0.005	< 0.005	<1.0	< 1.0	< 30				
S-10-B10	< 0.005	< 0.005	< 0.005	< 0.005	<1.0	<1.0	<30				
S-20-B10	< 0.005	< 0.005	< 0.005	< 0.005	<1.0	< 1.0	< 30				
S-30-B10	< 0.005	< 0.005	< 0.005	< 0.005	<1.0	< 1.0	< 30				
S-45-B10	< 0.005	< 0.005	< 0.005	< 0.005	<1.0	<1.0	71				
S-55-B10	< 0.005	< 0.005	< 0.005	< 0.005	<1.0	<1.0	<30				
S-1014-B11	< 0.005	< 0.005	< 0.005	< 6.005	<1.0	NA	NA				
S-2014-B11	< 0.005	< 0.005	< 0.005	< 0.005	<1.0	NA	NA				
S-3014-B11	< 0.005	< 0.005	< 0.005	< 0.005	5.7	NA	NA				
S-401/2-B11	< 0.005	< 0.005	< 0.005	< 0.005	<1.0	NA	NA				
S-501/2-B11	< 0.005	< 0.005	< 0.005	< 0.005	<1.0	NA	NA				
S-5514-B11	< 0.005	< 0.005	< 0.005	< 0.005	<1.0	NA	NA				
S-0615-SP1(A-D)	< 0.005	< 0.005	< 0.005	< 0.005	<1.0	NA	NA				
S-0615-SP2(A-D)	0.014	0.037	0.054	0.45	24	NA	NA				
igust 1992											
S-10-B12	< 0.005	< 0.005	< 0.005	< 0.005	<1.0	NA	NA				
S-20-B12	< 0.005	< 0.005	< 0.005	< 0.005	<1.0	NA	NA				
S-30-B12	< 0.005	< 0.005	< 0.005	< 0.005	<1.0	NA	NA				
S-40-B12	0.59	0.60	1.3	2.0	110	NA	NA				
S-50-B12	< 0.005	< 0.005	< 0.005	< 0.005	<1.0	NA	NA				
S-0804-SP(A-D)	< 0.005	0.011	0.030	0.066	2.6	NA.	NA				

See notes on Page 3 of 3.



Additional Subsurface Investigation and VET ARCO Station 6113, Livermore, California

December 21, 1992 69028.07

TABLE 3 CUMULATIVE RESULTS OF LABORATORY ANALYSES OF SOIL SAMPLES ARCO Station 6113 785 East Stanley Boukevard Livermore, California (Page 3 of 3)

Sample	Cadmium	Chromium	Lead	Nickel	Zinc	VOC	
me 1992							
S-81/2-B9	< 0.010	< 0.010	< 0.0050	0.051	0.47	ND*	
S-5014-B9	< 0.010	< 0.010	< 0.0050	0.098	0.57	ND*	
S-10-B10	< 0.010	< 0.010	< 0.0050	0.13	0.44	ND*	
S-55-B10	< 0.010	< 0.010	< 0.0050	0.063	0.75	ND*	

11.5

in soil (ppm)^{1,2}

Results in parts per million (ppm).

<: Results reported as less than the detection limit.

NA: Not Analyzed

TPHg Total petroleum hydrocarbons as gasoline by EPA method 5030/8015/8020.

TPHd: Total petroleum hydrocarbons as diesel by EPA method 3550/8015.

B: Benzene, T: Toluene, E: Ethylbenzene, T: Total Xylene isomers

100

BTEX: Analyzed by EPA method 5030/8015/8020.

0.06

TOG: Total Oil and Grease by Standard Method 5520 E&F.

VOCs = Halogenated volatile organics.

NA = Compound not analyzed for.

ND = Compound not detected.

* = 37 compounds were tested

'Lindsay, W.L. 1979. Chemical Equilibria in Soil. John Wiley & Sons.

²Scot, L.M. December 1991. Background Metal Concentrations in Soils in Northern Santa Clara County, California". M.S. Thesis, University of San Francisco.

74

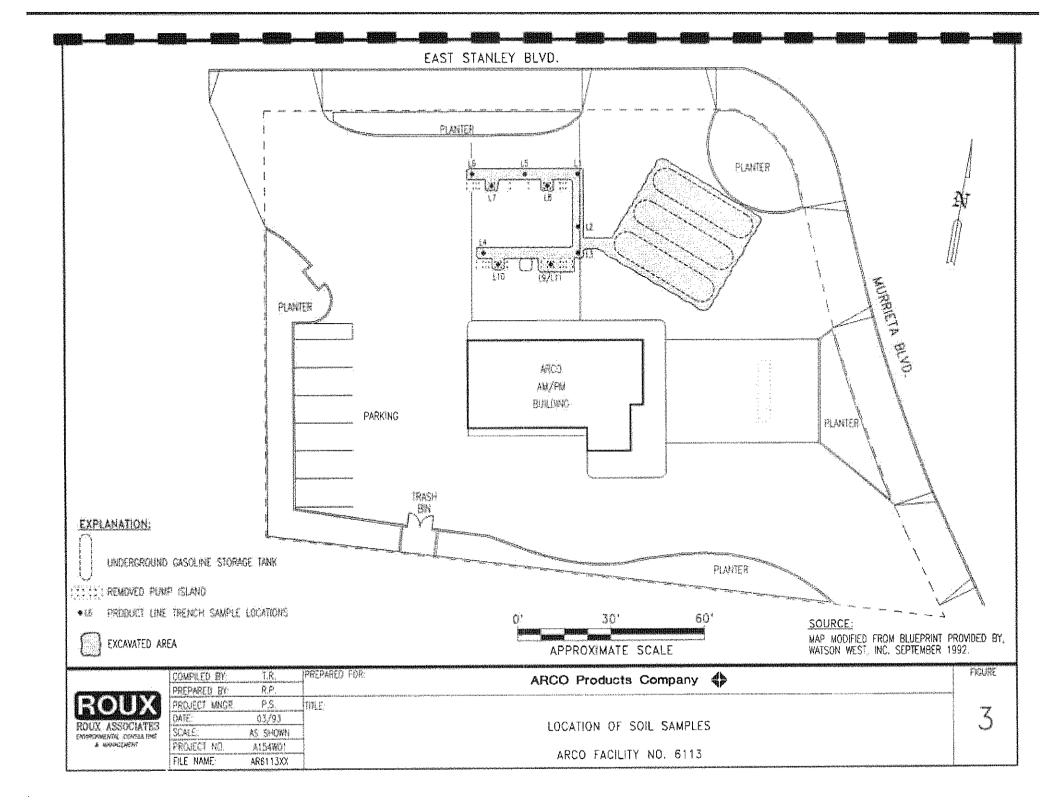
50

Composite soil sample S-0615-SP2(A-D) consists of four soil samples taken from stockpiled soil.

Sample designation:

S-	55-	B 11
	1	L
	Ľ	

Boring number Sample depth in feet below ground surface Soil sample



Sample		Depth		BTEX Distinction						
Designation	Date	(feet bgs)	TPH-G	Benzene	Toluene	Ethylbenzene	Xylenes	Lead		
L1	12/11/92	4.0	ND	0.010	0.019	0.0081	0.059	2.5		
L2	12/11/92	4.0	14	0.063	0.42	0.28	2.0	5.7		
L3	12/11/92	4.0	ND	ND	0.0057	ND	0.033	2.7		
L4	12/11/92	4.0	ND	0.0095	0.011	0.0052	0.031	12		
15	12/11/92	4.0	ND	0.0069	0.010	ND	0.028	5.4		
L6	12/11/92	4.0	ND	0.064	0.13	ND	0.13	7.9		
L7	12/11/92	3.5	7.0	0.59	1.6	0.15	1.1	6.9		
L.8	12/11/92	3.5	1.3	0.035	0.019	0.0054	0.052	4.4		
L9	12/11/92	4.0	210	ND	3.5	3.6	23	11		
L10	12/11/92	3.5	1.0	ND	0.0079	ND	0.017	15		
L11	12/16/92	6.0	ND	ND	ND	ND	ND	3.3		

TABLE 1: Summary of Soil Analyses: Product Line TrenchesARCO Facility No. 6113, Livermore, California

FOOTNOTES

All concentrations reported in mg/kg (ppm) TPH-G = Total Purgeable Petroleum Hydrocarbons (USEPA Method 8015) BTEX Distinction (USEPA Method 8020) Lead = Total Lead (USEPA Method 7421) ND = Not Detected (for detection limits see laboratory reports in Appendix B)

bgs = Below ground surface

ROUX ASSOCIATES

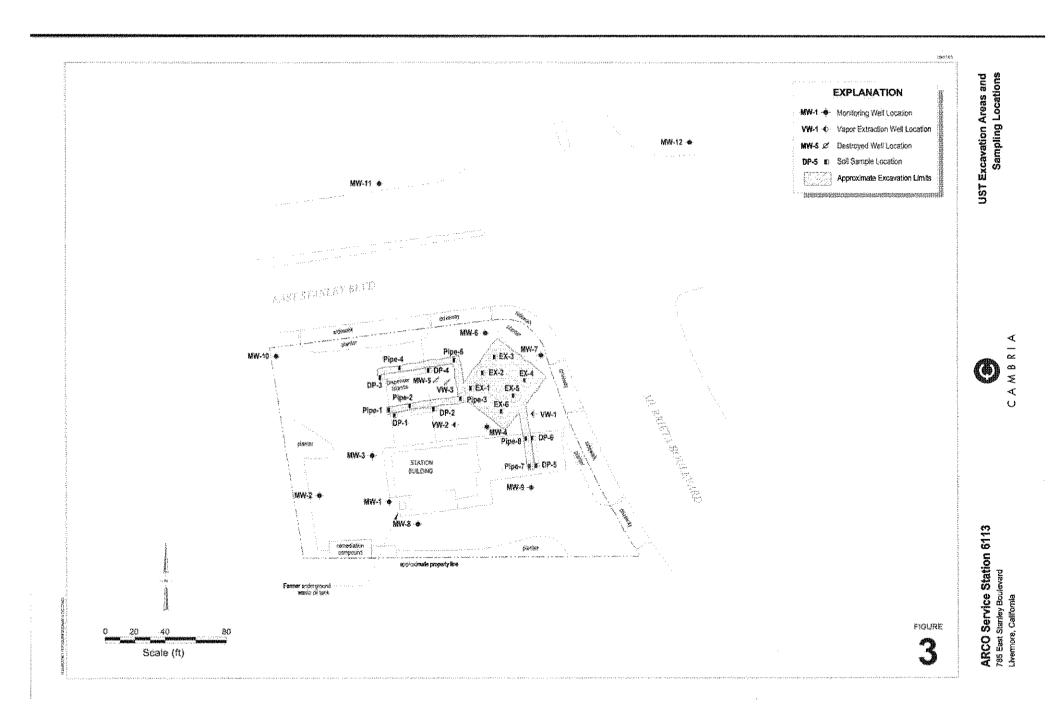


Table 1 UST Removal Compliance Sampling Results

ARCO Service Station 6113 785 East Stanley Boulevard, Livermore, California

Sample ID	Date Sampled	Depth Sampled (fbg)	TPHg (mg/kg)	Benzene (mg/kg)	Toulene (mg/kg)	Ethyl- benzene (mg/kg)	Xylene (mg/kg)	MTBE (mg/kg)	Lead (mg/kg)
DP-1	12/6/00	4.5	1.57	<0.00500	0.00694	<0.00500	0.0124	<0.0250	<10.4
DP-2	12/6/00	4.5	5.00	<0.00500	0.0102	<0.00500	0.0332	0.0268	<10.1
DP-3	12/6/00	4.5	1.40	<0.00500	0.00710	<0.00500	0.0126	<0.0250	22.9
DP-4	12/6/00	4.5	6.80	<0:00500	0.00568	0.0222	0.0241	<0.0250	<9.71
DP-5	12/6/00	4.5	1.40	<0.00500	0.0173	0.00522	0.0355	0.133	<9.27
DP-6	12/6/00	4.5	1.05	<0.00500	<0.00500	<0.00500	<0.00500	<0.0250	<9.27
Pipe-1	12/6/00	4.5	<1.00	<0.00500	<0.00500	<0.00500	0.00624	<0.0250	10.9
Pipe-2	12/6/00	4.5	<1.00	<0.00500	<0.00500	<0.00500	<0.00500	<0.0250	<9.71
Pipe-3	12/6/00	4.5	<1.00	<0.00500	<0.00500	<0.00500	0.00848	<0.0250	<10.0
Pipe-4	12/6/00	4.5	<1.00	<0.00500	0.00536	<0.00500	0.0102	<0.0250	15.1
Pipe-6	12/6/00	4.5	<1.00	0.00918	0.0326	<0.00500	0.0193	0.0610	<9.90
Pipe-7	12/6/00	4.5	<1.00	<0.00500	<0.00500	<0.00500	<0.00500	<0.0250	<9.90
Pipe-8	12/6/00	4.5	<1.00	<0.00500	<0.00500	<0.00500	<0.00500	<0.0250	<9.27
	1/8/01	17.5	3,080	271	9.85	33.7	297		<9.81
EX-2	1/8/01	18.0	2,930	2.74	10.7	37.4	225	<6.25	<9.90

H:\ARCO\6113\Data\TANKPULL ANALYTICAL

Table 1 UST Removal Compliance Sampling Results

ARCO Service Station 6113 785 East Stanley Boulevard, Livermore, California

Sample ID	Date Sampled	Depth Sampled (fbg)	TPHg (mg/kg)	Benzene (mg/kg)	Toulene (mg/kg)	Ethyl- benzene (mg/kg)	Xylene (mg/kg)	MTBE (mg/kg)	Lead (mg/kg)
EX-3	1/8/01	18.0	1,480	<0.500	8.86	8.33	16.8	5.42	<10.0
EX-4	1/8/01	18.0	295	<0.500	0.846	1.66	10.1	2.72	<10.0
EX-5	1/8/01	18.0	3,490	<1.25	<1.25	22.8	39.8	<6.25	<9.62
EX-6	1/8/01	18.5	1.36	<0.00500	<0.00500	0.00906	0.0242	0.471	<9.71

Notes

fbg = feet below grade mg/kg = milligrams per kilogram

TPHg = total petroluem hydrocarbons as gasoline TPHd = total petroluem hydrocarbons as diesel MTBE = methyl tent butyl ether

Table 3 Soil Analytical Results

November 9, 2001

ARCO Service Station No. 6113 785 East Stanley Boulevard, Livermore, California

ñ In 175	Sample Depth	TPHg	Benzene	Toulene	Ethyl- benzene	Xylene	MTBE
Sample ID	(fbg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
MW-13 5.5'	5.5	<1.0	<0.0050	0.0068	0.0058	0.046	<0.050
MW-13 10.5'	10.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	0.28
MW-13 15.5'	15.5	13	<0.010	<0.010	0.045	0.30	<0.10

Notes

fbg = feet below grade

mg/kg = milligrams per kilogram

TPHg = total petroluem hydrocarbons as gasoline

MTBE = methyl tertiary butyl ether by EPA Method 8020

1

Table 1. Summary of Soil Sample Analytical Data Station #6113, 785 East Stanley Boulevard, Livermore, CA

Soil Boring Identification*	Sample ID	Date Collected	GRO (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	MTBE (mg/kg)	TBA (mg/kg)	Comments
RMW-13										
	RMW13@14.5-15.0	3/11/2010	<0.50	0.001	<0.0010	0.0037	0.0054	0.0018	0.12	
	RMW13@21.0-21.5		1,900	2.1	0.13	22	52	0.15	<1.0	
	RMW13@25.5-26.0	3/11/2010	160	0.98	<0.1	2.0	3.3	0,28	<1.0	
	RMW13@31.0-31.5	3/11/2010	63	0.54	<0.1	0.32	0.25	<0.1	<1.0	

Abbreviations & Symbols:

* = See Drawing 2 for soil boring location

GRO: Gasoline range organics

Calscience Environmental Laboratories, Inc.: GRO(C6-C12)

GRO analyzed using EPA method 8015B

MTBE: Methyl tert-butyl ether

TBA: Tert-butyl alcohol

Benzene, toluene, ethylbenzene, total xylenes, MTBE, and TBA analyzed using EPA method 8260B

mg/kg = Milligrams per kilogram

Notes:

1,2-dibromoethane (EDB), 1,2-dichloroethane (1,2 DCA), Di-isopropyl ether (DIPE), ethyl tert-butyl ether (ETBE), ter-amyl methyl ether (TAME),

and ethanol were not detected at or above their respective laboratory reporting limit.

The number after @ in Sample ID denotes the depth range at which the sample was collected in feet bgs (i.e., RMW13@14.5-15.0 was collected between 14.5 and 15.0 feet bgs.

							805-134.01
Well Desig- nation	Water Level Field Date	TOC Elevation	Depth to Water	Ground- Water Elevation	Floating Product Thickness	Ground- Water Flow Direction	Hydrauli Gradien
		ft-MSL.	feet	ft-MSL	feet	MWN	foot/foc
MW-1	09-20-89	457.04	21.03	436.01	ND	NR -	NI
MW-1	10-12-89	457.04	19.64	437.40	ND	NR	NF
MW-1	06-21-90	457.04	21.72	435.32	ND	NR	NF
MW-1	09-20-90	457.04	19.79	437.25	ND	NR	NF
MW-1	12-18-90	457.04	19.28	437.76	ND	NR	NF
MW-1	02-21-91	457.04	22.45	434.59	ND	NR	NI
MW-1	03-20-91	457.04	19.87	437.17	ND	NR	NF
MW-1	04-10-91	457.04	19.42	437.62	ND	NR	NI
MW-1	05-20-91	457.04	25,95	431.09	ND	NR	NF
MW-1	06-20-91	457.04	32.55	424.49	ND	NR	NE
MW-1	07-25-91	457.04	38,22	418.82	ND	NR	NE
MW-1	08-13-91	457.04	40.74	416.30	ND	NR	NI
MW-I	09-12-91	457.04	43.16	413.88	ND	NR	NI
MW-1	10-22-91	457.04	DRY	DRY	ND	DRY	DRY
MW-I	11-13-91	457.04	DRY	DRY	ND	DRY	DRY
MW-i	12-21-91	457.04	DRY	DRY	ND	DRY	DRY
MW-1	01-18-92	457.04	DRY	DRY	ND	DRY	DRY
MW-1	02-21-92	457.04	DRY	DRY	ND	DRY	DRY
MW-1	03-19-92	457.04	36.16	420.88	ND	NR	NF
MW-I	04-24-92	457.04	38.14	418.90	ND	NR	NF
MW-1	05-20-92	457.04	40.74	416.30	ND	NR	NF
MW-1	06-29-92	457.04	DRY	DRY	ND	DRY	DRY
MW-1	07-28-92	457.04	DRY	DRY	ND	DRY	DRY
MW-1	08-26-92	457.04	DRY	DRY	ND		
MW-1	09-11-92	457.04	DRY	DRY		DRY	DRY
MW-1	10-29-92	457.04	DRY	DRY	ND	DRY	DRY
MW-1	11-11-92	457.04	DRY	DRY	ND	DRY	DRY
MW-1	12-14-92				ND	DRY	DRY
MW-1	01-27-93	457.04			to construction		
MW-1	02-26-93	457.04	30.10	426.94	ND	NR	NF
MW-1	03-30-93	457.04	24.72	432.32	ND	NR	NF
MW-1	04-30-93		20.87	436.17	ND	NR	NR
MW-1		457.04	19.46	437.58	ND	NR	NR
MW-1	05-14-93	457.04	19.27	437.77	ND	NR	NR
	06-17-93	457.04	19.21	437.83	ND	NR	NR
MW-1	07-27-93	457.04	19.95	437.09	ND	NR	NR
MW-1	08-30-93	457.04	20.72	436.32	ND	NR	NR
MW-1	11-04-93	457.04	20.61	436.43	ND	NR	NR
MW-1	03-25-94	457.04	17.54	439.50	ND	NR	NR
MW-1	06-02-94	457.04	21.30	435.74	ND	NR	NR
MW-1	09-16-94	457.04	19.98	437.06	ND	N	0.014
MW-1	11-29-94	457.04	19.12	437.92	ND	N	0.025

Table 2 Historical Groundwater Elevation Data Summary Report

7° 7'

-

							805-134.01
	Water					Ground-	
Well	Level		Depth	Ground-	Floating	Water	
Desig- nation	Field	TOC	to	Water	Product	Flow	Hydrauli
nation	Date	Elevation	Water	Elevation	Thickness	Direction	Gradien
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foo
MW-2		457.74	20.67	437.07	ND	NR	· NF
MW-2	10-12-89	457.74	18.98	438.76	ND	NR	NF
MW-2	06-21-90	457.74	21.88	435.86	ND	NR	NF
MW-2	09-20-90	457.74	19.90	437.84	ND	NR	NF
MW-2	12-18-90	457.74	19.32	438.42	ND	NR	NF
MW-2	02-21-91	457.74	23.02	434.72	ND	NR	NF
MW-2	03-20-91	457.74	20.01	437.73	ND	NR	NR
MW-2	04-10-91	457.74	19.81	437.93	ND	NR	NF
MW-2	05-20-91	457.74	26.62	431.12	ND	NR	NR
MW-2	06-20-91	457.74	33.15	424.59	ND	NR	NR
MW-2	07-25-91	457.74	37.10	420.64	ND	NR	NF
MW-2	08-13-91	457.74	37.20	420.54	ND	NR	NF
MW-2	09-12-91	457.74	DRY	DRY	ND	DRY	DRY
MW-2	10-22-91	457.74	DRY	DRY	ND	DRY	DRY
MW-2	11-13-91	457.74	DRY	DRY	ND	DRY	DRY
MW-2	12-21-91	457.74	DRY	DRY	ND	DRY	DRY
MW-2	01-18-92	457.74	DRY	DRY	ND	DRY	DRY
MW-2	02-21-92	457.74	DRY	DRY	ND	DRY	DRY
MW-2	03-19-92	457.74	35,82	421.92	ND	NR	
MW-2	04-24-92	457.74	36.64	421.10	ND		NR
MW-2	05-20-92	457.74	37.23	420.51	ND	NR	NR
MW-2	06-29-92	457.74	DRY	DRY	ND	NR	NR
MW-2	07-28-92	457.74	DRY			DRY	DRY
MW-2	08-26-92	457.74	DRY	DRY	ND	DRY	DRY
MW-2	09-11-92	457.74	DRY	DRY	ND	DRY	DRY
MW-2	10-29-92	457.74		DRY	ND	DRY	DRY
MW-2	11-11-92	457.74	DRY	DRY	ND	DRY	DRY
4W-2	12-14-92		DRY	DRY	ND	DRY	DRY
MW-2	01-27-93	457.74 Not	surveyed: in:		to construction		
MW-2	02-26-93		32.87	424.87	ND	NR	NR
MW-2	03-30-93	457.74 (NOU	surveyed: in:		to construction		
MW-2		457.74	20.47	437.27	ND	NR	NR
	04-30-93	457.74	19.02	438.72	ND	NR	NR
4W-2	05-14-93	457.74	18.65	439.09	ND	NR	NR
4W-2	06-17-93	457.74	18.21	439.53	ND	NR	NR
4W-2	07-27-93	457.74	17.95	439.79	ND	NR	NR
4W-2	08-30-93	457.74	18.43	439.31	ND	NR	NR
AW-2	11-04-93	457.74	19.73	438.01	ND	NR	NR
4W-2	03-25-94	457.74	17.26	440.48	ND	NR	NR
/W-2	06-02-94	457.74	21.23	436.51	ND	NR	NR
/W-2	09-16-94	457.74	19.64	438.10	ND	N	0.014
4W-2	11 -29-9 4	457.74	18.89	438.85	ND	N	0.025

Table 2 Historical Groundwater Elevation Data Summary Report

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Well Desig- nation MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3	Level Field Date 09-20-89 10-12-89 06-21-90 09-20-90 12-18-90 02-21-91	TOC Elevation ft-MSL 456.97 456.97	Depth to Water feet 20.98	Ground- Water Elevation ft-MSL	Floating Product Thickness	Water Flow Direction	Hydraulic Gradient
nation MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3	Date 09-20-89 10-12-89 06-21-90 09-20-90 12-18-90	Elevation ft-MSL 456.97 456.97	Water feet	Elevation	Thickness		
MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3	09-20-89 10-12-89 06-21-90 09-20-90 12-18-90	ft-MSL 456.97 456.97	feet			Direction	
MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3	10-12-89 06-21-90 09-20-90 12-18-90	456.97 456.97		ft-MSL	faat		Gradieni
MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3	10-12-89 06-21-90 09-20-90 12-18-90	456.97	20.98		feet	MWN	foot/foot
MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3	06-21-90 09-20-90 12-18-90			435.99	ND	NR	NR
MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3	09-20-90 12-18-90	467.05	19.66	437.31	ND	NR	NR
MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3	12-18-90	456,97	21.72	435.25	ND	NR	NR
MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3		456.97	19.72	437.25	ND	NR	NR
MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3	02-21-91	456.97	19.21	437.76	ND	NR	NR
MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3		456.97	22.36	434.61	ND	NR	NR
MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3	03-20-91	456.97	19.79	437.18	ND	NR	NR
MW-3 MW-3 MW-3 MW-3 MW-3 MW-3 MW-3	04-10-91	456.97	19.35	437.62	ND	NR	NR
MW-3 MW-3 MW-3 MW-3 MW-3 MW-3	05-20-91	456.97	25.86	431.11	ND	NR	NR
MW-3 MW-3 MW-3 MW-3 MW-3	06-20-91	456.97	32.45	424.52	ND	NR	NR
MW-3 MW-3 MW-3 MW-3	07-25-91	456.97	38.06	418.91	ND	NR	NR
MW-3 MW-3 MW-3	08-13-91	456.97	38.40	418.57	ND	NR	NR
MW-3 MW-3	09-12-91	456.97	DRY	DRY	ND	DRY	DRY
MW-3	10-22-91	456.97	DRY	DRY	ND	DRY	DRY
	11-13-91	456.97	DRY	DRY	ND	DRY	DRY
	12-21-91	456.97	DRY	DRY	ND	DRY	DRY
MW-3	01-18-92	456.97	DRY	DRY	ND	DRY	DRY
MW-3	02-21-92	456.97	DRY	DRY	ND	DRY	DRY
MW-3	03-19-92	456.97	36.03	420.94	ND	NR	NR
MW-3	04-24-92	456.97	37.92	419.05	ND	NR	NR
MW-3	05-20-92	456.97	DRY	DRY	ND	DRY	DRY
vIW-3	06-29-92	456.97	DRY	DRY	ND	DRY	DRY
MW-3	07-28-92	456.97	DRY	DRY	ND	DRY	DRY
/W-3	08-26-92	456.97	DRY	DRY	ND	DRY	DRY
4W-3	09-11-92	456.97	DRY	DRY	ND	DRY	
4W-3	10-29-92	456,97	DRY	DRY	ND	DRY	DRY
/ W-3	11-11- 92	456.97	DRY	DRY	ND	DRY	DRY
AW-3	12-14-92				to construction	DKi	DRY
4W-3	01-27-93	456.97	30.36	426.61	ND	NR	
4W-3	02-26-93	456.97	24.96	432.01	ND		NR
4W-3	03-30-93	456.97	21.45	435.52	ND	NR	NR
1W-3	04-30-93	456.97	19.43	437.54	ND	NR	NR
1W-3	05-14-93	456.97	19.37	437.60		NR	NR
1W-3	06-17-93	456.97	19.38	437.59	ND	NR	NR
1W-3	07-27-93	456.97	20.10	437.39 436.87	ND	NR	NR
fW-3	08-30-93	456.97	20.10		ND	NR	NR
fW-3	11-04-93	456.97	20.98	435.99	ND	NR	NR
IW-3	03-25-94	456.97		436.06	ND	NR	NR
IW-3	06-02-94	456.97	17.57	439.40	ND	NR	NR
IW-3	09-16-94	456.97	21.30 20.03	435.67	ND	NR	NR
IW-3	119-10-94			436.94	ND	N	0.014

Table 2 Historical Groundwater Elevation Data Summary Report

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Well Desig- nation	Water Level Field Date	TOC Elevation	Depth to Water	Ground- Water Elevation	Floating Product Thickness	Ground- Water Flow Direction	Hydraulic Gradient
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot
MW-4	02-21-91	456.55	22.01	434.54	ND	NR	NR
MW-4	03-20-91	456.55	20.31	436.24	ND	NR	NR
MW-4	04-10-91	456.55	19.55	437.00	ND	NR	NR
MW-4	05-20-91	456.55	25.24	431.31	ND	NR	NR
M₩-4	06-20-91	456.55	DRY	DRY	ND	DRY	DRY
MW-4	07-25-91	456.55	DRY	DRY	ND	DRY	DRY
M₩-4	08-13-91	456.55	DRY	DRY	ND	DRY	DRY
MW-4	09-12-91	456.55	DRY	DRY	ND	DRY	DRY
MW-4	10-22-91	456.55	DRY	DRY	ND	DRY	DRY
MW-4	11-13-91	456.55	DRY	DRY	ND	DRY	DRY
MW-4	12-21-91	456.55	DRY	DRY	ND	DRY	DRY
MW-4	01-18-92	456.55	DRY	DRY	ND	DRY	DRY
MW-4	02-21-92	456.55	DRY	DRY	ND	DRY	DRY
MW-4	03-19-92	456.55	DRY	DRY	ND	DRY	DRY
MW-4	04-24-92	456.55	DRY	DRY	ND	DRY	
MW-4	05-20-92	456.55	DRY	DRY	ND	DRY	DRY DRY
MW-4	06-29-92	456.55	DRY	DRY	ND	DRY	
MW-4	07-28-92	456.55	DRY	DRY	ND	DRY	DRY
MW-4	08-26-92	456.55	DRY	DRY	ND		DRY
MW-4	09-11-92	456.55	DRY	DRY		DRY	DRY
MW-4	10-29-92	456.55	DRY	DRY	ND	DRY	DRY
MW-4	11-11-92	456.55	DRY	DRY	ND	DRY	DRY
MW-4	12-14-92				ND	DRY	DRY
MW-4	01-27-93	456.55			to construction		
MW-4	02-26-93	456.55	DRY	DRY	ND	DRY	DRY
MW-4	03-30-93		23.60	432.95	ND	NR	NR
MW-4	04-30-93	456.55 456.55	20.87	435.68	ND	NR	NR
MW-4	05-14-93		19.73	436.82	ND	NR	NR
MW-4	06-17-93	456.55	19.75	436.80	ND	NR	NR
/W-4	07-27-93	456.55	19.69	436.86	ND	NR	NR
/IW-4 /IW-4	··· -· • -	456.55	20.40	436.15	ND	NR	NR
/W-4	08-30-93	456.55	21.10	435.45	ND	NR	NR
/W-4 /W-4	11-04-93	456.55	21.60	434.95	ND	NR	NR
1W-4 1W-4	03-25-94	456.55	18.59	437. 9 6	ND	NR	NR
	06-02-94	456.55	21.41	435.14	ND	NR	NR
/W-4	09-16-94	456.55	20.51	436.04	ND	N	0.014
4 W- 4	11-29-94	456.55	19.77	436.78	ND	N	0.025

Table 2 Historical Groundwater Elevation Data Summary Report

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	Water					Ground-	
Wel]	Level		Depth	Ground-	Floating	Water	
Desig-	Field	TOC	to	Water	Product	Flow	Hydraulic
nation	Date	Elevation	Water	Elevation	Thickness	Direction	Gradient
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot
MW-5	06-29-92	455.84	50.53	405.31	ND	NR	· NR
MW-5	07-28-92	455.84	54.92	400.92	ND	NR	NR
MW-5	08-26-92	455.84	59.58	396,26	ND	NR	NR
MW-5	09-11-92	455.84	60.88	394.96	ND	NR	NR
MW-5	10-29-92	455.84	DRY	DRY	ND	DRY	DRY
MW-5	11-11-92	455.84	DRY	DRY	ND	DRY	DRY
MW-5	12-14-92	455.84 No	t surveyed: in		to constructio	n activities	2
MW-5	01-27-93	455.84	29.08	426.76	ND	NR	NR
MW-5	02-26-93	455.84	23.56	432.28	ND	NR	NR
MW-5	03-30-93	455.84	20.32	435.52	ND	NR	NR
MW-5	04-30-93	455.84	19.57	436.27	ND	NR	NR
MW-5	05-14-93	455.84	19.29	436.55	ND	NR	NR
MW-5	06-17-93	455.84	18.66	437.18	ND	NR	NR
MW-5	07-27-93	455.84	20.16	435.68	ND	NR	NR
MW-5	08-30-93	455.84 No		120100		1 411	
MW-5	11-04-93	455.84	21.05	434.79	ND	NR	NR
MW-5	03-25-94	455.84	17.95	437.89	ND	NR	NR
MW-5	06-02-94	455.84	21.32	434.52	ND	NR	NR
MW-5	09-16-94	455.84	20.41	435.43	ND	N N	0.014
MW-5	11-29-94	455.84	19.72	436.12	ND	N	0.014
MW-6	06-29-92	454.93	49.72	405.21	ND	NR	NR
MW-6	07-28-92	454.93	54.63	400.30	ND	NR	NR
MW-6	08-26-92	454.93	59.45	395.48	ND	NR	NR
MW-6	09-11-92	454.93	^60.73	^394.20	0.04	NR	NR
MW-6	10-29-92	454.93	62.14	392.79	ND	NR	NR
∕IW-6	11-11-92	454.93	^62.42	^392.51	0.03	NR	NR
MW-6	12-14-92	454.93 Not			to construction	activities	741
AM-6	01-27-93	454.93 Not	surveyed: in:	accessible due	to construction	activities	
AM-6	02-26-93	454.93	22.73	432.20	ND	NR	NR
MW-6	03-30-93	454.93	19.53	435.40	ND	NR	NR
AM-6	04-30-93	454.93	18.76	436.17	ND	NR	
4W-6	05-14-93	454.93	^19.19	^435.74	0.01	NR	NR
AW-6	06-17-93	454.93	18,54	436.39	ND	NR	NR
AW-6	07-27-93	454.93	19,47	435.46	ND		NR
/W-6	08-30-93	454.93	^20.33	434.60	0.01	NR	NR
/W-6	11-04-93	454.93	^20.33	^434.60		NR	NR
4W-6	03-25-94	454.93	17.13	437.80	0.01	NR	NR
/W-6	06-02-94	454.93	20.45	434.48	ND	NR.	NR
					ND	NR	NR
4W-6	09-16-94	454.93	19.62	435.31	ND	N	0.014

Table 2 Historical Groundwater Elevation Data Summary Report

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	Water						
Well	Level		Depth	Ground-	Thestine	Ground-	
Desig-	Field	TOC	to	Water	Floating Product	Water	**
nation	Date	Elevation	Water	Elevation	Thickness	Flow Direction	Hydraulic
		ft-MSL	feet	ft-MSL	feet	MWN	Gradient foot/foot
MW-7	06-29-92	451.00		······································			10001001
MW-7	07-28-92	454.92	49.57	405.35	ND	NR	· NR
MW-7	08-26-92	454.92 454.92	54.60	400.32	ND	NR	NR
MW-7	09-11-92		59.60	395.32	ND	NR	NR
MW-7	10-29-92	454.92	60.74	394.18	ND	NR	NR
MW-7		454.92	62.23	392.69	ND	NR	NR
MW-7	11-11-92	454.92	62.69	392.23	ND	NR	NR
	12-14-92	454.92 No	t surveyed: in	accessible due	to constructio	n activities	
MW-7	01-27-93	454.92	27.97	426.95	ND	NR	NR
MW-7	02-26-93	454.92	22.57	432.35	ND	NR	NR
MW-7	03-30-93	454.92	19.29	435.63	ND	NR	NR
MW-7	04-30-93	454.92	18.79	436.13	ND	NR	NR
MW-7	05-14-93	454.92	18.35	436.57	ND	NR	NR
MW-7	06-17-93	4 54.92	18.36	436.56	ND	NR	NR
MW-7	07-27-93	454.92	19.49	435.43	ND	NR	NR
MW-7	08-30-93	454.92	20.26	434.66	ND	NR	NR
MW-7	11-04-93	454.92	20.33	434.59	ND	NR	NR
MW-7	03-25-94	454.92	16.91	438.01	ND	NR	
MW-7	06-02-94	454.92	20.31	434.61	ND	NR	NR
MW-7	09-16-94	454.92	19.47	435.45	ND		NR
MW-7	11-29-94	454.92	18,73	436.19	ND	N N	0.014 0.025
MW-8	06-29-92	456.97	50.40	406.57	ND	NR	NR
MW-8	07-28-92	456.97	55.79	401.18	ND	NR	NR
MW-8	08-26-92	456.97	60.79	396.18	ND	NR	
MW-8	09-11-92	456.97	61.97	395.00	ND		NR
MW-8	10-29-92	456.97	63.51	393.46	ND	NR	NR
∕I₩-8	11-11-92	456.97	64.21	392.76	ND	NR	NR
MW-8	12-14-92			JJZ.10	IND to construction	NR	NR
/W-8	01-27-93	456.97	25.57	ATT AO			
4W-8	02-26-93	456.97	19.86	431.40	ND	NR	NR
1W-8	03-30-93	456.97		437.11	ND	NR	NR
4W-8	04-30-93	456.97	16.69	440.28	ND	NR	NR
1W-8	05-14-93	456.97	15.83	441.14	ND	NR	NR
4W-8	06-17-93		15.79	441.18	ND	NR	NR
4W-8		456.97	15.79	441.18	ND	NR	NR
1W-8	07-27-93	456.97	16.80	440.17	ND	NR	NR
	08-30-93	456.97	17.37	439.60	ND	NR	NR
1W-8	11-04-93	456.97	17.60	439.37	ND	NR	NR
1W-8	03-25-94	456.97	15.04	441.93	ND	NR	NR
1W-8	06-02-94	456.97	18.43	438.54	ND	NR	NR
1W-8	09-16-94	456.97	17.02	439.95	ND	N	0.014
fW-8	11-29-94	456.97	16.83	440.14	ND	N	0.025

Table 2 Historical Groundwater Elevation Data Summary Report

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337-11	Water		· ·	_ .		Ground-	
Well	Level	200	Depth	Ground-	Floating	Water	
Desig- nation	Field Date	TOC	to	Water	Product	Flow	Hydrauli
nation	Date	Elevation	Water	Elevation	Thickness	Direction	Gradien
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foo
MW-9	06-29-92	456.18	50.29	405.89	ND	NR	NF
MW-9	07-28-92	456.18	55.53	400.65	ND	NR	NF
MW-9	08-26-92	456.18	60.62	395.56	ND	NR	NE
MW-9	09-11-92	456.18	61.67	394.51	ND	NR	NF
MW-9	10-29- 9 2	456.18	63.17	393.01	ND	NR	NF
MW-9	11-11-92	456.18	63.68	392.50	ND	NR	NF
MW-9	12-14-92	456.18 Not	surveyed: in	accessible due	e to constructio	n activities	
MW-9	01-27-93	456.18	26.48	429.70	ND	NR	NR
MW-9	02-26-93	456.18 Not	surveyed: ir	accessible due	e to constructio		
MW-9	03-30-93	456.18	17.77	438.41	ND	NR	NF
MW-9	04-30-93	456.18	17.01	439.17	ND	NR	NR
MW-9	05-14-93	456.18	16.55	439.63	ND	NR	NR
MW-9	06-17-93	456.18	16.68	439.50	ND	NR	NB
MW-9	07-27-93	456.18	17.77	438.41	ND	NR	NR
MW-9	08-30-93	456.18	18.74	437.44	ND	NR	NR
MW-9	11-04-93	456.18	18.72	437.46	ND	NR	NR
/W-9	03-25-94	456.18	15.78	440.40	ND	NR	NR
MW-9	06-02-94	456.18	19.03	437.15	ND	NR	NR
4W-9	09-16-94	456.18	17.84	438.34	ND	N	0.014
/W-9	11-29-94	456.18	17.32	438.86	ND	N	0.025
						• *	
IW-10	03-30-93	456.85	21.33	435.52	ND	NR	NF
[W-1 0	04-30-93	456.85	20.51	436.34	ND	NR	NF
[W-10	05-14-93	456.85	20.26	436.59	ND	NR	NF
W-10	06-17-93	456.85	20.30	436.55	ND	NR	NF
W-10	07-27-93	456.85	20.29	436.56	ND	NR	NR
W-10	08-30-93	456.85	22.19	434.66	ND	NR	NF
W-10	11-04-93	456.85	22.11	434.74	ND	NR	NF
W-10	03-25-94	456.85	18.84	438.01	ND	NR	NF
W-10	06-02-94	456.85	22.40	434.45	ND	NR	NR
W-10	09-16-94	456.85	21.25	435.60	ND	N	0.014
W-10	11-29-94	456.85	20.50	435.00	ND	N N	0.014

Table 2 Historical Groundwater Elevation Data Summary Report

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1' 1'

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	Water						
Well	Level		Depth	Ground-	Floating	Ground- Water	
Desig-	Field	TOC	to	Water	Product	Flow	Hydrauli
nation	Date	Elevation	Water	Elevation	Thickness	Direction	Gradien
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foo
MW-11	03-30-93	455.07	20.78	434.29	ND	NR	. NE
MW-11	04-30-93	455.07	20.71	434.36	ND	NR	NE
MW-11	05-14-93	455.07	20.01	435.06	ND	NR	N
MW-11	06-17-93	455.07	20.18	434.89	ND	NR	NE
MW-11	07-27-93	455.07	21.31	433.76	ND	NR	NF
MW-11	08-30-93	455.07	21.09	433.98	ND	NR	N
MW-11	11-04-93	455.07	21.40	433.67	ND	NR	N
MW-11	03-25-94	455.07	18.28	436.79	ND	NR	N
MW-11	06-02-94	455.07	21.78	433.29	ND	NR	NI
MW-11	09-16-94	455.07	20.98	434.09	ND	N	0.01
MW-11	11-29-94	455.07	20.67	434.40	ND	N	0.02
4W-12 4W-12	03-30-93 04-30-93	455.04 455.04	21.33 20.23	433.71 434.81	ND ND	NR NR	NF
1W-12	05-14-93	455.04	19.97	435.07	ND	NR	NE
1W-12	06-17-93	455.04	20.00	435.04	ND	NR	NE
IW-12	07-27-93	455.04	20.94	434.10	ND	NR	N
1W-12	08-30-93	455.04	21.79	433.25	ND	NR	NE
IW-12	11-04-93	455.04	21.95	433.09	ND	NR	NE
IW-12	03-25-94	455,04	18.74	436.30	ND	NR	NI
fW-12	06-02-94	455.04	22.21	432.83	ND	NR	NI
IW-12	09-16-94	455.04	21.62	433,42	ND	N	0.014
IW-12	11-29-94	455.04	20.82	434.22	ND	N	0.01

Table 2 Historical Groundwater Elevation Data Summary Report

TOC = Top of casing

ft-MSL = Elevation in feet, relative to mean sea level

MWN = Ground-water flow direction and gradient apply to the entire monitoring well network

ND = None detected

NR = Not reported; data not available

DRY = Dry well; groundwater was not detected

N = North

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*= Groundwater elevation (GWE) and depth to water (DTW) adjusted to include 80 percent of the floating product thickness (FPT):

 $[GWE = (TOC - DTW) + (FPT \ge 0.8)]$

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We]]	Water Sample						-
Desig-	Field				172 al	77 1	TOC
nation	Date	TPHG	Benzene	Toluene	Ethyl-	Total	0
hation	Date	-			benzene	Xylenes	TRPH
		рро	ppb	ррb	ppb	ppb	ppl
MW-1	09-20-89	80	3	1	0.7	1	<5000
MW-1	06-21-90	<20	<0.5	0.66	<0.5	<0.5	13000
MW-1	09-20-90	<50	<0.5	1	<0.5	1.8	<5000
MW-1	12-18-90	<50	<0.5	1.8	<0.5	1.7	NA
MW-1	02-21-91	<50	1.2	2.3	<0.5	2.2	NA
MW-I	05-20-91	<30	<0.3	<0.3	<0.3	<0.3	NA
MW-1	08-13-91	Not sampled: dry					
MW-1	11-13-91	Not sampled: dry	/ well				
MW-1	03-19-92	400	<3.5	<1.2	<0.8	<1.0	NA
MW-1	06-29-92	Not sampled: dry	/ well				
MW-1	09-11-92	Not sampled: dry					
MW-1	11-12-92	Not sampled: dry					
MW-1	03-30-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-1	05-14-93	<50	<0.5	<0.5	<0.5	<0.5	12000
MW-1	08-30-93	<50	<0.5	<0.5	<0.5	<0.5	906
MW-1	11-04-93	<u> 3</u> 0	<0.5	<0.5	<0.5	<0.5	
MW-1	03-25-94	<u>ح</u> ة	<0.5	<0.5	<0.5		2900
MW-1	06-02-94	<00 <50	<0.5	<0.5 <0.5	<0.5	- <0.5	<60
MW-1	09-16-94	<u>ح</u> 0	<0.5	<0.5 <0.5		<0.5	<50(
MW-1	11-29-94	<0°	<0.5	<0.5	<0.5 <0.5	<0.5 <0.5	<500 <500
MW-2	09-20-89	<50	<0.5	<0.5	<0.5	1	<5000
vf₩-2	06-21-90	<20	<0.5	<0,5	<0.5	<0,5	<5000
MW-2	09-20-90	<50	<0.5	0.7	<0.5	1.4	<5000
/W-2	12-18-90	<50	0.6	1.5	<0.5	1.9	<5000
/W-2	02-21-91	<50	<0.5	<0.5	<0.5	<0.5	<5000
/W-2	05-20-91	<30	<0.3	<0.3	<0.3	<0.3	<75000
4W-2	08-13-91	Not sampled: dry		-0.2	0.5	-0.0	~75000
4W-2	11-13-91	Not sampled: dry					
4W-2	03-19-92	<50	<0.5	<0.5	<0.5	<0.5	NA
AW-2	06-29-92	<50	<0.5	<0.5	<0.5		
AW-2	09-11-92	Not sampled: dry		~ 0.5	NO.5	<0.5	NA
4W-2	11-12-92	Not sampled: dry					
4W-2	03-30-93			-0.E	-0 E		
/W-2 /W-2		<50	<0.5	<0.5	<0.5	<0.5	NA
	05-14-93	⊲ 0	<0.5	<0.5	<0.5	<0.5	NA
AW-2	08-30-93	5 0	<0.5	<0.5	<0.5	<0.5	NA
1W-2	11-04-93	<0	<0.5	<0.5	<0.5	<0.5	NA
4W-2	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA
/W-2	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	NA
/₩~2	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
4W-2	11-29-94	<50	<0.5	<0.5	<0.5	<0.5	NA

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	Water						
Well	Sample						TOC
Desig-	Field				Ethyl-	Total	0
nation	Date	TPHG	Benzene	Toluene	benzene	Xylenes	TRPH
		ppb	ррь	ppb	ppb	ppb	ppt
MW-3	09-20-89	170	8,9	0.6	1.1	<1	<5000
MW-3	06-21-90	<20	<0.5	1	<0.5	<0.5	10000
MW-3	09-20-90	<50	<0.5	1	<0.5	1.9	<5000
MW-3	12-18-90	<50	<0.5	1.7	<0.5	2	<5000
MW-3	02-21-91	<50	<0.5	<0.5	<0.5	<0.5	<5000
MW-3	05-20-91	97	1.3	1.1	6.2	8.4	<75000
MW-3	08-13-91	Not sampled: dr			0.2	0.1	~10000
MW-3	11-13-91	Not sampled: dr					
MW-3	03-19-92	220	<1.1	<1.9	<0.6	<0.8	<5000
MW-3	06-29-92	Not sampled: dr		4212	0.0	-0.0	
MW-3	09-11-92	Not sampled: dr					
MW-3	11-12-92	Not sampled: dr					
MW-3	03-30-93	200*	<4.0	<0.5	<0.5	<0.5	NA
MW-3	05-14-93	72*	<3.0	<0.5	<0.5	<0.5	NA
MW-3	08-30-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-3	11-04-93	<0	<0.5	<0.5	<0.5	<0.5	NA
MW-3	03-25-94	<0	<0.5	<0.5	<0.5	<0.5	NA
MW-3	06-02-94	<50	<0.5	<0.5			
MW-3	09-16-94	<00 <50	<0.5	<0.5	<0.5 <0.5	<0.5 <0.5	NA
MW-3	11-29-94	<50	<0.5	<0.5	<0.5	<0.5	NA NA
MW-4	02-21-91	3500	410	7.6	30	47	<5000
∕IW-4	05-20-91	1400	150	6	4.4	3.1	<75000
MW-4	08-13-91	Not sampled: dry	/ well				
MW-4	11-13-91	Not sampled: dry					
/IW-4	03-19-92	Not sampled: dry					
/W-4	06-29-92	Not sampled: dry					
MW -4	09-11-92	Not sampled: dry					
∕I₩-4	11-12-92	Not sampled: dry					
MW-4	03-31-93	680	110	5.2	3	7.4	NA
WW-4	05-14-93	1200	200	6.2	15	9.2	NA
4W-4	08-30-93	620	200	0.9	3.6	2.1	NA
4W-4	11 -04-93	320	11	<0.5	5.0 1.3		
4W-4	03-25-94	480	5.4	<0.5		0.9	NA
/W-4	05-23-94 06-02-94	480 270	5.4 4.2		1.6	1.7	NA
/W-4	09-16-94	270 250		<0.5	1	<1.7	NA
/W-4	11-29-94	230 280	1 1.8	<0.5 <0.5	<0.6 <1.2	<1 <0.8	NA NA

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Table 3 Historical Groundwater Analytical Data (TPHG, BTEX, and TRPH)

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Well Desig- nation	Water Sample Field Date	TPHG	Benzene	Toluene	Ethyl- benzene	Total Xylenes	TOC O TRPH
		ppb	ppb	ррь	ppb	ррь	pp
MW-5	06-29-92	8900	1700	640	310	1100	NA
MW-5	09-11-92	13000	2200	1500	130	930	NA
MW-5	11-12-92	Not sampled: dr	y well				• ·-
MW-5	03-31-93	9700	1 70 0	430	220	880	NA
MW-5	05-14-93	9800	1300	820	270	1100	NA
MW-5	08-30-93	Not sampled: we	ll inaccessible				• •
MW-5	11-04-93	41000	3500	3100	890	5400	NA
MW-5	03-25-94	780	36	1.5	4.8	5.7	N/
MW-5	06-02-94	500	25	7.4	6	33	N/
MW-5	09-16-94	1500	370	28	110	120	NA
MW-5	11-29-94	1100	280	11	82	31	NA
MW-6 MW-6	06-29-92 09-11-92	8600 Not sampled: we	1800	460	52	450	NA
MW-6	11-12-92	Not sampled: we					
MW-6	03-31-93	Not sampled: we	ll contained m	ating product			
MW-6	05-14-93	Not sampled: we		aung product			
MW-6	08-30-93	Not sampled: we	n contained ife	aung product			
MW-6	11-04-93	Not sampled, we	n contained inc	aung product			
viw-6	03-25-94	Not sampled: we					
4W-6	06-02-94	530	<2.5	<2.5	<2.5	4.6	NA
MW-6	00-02-94	< <u>5</u> 0	<0.5	<0.5	<0.5	<0.5	NA
/W-6		<50	<0.5	<0.5	<0.5	<0.5	NA
11 47 -0	11- 29-94	<50	1.3	₹0.5	<0.5	<0.5	NA
4W-7	06-29-92	270	38	3.7	1.1	4,4	NA
AW-7	09-11-92	420	20	0.7	<0.5	<0.5	
1W-7	11-12-92	470	31	0.)	<0.5		NA
1W-7	03-31-93	190	20	1		0.8	NA
1W-7	05-14-93	170	17	0.6	<0.5 <0.5	<0.5	NA
4W-7	08-30-93	<50	1.8	<0.5	<0.5 <0.5	0.5	NA
1W-7	11-04-93	ර 0	6.6	<0.5		0.5	NA
1W-7	03-25-94	ර 0	<0.5	<0.5 <0.5	<0.5	0.8	NA
1W-7	06-02-94	<0<0	<0.5	<0.5 <0.5	<0.5	<0.5	NA
1W-7	09-16-94	<50	<0.5		<0.5 	<0.5	NA
1W-7	11-29-94	ර 0	<0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	NA NA

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	Water						
Well	Sample						тос
Desig-	Field		_		Ethyl-	Total	0
nation	Date	TPHG	Benzene	Toluene	benzene	Xylenes	TRPH
		ppb	ррь	ppb	ppb	ppb	ppt
MW-8	06-29-92	<50	<0.5	<0.5	<0.5	<0.5	<500
MW-8	09-11-92	<50	<0.5	<0.5	<0.5	< 0.5	<500
MW-8	11-12-92	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-8	03-30-93	<50	<0.5	<0.5	<0.5	< 0.5	NA
MW-8	05-14-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-8	08-30-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-8	11-04-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-8	03-25-94	<50	< 0.5	<0.5	<0.5	<0.5	NA
MW-8	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-8	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-8	11-29-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-9 MW-9 MW-9 MW-9 MW-9 MW-9 MW-9 MW-9	06-29-92 09-11-92 11-12-92 03-31-93 05-14-93 08-30-93 11-04-93 03-25-94 06-02-94 09-16-94 11-29-94	 <50 <50	<0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5	<0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5	<0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5	<0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5	NA NA NA NA NA NA
fW-10 fW-10 fW-10 fW-10 fW-10 fW-10 fW-10	03-31-93 05-14-93 08-30-93 11-04-93 03-25-94 06-02-94	230* 440* 280* <50 <50 <50	<0.5 <10 <4 <0.5 <0.5 <0.5	<0.5 <0.6 <0.5 <0.5 <0.5 <0.5 <0.5	<1 <0.9 <1.3 <0.5 <0.5 <0.5	0.6 <0.5 0.6 <0.5 <0.5 <0.5	NA NA NA NA NA

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Well Desig- nation	Water Sample Field Date	TPHG	Benzene	Toluene	Ethyl- benzene	Total Xylenes	TOG or TRPH
		ppb	ррь	ppb	ppb	ppb	ppb
MW-11	03-31-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-11	05-14-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-11	08-30-93	<50	< 0.5	<0.5	<0.5	<0.5	NA
MW-11	11-04-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-11	03-25-94	<50	<0.5	<0.5	< 0.5	<0.5	NA
MW-11	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-11	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-11	11-29-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-12	03-31-93	150	20	<0.5	<0.5	<0.5	NA
MW-12	05-14-93	<0	<0.5	<0.5	<0.5	<0.5	NA
MW-12	08-30-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-12	11-04-93	<50	<0.5	<0.5	<0.5	<0.5	NA
AM-12	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA
AW-12	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	NA
4W-12	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
4W-12	11-29-94	<50	<0.5	<0.5	<0.5	<0.5	NA

TPHG = Total petroleum hydrocarbons as gasoline

TOG = Total oil and grease measured by EPA Method 5520 C&F

TRPH = Total recoverable petroleum hydrocarbons measured by EPA Method 418.1

ppb = Parts per billion or micrograms per liter (ug/l)

NA = Not analyzed

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^{* =} Chromatogram does not match the typical gasoline fingerprint.

5 East Sta	nley Bouleva	rd, Livermore, Ca	lifornia			Ртоје	ct Number: 08	305-134.0
Well Desig- nation	Water Sample Field Date	Total VOCs	TPHD	Cadmium by EPA 6010	Chromium by EPA	Lead by EPA	Zinc by EPA	Nick by EP
nauon	,	ppb	ppb	ppb	6010 ppb	7421 ppb	6010 ppb	601 pr
MW-1	09-20-89	NA	<50	NA	NA	NA	NA	N
MW-1	06-21-90	NA	<100	NA	NA	NA	NA	N
MW-1	09-20-90	NA	<50	NA	NA	NA	NA	
MW-1	12-18-90	NA	<5000	NA				N
MW-1	02-21-91	NA	<5000	NA	NA NA	NA	NA	N
MW-1	05-20-91	NA	<75000	NA		NA	NA	N
MW-1	08-13-91	Not sampled: dr	-	INA	NA	NA	NA	N
MW-1	11-13-91	Not sampled: dr						
MW-1	03-19-92	NA	NA	NA	NA	NA	NA	N
MW-1	06-29-92	Not sampled: dr		in A	INA	INA	INA.	N
MW-1	09-11-92	Not sampled: dr						
MW-1	11-12-92	Not sampled: dr						
MW-1	03-30-93	NA	y wen NA	N7.4	×1.4			
MW-1	05-14-93	NA		NA	NA	NA	NA	N
MW-1			NA	NA	NA	NA	NA	Ν
MW-1	08-30-93	NA	NA	NA	NA	NA	NA	N
	11-04-93	NA	NA	NA	NA	NA	NA	N
MW-1 MW-1	03-25-94	NA	NA	NA	NA	NA	NA	N
41 4Y ~L	06-02-94	NA	NA	NA	NA	NA	NA	N
							. •	
4W-2	09-20-89	NA	<0	NA	NA	NA	NA	N
4W-2	06-21-90	NA	<100	NA	NA	NA	NA	N
/W-2	09-20-90	NA	<50	NA	NA	NA	NA	N
/W-2	1 2-18-9 0	NA	NA	NA	NA	NA	NA	N
/W-2	02-21-91	NA	NA	NA	NA	NA	NA	N
1W-2	05-20-91	NA	NA	NA	NA	NA	NA	N
1W-2	08-13-91	Not sampled: dry	well					
/W-2	11-13-91	Not sampled: dry	well					
1W-2	03-1 9-92	NA	NA	NA	NA	NA	NA	N
1W-2	06-29-92	NA	NA	NA	NA	NA	NA	N
1W-2	09-11-92	Not sampled: dry	well					
4W-2	11-12-92	Not sampled: dry						
1W-2	03-30-93	NA	NA	NA	NA	NA	NA	N
1W-2	05-14-93	NA	NA	NA	NA	NA	NA	N

Table 4 Historical Groundwater Analytical Data (VOCs, TPHD, and Metals)

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Page 1

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Well Desig- nation	Water Sample Field Date	Total VOCs	TPHD	Cadmium by EPA 6010	Chromium by EPA 6010	Lead by EPA 7421	Zinc by EPA 6010	Nicke by EP/ 6014
		ррb	ppb	ppb	ppb	ppb	ppb	ppl
MW-3	09-20-89	NA	<50	NA	NA	NA	NA	NA
MW-3	06-21-90	NA	<100	NA	NA	NA	NA	N
MW-3	09-20-90	NA	<50	NA	NA	NA	NA	N
MW-3	12-18-90	NA	NA	NA	NA	NA	NA	N
MW-3	02-21-91	NA	NA	NA	NA	NA	NA	N
MW-3	05-20-91	NA	NA	NA	NA	NA	NA	N,
MW-3	08-13-91	Not sampled: dry	well					
MW-3	11-13-91	Not sampled: dry	well					
MW-3	03-19-92	NA	<50	NA	NA	NA	NA	N
MW-3	06-29-92	Not sampled: dry						
MW-3	09-11-92	Not sampled: dry						
MW-3	11-12-92	Not sampled: dry						
MW-3	03-30-93	NA	NA	NA	NA	NA	NA	N.
AW-3	05-14-93	NA	NA	NA	NA	NA	NA	N
4W-4 AW-4 AW-4	02-21-91 05-20-91 08-13-91	NA NA Not sampled: dry	NA NA well	NA NA	NA NA	NA NA	NA NA	N. N.
AW-4	11-13-91	Not sampled: dry						
/W-4	03-19-92	Not sampled: dry						
/W-4	06-29-92	Not sampled: dry						
AW-4	09-11-92	Not sampled: dry						
1W-4	11-12-92	Not sampled: dry						
AW-4	03-31-93	NA	NA	NA	NA	NA	NA	N
/W-4	05-14-93	NA	NA	NA	NA	NA	NA	N
			2.12.4					
/W-8	06-29-92	ND	<50	3	1780	143	1310	510
/W-8	09-11-92	NA	<50	13	3580	308	2620	1030
1W-8	11-12-92	NA	NA	28	3440	221	2550	984
1W-8	03-30-93	NA	NA	NA	NA	NA	NA	N
1W-8	05-14-93	NA	NA	NA	NA	NA	NA	N
4W-9	11-12-92	NA	NA	10	1080	101	859	307
4W-9	03-31-93	NA	NA	NA	NA	NA	NA	N
		1143	1117	7422	1111	1363	115	14

Table 4 Historical Groundwater Analytical Data (VOCs, TPHD, and Metals)

VOCs = Halogenated volatile organic compounds by EPA Method 5030/601 TPHD = Total petroleum hydrocarbons as diesel by EPA Method 3510/California DHS LUFT Method

ppb = Parts per billion or micrograms per liter (µg/l)

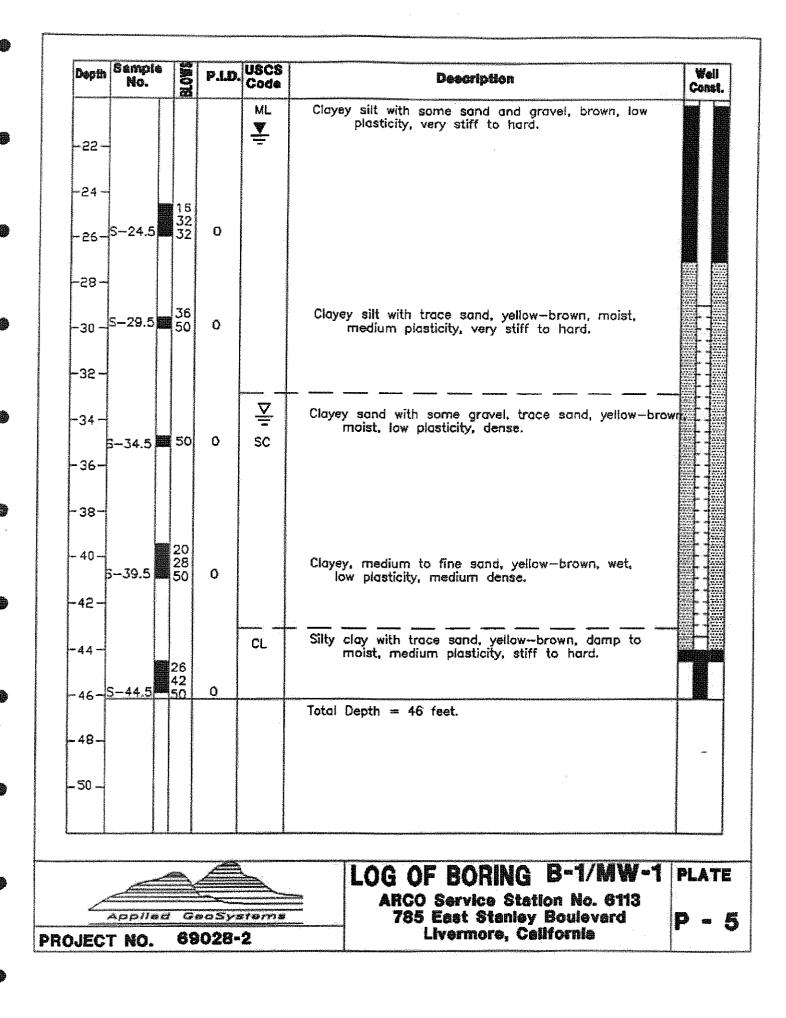
 $e^{i} = \sqrt{2}$

NA = Not analyzed ND = Not detected (31 compounds tested for VOCs were nondetectable)

APPENDIX C

Soil Boring and Well Construction Logs

Cat	ing di	unoto	ľ:	<u>2 inch</u>	Length: 44 feet Slot size: 0.020	-inch
Scr	een di	emote	P 1	2 inche	s Length. 15 feet Material type: Sch 40	PVC
Drii	iing Ca	mpan	¥r <u>Exp</u>	oration (Geoservices Driller: Mike & Curtis	
Mə	hod U	eed:	Hollow-	-Stem Au	ger Field Geologist. George	& B11
		S	Ignatu	re of Re	gistered Professional	
				Rogistra	tion No.: State:	
	Sampi			USCS		We
Dopth	No.	B 20776.1	P.I.D.	Code	Description	Cona
				1		**************************************
. o -						
				GM/SM	Silty sand and gravel, brown, damp, loose.	27
2						2
-						M
. 4 -				GC	Clayey gravel with some cobbles, yellow-brown, damp,	
					dense.	
· 6 -	S-5	36 50	0			
8-		-				
6 (YATERALI AL ANALY A)		YIII YAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA		1749-1419-1419-1419-1419-1419-1419-1419-		AL
10-	×				Clayey coarse sand and gravel.	
	S-10		O			v b
12						
the second second				ML.	Clayey silt with minor gravel, abundant caliche, yellow-	V
14 -					brown, damp to moist, low plasticity, hard.	70 7
	5-14.5	50	0			
16 -						
18-						F.
and the second		23			Some sand, brown, low plasticity, very stiff to hard.	
20 -		40	0		come cond, brown, low productly, very alle to here.	200
P			U		(Section continues downward)	
				<u>.</u>		<u>r i ř</u>
		<u> </u>			LOG OF BORING B-1/MW-1	PLA
, second		Ś			ARCO Service Station No. 6113	
A	ppile	d Gr	oSys	terna	785 East Stanley Boulevard	D a
	ECT I		88#	28-2	Livermore, California	



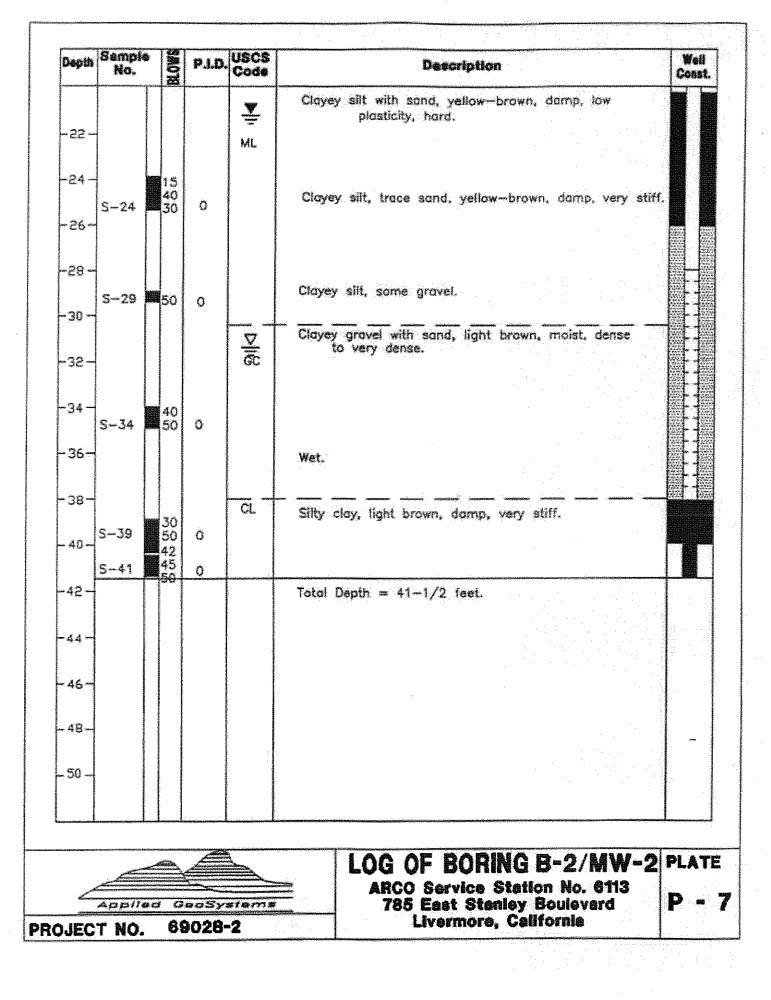
Casing diameter: 2 inches Length: 10 feet Slot size: 0.020-inch Screen diameter: 2 inches Length: 38 feet Material type: Sch 40 PVC Drilling Company: Exploration Geoservices Driller: Mike & Curtis Method Used: Hollow-Stem Auger Field Geologist: George & Bill Signature of Registered Professionalis Signature Signature	Total depth of bo	pringe 40 feet	Diameter of	f boring	a <u>6</u> ir	iches D	ate drilled.	9-13-	89
Drilling Company: Exploration Geoservices Driller: Mike & Curtis Method Used: Hollow-Stem Auger Field Geologist: George & Bill Signature of Registered Professional:	Casing diameter:_	2 inches	Longihr_	1	0 fee	t	Slot size:	0.020-i	nch
Nethod Used: Hollow-Stem Auger Field Geologist: George & Bill Signature of Registered Professional:	Screen diameter:	2 inches	Length,	38	feet	Mate	nial type:	Sch 40 I	PVC
Signature of Registered Professional,	Drilling Companyı	Exploration Geose	rvices	Drillierı	Mike	& Curtis			
Signature of Registered Professional	Wethod Used. Ho	llow-Stem Auger				Fleid	Geologist.	George &	8111
	Sign	nature of Registe	red Protees	lonalı					
Registration No State:		Registration i	No.	8	tato:	CA	and a second		

50 26 50	O	GM/SM GC	Asphalt (9 inches). Silty sand, some gravel, brown, damp, loose. Clayey gravel, light brown, damp, very dense. Clayey gravel, some cobbles, trace sand, damp, very dense.	A 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
26	O		Silty sand, some gravel, brown, damp, loose. Clayey gravel, light brown, damp, very dense.	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
26	O	GC	Clayey gravel, some cobbles, trace sand, damp, very	20 20 20 20 20 20 20 20 20 20 20
26				VI
26 50				v ∧
CATE IN CALL I	0	GP	Coarse sand and gravel with some silt and clay brown, damp, medium to very dense.	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
50	٥	ML	Clayey silt, yellow-brown, damp, low plasticity, hard.	
50	o		Clayey silt with sand. (Section continues downward)	29999999999999999999999999999999999999
	and a second		50 g	50 g

Applied GeoSystems PROJECT NO. 89028-2

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ARCO Service Station No. 6113 785 East Stanley Boulevard Livermore, California



Scr Drii	Casing diameter: 2 inches Length: 10 feet Slot size: 0.020 Screen diameter: 2 inches Length: 38–1/2 feet Material type: Sch 40 Orilling Company: Exploration Geoservices Driffer: Mike & Curtis Jethod Used: Hollow-Stem Auger Fleid Geologist: George Signature of Registered Professional: Descention Signature Signature							
			6ignetı		gistered Professional: Non No.1 State:CA			
Depth	Samp No.		g bro	USCS Code	Description	Wei Cons		
- 0 -		and a set of a set o			Asphalt (9 inches).			
- 2 -		n jan da mining ang ang ang ang ang ang ang ang ang a		GM/ _{SM}	Silty fine sand and gravel, brown, damp, loose.	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
- 4 -		te v de militer es seu est se mensen ser la service de la décidio de la décidio de la décidio de la décidio de La décidio de la décidio de	NAME OF THE OTHER PARTY	GP	Gravel and cobbles, some fine sand and silt, brown, damp, loose.	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		
- 8 -	S-9	4(24 29	4	ML	Clayey silt, some coarse sand, yellow—brown, damp, low plasticity, very stiff.			
- 12- - 14- - 16-	S-14	31 51	000					
- 18 -	S-19	50) a	CL/GC	Silty clayey, gravel with pebbles, yellow-brown, damp, loose.			
		d (X Suosyi		ARCO Service Station No. 6113 785 East Stanley Boulevard Livermore, California	P -		

Depth	Sampi No.	•	BLOWS	P.I.D.	USCS Code	Description	Wel Cons
					CLCC	Silty clayey, gravel with pebbles, yellow-brown, damp,	
-55-			ana a sha she in the she she she she		ML T	Clayey silt with fine sand, yellow-brown, damp, low plasticity, soft.	
-24 -	S-24		20 25 92	_			
-56-	5-24		92	0			
-28-		وبمحافظ والمحافظ والمحافظ				:	ANY CONTRACTOR
-30 -	S–29		30 50	٥		Trace fine sand and gravel, stiff.	
-32-			And a substantial design of the substant of the		<u> </u>	Clayey gravel with sand, brown, moist, low	
-34 -	S34	<u>ع</u>	50 40 25		GC	plasticity, very to medium dense.	
-36-	534		25	0	ooranii aadii maddaadii aadii aa	Wet.	
-38-	537.5		20 90 50	0	CL	Silty clay, brown, moist, low plasticity, very stiff to hard,	
- 40 -						Total Depth = 39 feet.	
-42-		ARMAN AND A STATE OF					
-44 -							
- 46-							
-48-	nakora na svednji je svot je trajevje koji koji je svoti				A second s		-
.50 -	***********************				() Million Standard S		

			Š¢	<u></u>			PLAT
	مەرمە	đ	Gø	05ya	18075		р.
.IFC	r NO.		ao.	028-	9	Livermore, California	•

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Met	hod l Samp	Jsed: Si	gnatur	Hollow e of Re	-Stem Aug sgistered F	vices Driller: John Collins er Field Geologist: <u>Marc &</u> Professional: <u>CE 044600</u> State: <u>CA</u>	Ken
	Samp	SI	gnatur	e of Re	gistered F	Professional:	Ken
)epit	Samp		•		•	• WAS ADDRESS OF A DRESS OF A DRESS OF A DRESS OF A	
)epit	Samp	611-1113-1-1-1		Registra	tion No.:	CE 044600 State: CA	
)eptH	Samp						
DeptH	Samp						
		le 🕺	P.I.D.	USCS	940-99	Description	Well
a maria	No.	Ē	1 . 1 . 6 . 6 .	Code			Cons
i.							over 2012 12 12 12 12 12 12 12 12 12 12 12 12 1
· 0 -					A a a b a l i	(4 inches).	and the second s
to state state of the state		10.0000 V0.000	*****	SM		id with gravel, brown, damp, loose: Fill.	⊽ ⊽ ?
· 2		1003-63.407 X3-63-4		SW		uningener van bigen bestelsener verstelsener van de sterener beterener van bestelsener en	
X bised of Xe at y		162000000000000000000000000000000000000	*******	1 JIA		ravel, subangular to subrounded gravel to 6 inch wn, damp, very dense.	. ∇
- 4 **	S-4	18	2"	400-440-400-000			
And both of the		T (0	ANA			
- 6 -					Gravel c	composed of chert and sandstone.	
iyaaniyi dadi			79 DV 001-844 - 6-0 2008-	*******			
8 -		25	19 STANIS A 4.0 CLTV.	Constraints to be devined			
- Le 63403400-	S-9	T 25 50/	4 "				
10-			· ·	A TATA A A A A A A A A A A A A A A A A			
10		and the second se					
. 12 -		and the second se		SM	Silty sar	nd, some gravel. gray, damp. dense;	
		T 17			1934, miles	iceable product odor.	
. 14 -	5-14.5	40		CL	Sandy cl Iow	lay, some gravel, gray mottled with brown, damp to medium plasticity; noticeable product odar.	
- 16 -			24				▼ 7 ▼ 1
. 10							
- 18 -		ار بر از این از این این از این از					
-	× _ n	T 33 50/					
20 -	s–19.5	50/	6" 5		Gray—bro	own, meist	
						(Casting antiques downword)	
					10930910 1000000000000000000000000000000	(Section continues downward)	
		بىسىرى					[⊯] PLA ⁻
, state	And the second se Second second s					LOG OF BORING 8-4/MV-4	
fliere Same	pplie	sd G	aosya	tems	With 000000000000000000000000000000000000	ARCO Service Station 6113 785 East Stanley Boulevard	4

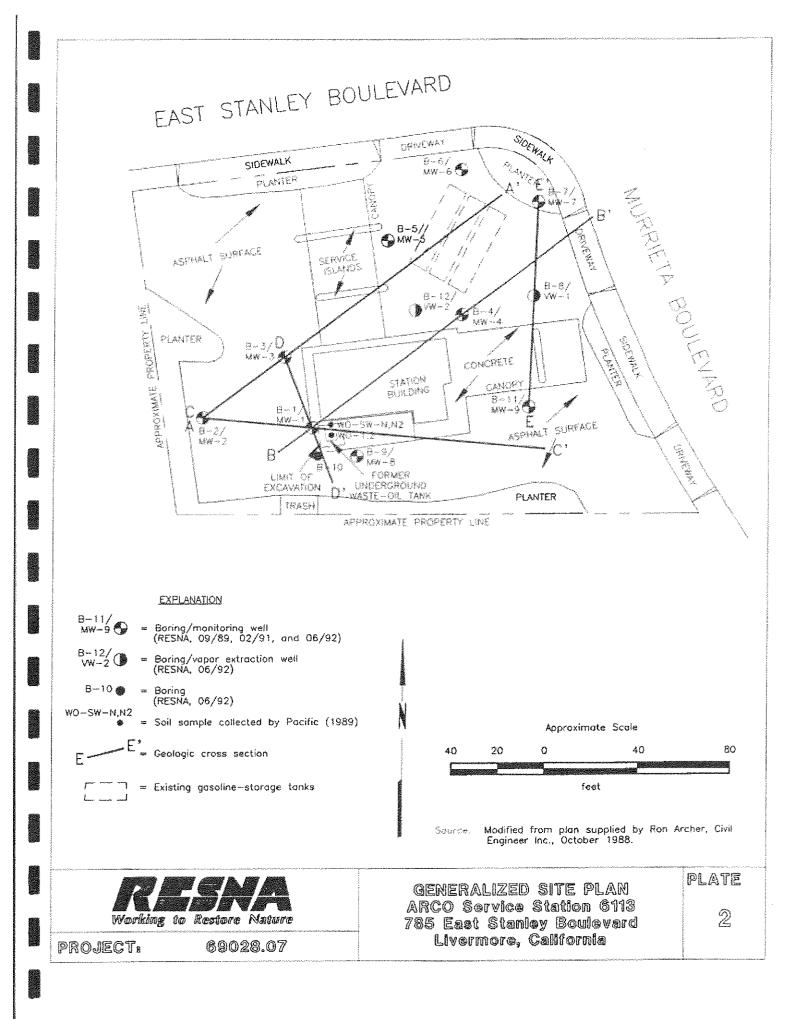
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Depth	Sample No.	BLOWS	P.I.D.	USCS Code			Desc	cription				Wel Cons
	Service and the service of the servi			CL	Sandy n	clay, so nedium p	me gravi lasticity,	el, gray— hard.	brown, m	oist, Iov	v to	
-55-	n un version and extension of the second			SM	Silty T	sand, bra	wn, very	moist, t	jense.			
-24 -	S-24.5	8		SC V	Clavev	eand h	rown we	et, dense.		86200mmatematistististististist		
- 26		14	0		Jugoy	39119, D		r, griger				
~~		10,16645346 July 69444	and and a second se	CL	Sandy	clay, gr	ay mottle	ed with 6	f	i st, low	ŧo	
-28 -	S-29 [™]	28 34 50	0	СН	Silty c	lay, brow lasticity,	/n mottle	ed with g	ray, damı	o, high		
- 30	S30.5	19 3	0		·	<u>,</u>	-					
-35 -		35	11 1 1 X X 2010									
-34 -					Total	Depth 📼	32-1/2	feet.				and a local state of state of a
-34 -			5 Y 1971 XX 5 X 1975 X 1976 X 1986 A An	a da						·		
-36-				a series and a series of the ser							•••	Vateral IV Manual Version
- 38		ordaste interior	4 11 - 4 - 44 - 14 - 14 - 14 - 14 - 14									i kanalan kanala
- 40		r dan Mirk da Da Kraan Mad Krawitski v Gyan	, Andridi AN Mitalia (Andriania)									und half and a subsection of the subsection of
- 42			anononomo o Angela	i na se de la se de l								newe we are done on the second second
-44 -		začiotra v prevo na čeneralno se de se	Standol Ab	digina di seconda di s								THE STATE OF CONTRACT OF CONTRACT.
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- 46		Wand plants in some		a (manufacture) Manufacture								war with the existant of
- 48	o Contractor via 19 ga forma a		oo yeara ahaa ahaa ahaa ahaa ahaa ahaa ahaa	or VC2000000000000000000000000000000000000								
-50	s den se se se se se se se			MA beland on data was o								Palishaa (Ferrer oooraan
				sume industrial second statements	214 PT PT 215 CT 215	1272223355699999999999999999999999999999999	empanal gaining an	1917 O A THE BOSSING OF GRADIES OF THE STREET AND		1	anovatika na titu ka ma kwa pat	
		<u></u>	Annana			LO	G OF 1	BORING	B-4	⊦∕MW-	- 4	PLA
2	Applied	C7	eosya	****		AF	RCO Se 5 Eas	ervice S t Stanl	Station ey Boul	6113 levard		ц Ц
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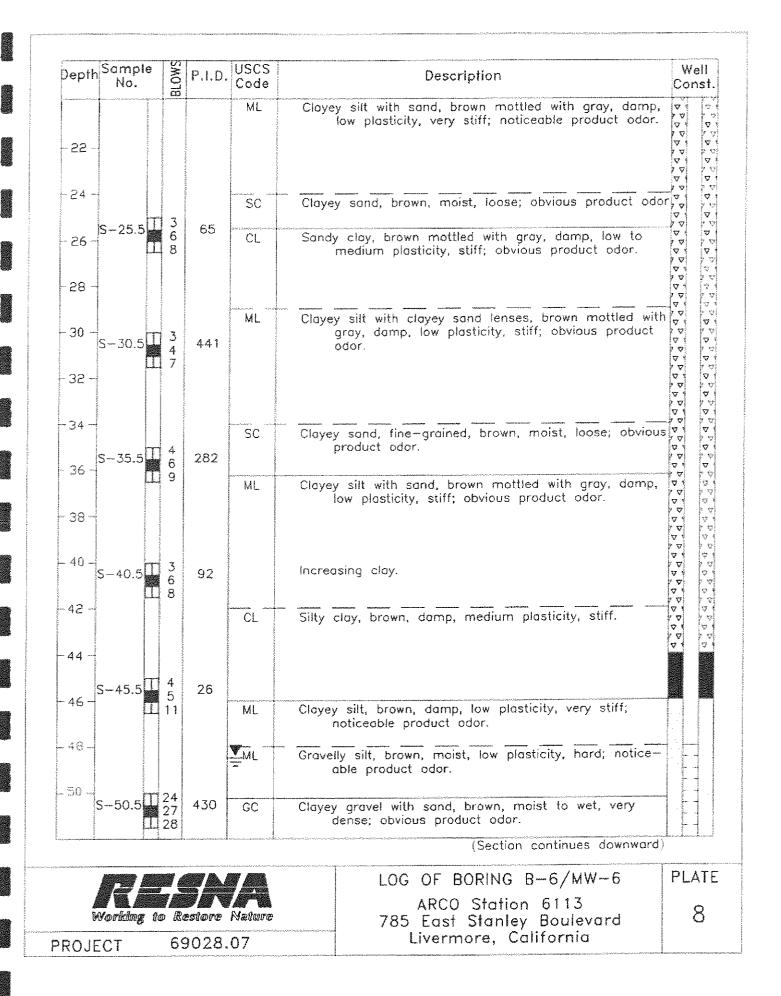
Depth of boring: <u>64 feet</u> Diameter of Well depth: <u>63 feet</u> Material type:		hes Date drilled: 06/08/92 Casing diameter: 4 inches
Screen interval: 43 to 63 feet	Slot size:	0.020-inch
Drilling Company: HEW Drilling	Oriller:	Casto and Marcelino
Method Used: Hollow-Stem Auger	v jezenský jezenské roku za konstrukciú sa konstrukciú sa konstrukciú sa konstrukciú sa konstrukciú sa konstruk	Field Geologist: Barbara Sieminski
Signature of Registered Profe	ssional	Jaman
Registration No.:RCE 0	44600 State:	CA

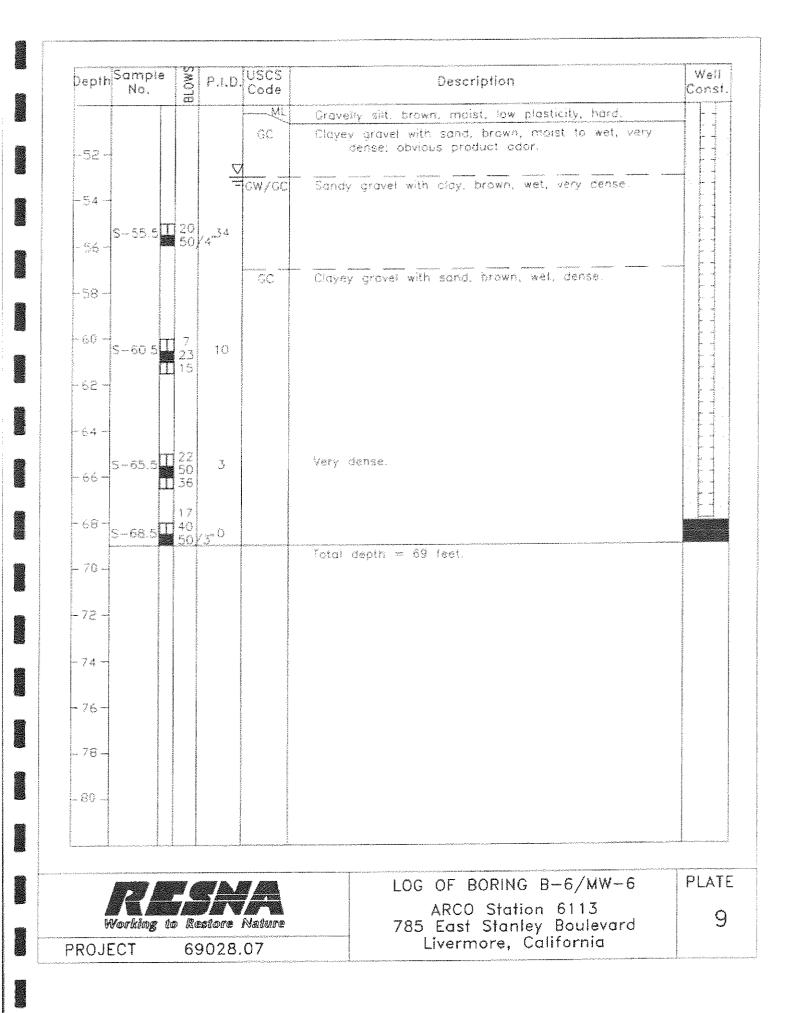
)eptt	Sampl No.	e	Blows	P.I.D.	USCS Code	Description	Well Const
0 -					AU.	Asphalt. Asphalt (4 inches).	
					GW GC	Sandy gravel, brown, damp, dense: baserock.	- ▽ 「∇ - ▽ ∇-
2						Clayey gravel with sand and cobbles, brown, damp, dense Color change to gray.	10 7
					SP (Medium- to coarse-grained sand, brown, damp, dense.	
4 -					GW	Sandy gravel, grayish-brown, damp to moist, medium dense.	7 0 7 V V 7 V 7
6 -	S-5.5		5 10 8	0			
8	ti fill feddin i feddio y i wy ro U bolan	molectra transmi (mgagaga egge	a second and a second se				
10	S-10.5		8 25	0	a de la constante da velle fagella esta vella	Dense.	⊽ ⊽ ₹ ⊽ ₹ ₹ ⊽ ₹
12 -		and the second	25				
14 -		a da se	مىيە دىغانىيىلىكى مەكەر بىرىمىيە بىلىكى بىرىمىيە بىلىكى بىرىمىيە		ML.	Gravelly silt with clay, brown, damp, low plasticity, very stiff.	
16 -	S-15.5		10 15 20	193	GW/GC	Sandy gravel with clay, gray, damp, dense; obvious product odor.	
18 -	Υ τη μια τη						7 0 7 7 0 7 7 0 7
20 -			3	005	a francisco de la constante de		7 7 7 7 7 7 7 7
	S-20.5		4 6	295	ML	Clayey silt, brown mottled with gray, low plasticity, stiff; abvious product ador.	7 Q Q Q Q 7 Q Q
	haamen		A 7077.112.0 A	ana Jugana and Juna J. 7 (1, 76, 76, 76, 76, 76, 76, 76, 76, 76, 76		(Section continues downword)	
et aan de Kanemerken bekenden bekenden.	<u>F</u>			1@7/	N A	LOG OF BORING B-5/MW-5	PLAT
	Nation Workin	B			re Nature	ARCO Station 6113 785 East Stanley Boulevard	4
ROJ	ECT:			690)28.07	Livermore, California	

Depth	Sample No.	BLOW	P.I.D.	USCS Code	Description	Well Consi
		hattar Takining	addeedd Arlanes (a arwydd ar yw ydd	GC	Clayey gravel with sand, brown mottled with gray, moist, dense; obvious product adar.	
-52 -				SC	Clayey sand, medium-grained, brown mottled with gray morst to wet, dense: obvious product odor.	
and the second se	and the second Advertise of Asso	n V A Anna Anna Anna Anna Anna Anna Anna		Gw∕GC ⊻	Sondy grovel with clay, brown, wel, very dense.	responses of the second
	S~55.5	125 50	4 ⁶⁷			
-58 -	ti kalura ati ulla / ka sa kwa a du	A NAVA A NAVA (A NAVA) (A NAVA)				n Sand San San San San
-40 -	s-60.5	250	1 m 1 k ŝ	very og XX arraitisk kalender som er som e	With cobbles.	
	ra, ja via via via	and a second sec	- <u>-</u> 2-	Arth - Roweld - The Article State		
-64 -	5-63.5 4	50	(5 ¹¹ 3		Total depth = 64 fest.	
- 56		d dan ka		v Merev Mondel Comme et de seu		I manage of applications of the control of the cont
- 68 -		Dob Millell Di Dword O Mildell I Panalis. Manuala Antonia		Wedgebook of Vicine- Hi Annual III WITH Key		TANAGRAANA IN ITTAA ING AMA
- 70		ւլիս տասնվելու չներերեր Տեռուս անգացին ու այն դեպուցին արը				NM 4 distribution of the second
-78		1/41 (Алший (Verbur) о Осдин в Билления нисто и на налагичиется		woodening to be a set of the set		1.1.1. Some Version Version van die state van die stat
-74 -		no fieren o voal de la riste				v vů v name ventrální na po populatil Sel 4 40 v sláža
- 76 -		A VY A LEVEL A RELATION AND BEVORE				of the second
- 78 -		and be dependent of the second s		ст. Сулан		
- 80 -		مريدية لي والدينية المريدية ال المريدية المريدية الم				inite of the state
etta data and digitized first				المقادم المقادم المعالم المعالم معرفة إلى المعالم المعال		
			<u>za</u>		LOG OF BORING B-5/MW-5	PLAT
	orking tu	Jana Kananga Mel	store 9028.		ARCO Station 6113 785 East Stanley Boulevard Livermore, California	E

Depth of boring: 6	<u>69 feet</u> Diameter of	boring: 10 incl	nesDate_drilled:06/09/92
Well depth:68 f	eet Material type:	Sch 40 PVC	_ Casing diameter: 4 inches
Screen interval:4	8 to 68 feet	Slot size:	0.020-inch
Drilling Company:	HEW Driffing	Driller:	Casto and Marcelino
Method Used:	Hollow-Stem Auger	Lin and of Alfred Assessor (wyp, wive a way and a second	Field Geologist: Barbara Sieminski
	e of Registered Profes Registration No.: <u>RCE 04</u>		CA

Deptk	Sampl No.	e	Blows	P.I.D.	USCS Code	Description	Well Const.
- O -		an Aran Managaran San Ing Kabupatén Kabupatén Kabupatén Kabupatén Kabupatén Kabupatén Kabupatén Kabupatén Kabup			GP	Asphalt. Asphalt (4 inches). Sandy gravel, gray, damp, dense: baserock.	1 (A) 2 (A) A (A) A (A) (A) A
2 -		Sector States	ordeningen die der volge		GC	Clayey gravel, brown, damp, dense.	⊽ ⊽ ⊽⊽ 7 ₹ ∀ ⊽ -√⊽ 7 ₹
4 -	S-5.5	Πı	0	8	GW	Sandy gravel with cobbles, grayish-brown, moist, medium dense.	
6 - 8 -			5				
10 -	5-10.5		3 6 0	0	CL	Sandy clay, trace fine gravel, dark brown, damp, low to medium plasticity, stiff.	
14 -	S-15.5		в 1	D	AND THE AND	Gravelly silt with sand, brown, damp, low plasticity, very stiff.	
16 -		D 1	5		ML	Clayey silt with sand, brown mottled with gray, damp, low plasticity, very stiff; noticeable product odor.	ν ν ν ν ν ν ν ν ν ν ν ν ν ν
20	5-20.5		5 7 0	33		(Section continues downward)	
	Wærlkin	8 1	la Io	kestori	NAL e Natura	LOG OF BORING B-6/MW-6 ARCO Station 6113 785 East Stanley Boulevard	PLAT
ROJ	ECT:		lowor	690	28.07	Livermore, California	ź





Depth of boring <u>: 6</u>	<u>8–1/2 feet</u> Diameter of	boring: 10 inc	hes Date drilled: 06/10/92
Well depth:68	<u>feet</u> Material type	Sch 40 PVC	_ Casing diameter: _ 4 inches
Screen interval:	48 to 68 feet	Slot size:	0.020-inch
Drilling Company:	HEW Drilling	Driller:	Costo, Marcelino, and Louis
Method Used:	Hallow-Stem Auger	we were a were and the second seco	Field Geologist: Barbara Sieminski
Signat	ure of Registered Profe	essional	100000
	Registration No.: RCE (044600 State:	CA

)epth	Sampl No.	e	Blows	P.I.D.	USCS Code	Description	Well Const
· 0 ·		V A V MIDATI C.		ى ئەر ھەلىرى ئىلىكى بەر يەر يەر يەر يەر يەر يەر يەر يەر يەر ي	SM	Silty sand, brown, damp, loose: fill.	
2 -					GW	Sandy gravel, brown, damp, dense.	
4 -	S-5.5		7 24 15	0			
8	715/01/2019 6/27 e/21 - 944.000000, Anna a - 9400 Anna	والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع	an Anna an Anna Anna Anna Anna Anna Ann		CL	Sondy clay, dark brown, damp, low to medium plasticity stiff.	
10 -	S-10.5		10 6 8	0	t v Pro Politik († 1919 - Vendedan ander de ander	S011.	V V V 7 V V 7 V V 7 V V 7 V V 7 V V 7 V V 7 V V 7 V V 7 V V 7 V V 7 V V
	S-15.5		5 11 22	0	GC	Clayey gravel with sand, brown, damp, dense.	
16		D	22	, 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994		Color change to grayish—brown; increasing sand.	יד סיד יד סיד יד סיד יד סיד יד סיד סיד סי
20	S—20.5		7 21 28	511		Moist; obvious product odor. (Section continues downward	
	Æ					LOG OF BORING B-7/MW-7	PLAT
RO.II	Workin ECT:	¢ s	10 10	ARA OLIVER AND A CONTRACT	e Nature 28.07	ARCO Station 6113 785 East Stanley Boulevard Livermore, California	10

)epth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const
	(Article) (Articular) (Article)			GC	Clayey gravel with sand, grayish—brown, moist, dense; obvious product odor.	
-22 -	a soon quees a la s	e Welde Hilferster og som		- air Al Isai e'i Al ea		▼ ▼ ▼
-24 -				SC	Clayey sand, fine-grained, grayish-brown, moist, loose; obvious product odor.	4
· 26	S−25.5	3 4 5	502		Increasing clay.	
-28	ана на			CL	Sandy clay, brown mottled with gray, damp, low to medium plasticity, stiff; obvious product odor.	
-30 -	s-30.5	6 7	86	ML	Clayey silt, brown mottled with gray, damp, low plasti-	
- 35 -	and a second				city, very stiff; noticeable product odor.	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
34	S-35.5		31	SC	Clayey sand, fine-grained, brown mottled with gray, moist, medium dense.	
36		35 8		ML	Clayey silt with sand and fine gravel, brown mottled with gray, damp to moist, low plasticity, stiff.	
- 38				i y ² in i n'i y ^a na we y ² yang ye ya		
40	5-40.5	5 6 9	21		No gravel.	
42 -	in colour	3	r) yw yr wrwn y fe ddianau y y wylendia y wyleiniau y wyleiniau y wyleiniau y wyleiniau y wyleiniau y wyleiniau	CL	Silty clay, brown, damp, medium plasticity, firm.	
44 -		3	-			0 0
46 -	S-45.5	3 4 8	0	ML	Clayey silt, brown, damp, low plasticity, stiff.	
48	Adimento - en directo de la competencia		oreneeptiviiii aadiiga oo too too	₩ =ML	Gravelly silt, brown, damp, low plasticity, hard.	10 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -
50	s-50.5	21 27	60	GC	Clayey gravel with sand, brown, moist, very dense.	het og Din an growt to give arts j
	Д	48	9999 4			r
nna nativi tuno	47 y 20 y 2	1 = 100.0000,000,000	P		(Section continues downward)	and a state of the s
	B ZE	M (ZA	742	LOG OF BORING B-7/MW-7	PLAT
N N	Yorking 1		9028.	مرور بر ۱۹۹۵ ورور بر این از مرور این اور اور مرور میروند. مرور این اور	ARCO Station 6113 785 East Stanley Boulevard Livermore, California	11

Depth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
yeense naga ya animii ya	2. Line of the second sec	<u> </u>		ML.	Graveliv sill, prown, damp, low plasticity, hard	
	Rafficking Law	whild a law as		GÇ	Clayey gravel with sand, brown, moist, very dense.	
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ar to	o to the second second					
a 6. j	1.000 C					
		28				
an tai ta an	S-55.5	40	1¢		Wet	
and Sof		48				
- 58 -						
						4 F
-60 -		20				
an an	S-60.5	32	2		increasing sand.	
		27				
						in the second
~64 ~						1 - 1
		- a				The second secon
	5-65.5	20 50	∕ ₅ °0			
• 66 m		1				1
						and the second se
- 68 -	S-68	50	(†°0			
	1995III/III/III/oort/document/		9. <del>gyunt (an gay atang markana</del> 10. an 1933)	ensuite et alle et all	fotal depth = 68-1/2 feet.	*********
- 70						And and an an and an and an and an an and an
i tud sint	* Addition					BALLY CONTRACTO
	~~~~~					Area Allizo e
-72-	NINE WAY					119 4Yr A.MIX
	3 143 AV		ł			- A
-74 -						s 4 h hodelin da WhyA
	C SELECTION CONTRACTOR					- An patri Agrae M
100 C	a constraint a series					The standard strength
- 76 -						- Alina (Annone a
	Variation y and					
- 78 -	-					14/11/2/14/14
-	1					v en sectores e
on			:			ra l'enare e vede
- 80 -						Annimologia Annis Contra
s of the second s	- Andrew - A					- produce and a second
	Santa Sa		Plant L'Emré e de some de aquest	<u> </u>		
	l fergenný a hange fragmý kaj na a ferní a si na se a v gour ganna fer		measure on soul Allertheats	What will be all and a second s		PLATE
		# (LOG OF BORING B-7/MW-7	FLAIL
Å	a c ai				ARCO Station 6113	12
ſ	Working t	o R	eslore	Nature	785 East Stanley Boulevard	12
ROJI			9028.		Livermore, California	1

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						et Diameter of boring: 10 inches Date drilled: 06/15	
						Material type: <u>Sch 40 PVC</u> Casing diameter: <u>4 ir</u>)CRES
						5 feet Slot size: 0.100-inch	
Dril	lling (Con	npc	iny:	HEW DI	rilling Driller: Costo, Marcelino, and Louis	3
Met	hod l	Jse				-Stem Auger Field Geologist: Barbara	Siemins
			Si			egistered Professional Article CA	
epłł	Samp No.	ole	Blows	P.I.D.	USCS Code	Description	Well Const.
0 -		The second of the second se				Asphalt, Asphalt (4 inches).	20 2 4
					GP SM	Sandy gravel gray dry dense: baserock Silty sand, brown, damp, loose.	
2 -					GW	Sandy gravel with cobbles, grayish-brown, damp, medium dense.	
4 - 6 8	S-5.5		8 11 8	0			v v v v v v v v v v v v v v v v v v v v v v v v v v v v v v v v v v v v
10	S-10.5	FMH	7 8 10	0	CL	Sandy clay, dark brown, damp, low to medium plasticity, very stiff.	$\begin{array}{c ccccc} 7 & \nabla & 7 & \nabla \\ \nabla & \nabla & \nabla \\ 7 & \nabla & 7 & \nabla \\ 7 & 0 & 0 & 0 \\ 7 & 0$
14		an a surface water a faith of the faith of the state of the surface of the surfac		:	GW/GC	Sandy gravel with clay, brown, damp, dense.	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
16	S-15.5		19 21 17	3			V V V V V V V V V V V V V V V V V V V V V
18 -		Standarson a summa a summa in summa sum	a Ab y BA, G. DEV, perform a sugartum prime second		ى بىلىنىڭ تەرىپىلىرىنى بىلىرىنىڭ بىلىنىڭ بىلىرىنىڭ بىلىنىڭ بىلىرىنىڭ بىلىرىنىڭ بىلىرىنىڭ بىلىرىكى بىلىرىكى بىلى بىلىرىنىڭ بىلىرىنىڭ بىلىرىنىڭ بىلىرىنىڭ بىلىرىنىڭ بىلىرىنىڭ بىلىرىنىڭ بىلىرىنىڭ بىلىرىنىڭ بىلىرىنىڭ بىلىرىكى بىل		

18 us product odor. 20 13 19 23 S-20.5 Color change to gray; obvious product odor. 572 Working to Restore Nature

PLATE LOG OF BORING B-8/VW-1 ARCO Station 6113 785 East Stanley Boulevard Livermore, California

13

PROJECT:

69028.07

Depth	iample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
el y Tariha Artennaeten were				GW/GC	Sandy gravet with clay, gray, domp, dense; obvious product odor.	
~ 22 ~	a an a' su an a'	Area in the second second				
C C C	9 (1 - 4 - 4 - 4 - 4 - 4 - 4 - 4 - 4 - 4 -	n an		MI.	Clayey silt with sand, grayish-brown with dark gray mottling, damp, low plasticity, stiff; eavious product adar	
		410 12	530			normalization of the second
-28 -	rm row we set to the destination	ال (1/2) و المحافظ المحسنية المحسنية بالمحسنية بالمحسنية المحسنية ا				generatigeneratigenerati
	- 33.5		276		Color change to brown mottled with orange and gray: increasing sand	menigan sheatainiya wa ya
-34 -	. 24. 45	an a	50	MŁ.	Sandy silt, prown mattled with orange, damp, low plasticity, stiff; obvious product oder	
				<u>^</u>	Silty clay, reddish-brown, damp, medium plasticity, very stiff; obvious product odor.	ar ngan nye na george a
CD	9 DY 1011 W-1 / 4 1.8 ministry wave wave	65411 lis Airo Alatanon nomen nom		international second se	Cloyey grovel with sond, grayish-brown, moist, dense.	
. 40 - 5	-40.5 T	15 27	163	re Fra År å følsti i vær andra ver ver mår		
42 -	Sec. Accord	ng sy		uluist hubbles, and state 10		
-44 -	statististististististististististististist		oranii y o di kito o biliiniida do kito	ML	Clayey silt, brown mottled gray, damp, low to medium plasticity, stiff; obvious product ador.	
	-45.5	D Ch Let	212		Total depth = 46-1/2 feet.	
. 4 🖗 🛶	and (411164) of a scill had been seen as a scill be	thand di Abilan dan, Qir yikay Ju e un yun' eyay.		Yer Hawan	inne atten - utruit natr	
50 -		"be" /b vo" or venues constanting of the second		San and Annual Annua		 A many provide a start sector sec
*****				 Month and the second sec		Providence of the second s



LOG OF BORING B-8/VW-1 ARCO Station 6113 785 East Stanley Boulevard Livermore, California

PLATE

PROJECT

69028.07

Depth of boring: 68-1/2 feet Diameter of	of boring: 10 inc	hes Date drilled: 06/11/92
Well depth: <u>67 feet</u> Material typ	e: Sch 40 PVC	_ Casing diameter: 4 inches
Screen interval: 47 to 67 feet	Slot size:	0.020-inch
Drilling Company: HEW Drilling	Driller:	Casto, Marcelino, and Louis
Method Used: Hollow-Stem Auger		Field Geologist: Barbara Sieminski
Signature of Registered Prot	fessional	
Registration No.:RCE		-

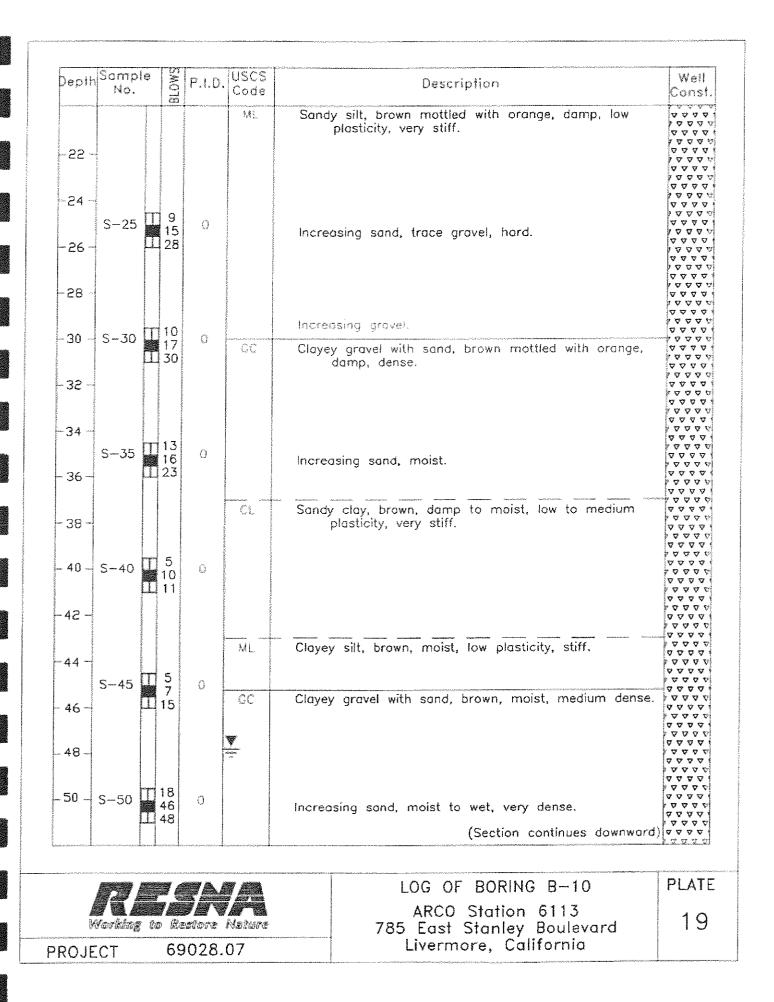
Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
- 0				GP	Asphalt. Asphalt (4 inches). Sandy gravel, gray, dry, dease: baserock	V 7 V 7 V 7 V 7 V
- 2				SM	Silty sand with gravel, brown, damp, loose.	7 0 7 7 7 7 7 7 7 7 7
- 4	an serie de la constante de la c			GW	Sandy gravel with cobbles, grayish—brown, damp, medium dense.	マ マ フマ フマ マ マ フマ フマ
- 6	S-5.5 II II	5 10 15	0			V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V
8 -	S-8.5	8 14 29	0			7 0 7 0 0 0 7 0 7 0 0 7 0 7 0 7 0
10	S-10	29 8 12 9	0			V V V 7 V 7 V 7 V 7 V 7 V 7 V 7 V 7 V 7 V 7
12-	5-15.5	9	0			$\begin{array}{cccccccccccccccccccccccccccccccccccc$
16		11 17		ML	Clayey silt, brown, damp, low to medium plasticity, very stiff	Φ Φ Φ Φ Φ Φ Φ Φ
18	میں میں اور		างจะจั่งกระบาทสามารถจะเป็นเป็นเป็นเป็นเป็นเป็นเป็นเป็นเป็นเป็น	ML	Sandy silt, brown mottled with orange, damp, low plasti- city, very stiff.	7 0 7 V V V V 7 7 V V V 7 V 7 V 7 V 7 V 7 V
20 - s	5-20.5 T	6 12 16			(Section continues downward)	7 0 7 0 0 0 7 0 7 5 0 7 5 0 0 1 0 7 5 1 0 7 5
	Working ECT:	J to	Restore		LOG OF BORING B-9/MW-8 ARCO Station 6113 785 East Stanley Boulevard Livermore, California	PLATE

Depth	Somple No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.	
~ @2 ~			e shares hadden til han sharesse och gje		Sandy silt, brown mottled with orange, damp, low plasticity, very stiff.		
-24 -	میں بیری در			na o realizador en manera en esta en es			
an <mark>al y</mark> ang	5-25.5 H	9977			With plant costs, hard.	0 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	
- 28	2	n da Anna a					
-30 -		14 27	o		Silly sand with gravel, brown, domp, medium dense.		
- 38		47	27		GC Clayey gravel, brown mottled with arange, do dense.	Clayey grovel, brown mottled with orange, damp, very dense.	
in the second		9-1		er er versetter der Arbeitspechikk geligt († 1906)			
- 36 -	S-35.5	가 있는 것은 것을 가 있다. 가 가 있는 것은 것을 가 있는 것을 가 있 같이 같이 같	Q	ing (v j tr slep), skreda i	With sand. No water after waiting 10 minutes		
- 38				oninguanne phoneignir	Clayey slit with clayey sund lenses, brown, damp to maist, law to medium plasticity, stiff.		
- 40	5-40.5	000		rithardsalasiinaii dalaseekanedd L ⁹⁶ a Lee	Sandy clay, reddish-brown, damp, medium plasticity,	10000000000000000000000000000000000000	
- 42		2.5		har lar	very stiff.		
-44		al more resources to the second	 P. O. TUPPY, A KNAME BY AN PERSON AND AN PROVIDENT OF A STATEMENT OF A STATEMENT OF A STATEMENT OF A STATEMENT OF A STATEMENT OF A STATEMENT OF A STATEMENT OF A STATEMENT OF A STATEMENT OF A STATEMENT OF A STATEMENT OF A STATEMENT OF A STATEMENT OF A STATEMENT OF A STATEMENT OF A STATEMEN		increasing sand.		
- 46	5-45.5 L	12) (1) -		ML	Clayey silt, brown, damp, low to medium plosticity. stiff.	And the second s	
- 48 -	r o Piller (h. y. K. K. J. y. K. K. K. Y. K.	purshrum-nomentorionistikingi e	5 AND 10 YOON 6000 STRAL AND 4 YO	CC	Clayey gravel with sand, brown, moist to wet, very dense.	regen to egy and growing	
. 50 -	5-50.5 -		0	nnutin Kar	(Section continues downward)	and and a second and	
12.000		vision/docelline	2. Lunco Social de Internet de Arrenet				
		W d	<u>ra</u>		LOG OF BORING B-9/MW-8	PLAT	
ROJI			9028.	ang gunnahan na abagada 100 matri 100 matr	ARCO Station 6113 785 East Stanley Boulevard Livermore, California	16	

Depth	Sample No.	n Cw	§ P.J.C	Code	Description	Well Const
				GC .	Clayey gravel with sand, brown, maist to wet, very dense.	
-52-	(4) For Chamber of A and A	- شار بار دوله بار می می می اور ا	an o chu mu ch	dirək hərəbə də bərəbə bərəbə də bərəbə d		A
- 54 -			n ferreðir fer skillander som			a contraction
- 56 -	S-59.5	12 4 15	2 5 5 7 4"		Increasing sand, wet.	ganiferantes a demonst
-58 -		and the state of the	nan na haran a sa an	وي ۋېرىكى بېرىكى بېرىكى يېرىكى يېرىكى يېرىكى بېرىكى يېرىكى يېرىكى يېرىكى يېرىكى يېرىكى يېرىكى يېرىكى يېرىكى يېرىكى		and a second
~ 60 -	S-60.5		2 2	مەربىيە بىرىمە تىرەر يەربىيە مەربىيە مە مەربىيە مەربىيە		na conference al company a company
Linement with the second	Breitere V erent och andere en er		1 €~5.	a ber of a star fragment of the star of a		eren anderen afrikanse. Anderen anderen afrikanse
- 54			a model of the Annual Processing of			
- 64 -	5 65,5					
- 68 -	5~67.5		¢		Total depth = 68-1/2 feet.	
- 70	din (42.2000/date di Alimini 10.) - (40.4)	كالمرحم ويحتقدهم برجعتهم والمتعاصر والمعالم	served the version cost has weak	WITTER CONTRACTOR AND	natur argasin millar (jila narri).	salata a di salata a di salata
		e e ol lio da comunda nomenazaran mu	definite landsteele verstillever. He we	vi i o B Cole Contrological S Coleman		ever to ever the function of the second s
•74 -			ny manufacture pala stationed a			14 PAGE AND A THINKING ALL AND A THINKING A
-76-						INTRODUCEN CONSIGNATION AND A SUBJECT
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. 80 -	HTA- WAR AL ADDUTT OF YAR O'LLIANS	An order a very the Andrew Stration of A belowing	 A muse ranker type of the state of the state			
an dhe mat mad dad dad dad dad dad dad dad dad dad					LOG OF BORING B-9/MW-8	PLATI
DAM	orking t	o R	estore	Nature	ARCO Station 6113 785 East Stanley Boulevard	17

Depth of boring: 60-1/2 feet Diameter	of boring: 8 inc	thesDate_drilled:06/08/92
Well depth:N/A Material typ	be: N/A	Casing diameter: N/A
Screen interval: N/A	Slot size:	N. A.
Drilling Company: HEW Drilling	Driller:	Casto and Marcelino
Method Used: Hollow-Stem Auger	a an	Field Geologist: Barbara Sieminski
Signature of Registered Pro	ofessional:	Damer
Registration No.RCE	·	

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PLAT
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)epth	Sample No.	BLOWS	P.I.D	USCS Code	Description	Well Const
- 52 -		t.t.d		GC	Clayey gravel with sand, brown, moist to wet, very dense.	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
-54	S-55 T	127	D			0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
~ 56 -		47 50				4 4
- 58		50		<u>▼</u>	Wet.	0 0
-60 -	S-60	30 38	0	ny, -energy in Ingenergy and a second	Total depth = $60-1/2$ feet.	
-62		To Galandard vitin 1777771 eduted				
-64		- Carrier, - syster Strutterministic in an				
- 66		Service and Alline of Industry and Alline				
- 68		A A A A A A A A A A A A A A A A A A A				
- 70		nnn shar sin				
-72	na n					NH - of Subard Country States
-74		en + OKTII SAKooyo Yuyu ya Vokta MAA		anna an		
76		dameda Vel'an e glaretto ju	A Die alle and All Die de Constantin et al. 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990			anna a' chuineacht a'
78-		e to famouth townshi seen s	9			- A WWW Constant
. 80		ىلىتىلىرىيە يەرىپىلىرىكى تايا تىرلىكىلىيە بىلىسىيە بىلىسىيە بىلىرىكى تايا تىرلىكىلىيە بىلىسىيە بىلىرىكى بىلىرىك مەرىيە بىلىرىكى بىلىرى	to have give an important of the strength of t			A THE REAL PROPERTY OF THE REA
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an at mit i d'ann a' ann an ann an an ann an ann an ann an	antibus et al production et al productio		F A		LOG OF BORING B-10 ARCO Station 6113	PLAT
Ŵ	orking te	d Re	store	Natara	785 East Stanley Boulevard Livermore, California	20

Depth of boring: 71-1/2 feet Diameter of	boring: 10 inc	thes Date drilled: 06/12/92
Well depth: <u>68 feet</u> Material type:	Sch 40 PVC	Casing diameter: 4 inches
Screen interval: 48 to 68 feet	Slot size:	0.020-inch
Drilling Company: HEW Drilling	Driller:	Casta, Marcelino, and Louis
Method Used: Hollow-Stem Auger	nannan managana yana kasala sa	Field Geologist: Barbara Sieminski
Signature of Registered Profe	ssional:	
Registration No.: RCE 0	44600 State:	CA

PROJECT:

69028.07

)eptl	Sample No.	Blows	P.I.D.	USCS Code	Description	Well ୁons
0 -			a managana kata sa	GP	Asphalt. Asphalt (4 inches) Sandy gravel, gray, dry, dense: baserock Silty sand, dark brown, damp, loose.	
2				GW GW	Sandy gravel with cobbles, grayish—brown, damp, very dense.	
6	S-5.5	Z 1 3	0	Visit Internet of Visit Science and Science Science and Science and Scienc		
8 -	ren (Provinsi A. 1977) A. M. Katalan K. Human K	99-77, 17-7, 19-7 (C).				
12	S-10.5	5 6 7	0	CL	Sandy clay, trace gravel, dark brown, damp, medium plasticity, stiff.	2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
14		9 17 19	0	ML	Clayey silt with sand, trace gravel, brown mottled with orange, damp, low plasticity, hard.	
18	مى بىرىمى بىلىدىنى بىرىتىنى بىلىدىنى بىرىكى بىرى مەرىكى بىلىرىكى بىلىرىكى بىرىكى بىر		7	ML	Sandy silt, grayish-brown, damp, low plasticity, very stiff.	
20	S-20.5	7 9 14	0	Andred Ministration of All Persons ((Section continues downward)	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
n Tana yang dan sama kanangan kan			œ A		LOG OF BORING B-11/MW-9	PLAT
	Working	8 0 80	Restore	Nature	ARCO Station 6113 785 East Stanley Boulevard	2

ARCO Station 6113 785 East Stanley Boulevard Livermore, California

)epth	Sample No.	BLOWS	P:I.D.	USCS Code	Description	Well Const
- 22			h − − − − − − − − − − − − − − − − − − −	ML	Sandy silt. grayish—brown. damp, low plasticity, very stiff.	
-24	معمد مع وتسب که د هواید بر و د هواید بر و دورید			SC	Clayey sand with sandy silt lenses, grayish-brown, damp, medium dense.	
- 26 -	S-25.5 L	4 8 11	0	ML	Clayey silt with clayey sand lenses, brown mottled with gray, damp, low plasticity, very stiff.	77 77
-58 -		5.1106 — 4.16.		af bar Although		
	S−30.5	5 7 11	NM	re y SAANSKA LA GURENA LIIMAA L	Noticeable product odor.	
32 -				ML	Sandy silt with gravel, orange-brown, damp, low plasti- city, very stiff.	
7 10.0	S-35.5	7 16 36	NM M	GC		
38-	n ar the second se	مستعمده وموالعة لوالملكوا والمحادثة فالمحادث والحالية والم	shi) (Alberd d'a manana ya		damp, very dense; noticeable product odor.	
40 -	S-40.5	22 30 25	NM		Increasing sand, becoming moist.	
42	Sarahara Saraharaharahara Saraharaharahara Saraharaharahara Saraharaharaharaharaharaharaharaharahara	4 4				
44	5-45.5	17	NM	CL	Becoming very moist.	
48		14			very stiff.	
50 -	s-50.5	9	NM	Ministratia companyos ML	Clayey silt, brown, damp, low to medium plasticity, very stiff.	
		11		a Theorem and Anna a	(Section continues downword)	
	(PP &		<u>Y</u> N			PLATI
	Y <i>orking to</i> CT		028.		ARCO Station 6113 785 East Stanley Boulevard Livermore, California	22

Depth	Sample No.	BLOWS	P.I.D	USCS Code	Oescription	Well Cons
				ML	Clayey sill, brown, damp, law to medium plasticity, very still.	
~ 52 -	and a second				ى ئىرىلىدىنى بىرىكىيىكى بىرىكىيىكى بىرىكىيىكى بىرىكىيىكى بىرىكىيىكى بىرىكىيىكى بىرىكىيىكى بىرىكىيىكى بىرىكىيىكى	siringanan
- \$4 -				ML	Gravelly silt with clay, brown, moist, medium prosticity. hard.	1000 - 10000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1
-56-	5-55.9 T	17 43 47	N M	760	Clayey grovel with sand, brown, wet, very dense.	
-58 -	anone series and the series of			in be been been being bit on inge bit		1000
non-military services	S60.5	1537	NM		Sandy gravel with clay, brown, wet, very dense.	erregense og en og e Bereje verkegenet og en og e
		danada da kangi da		e Gergergije i predskoj di Serie Balder de Alexandro. Konstruktion de Alexandro di Serie Balder de Alexandro di Serie Balder de Alexandro di Serie Balder de Alexandr		A STATE AND A S
entroday to community				er op en skriver i de gewenne en en en skriver i de skriver		international and the second
66	5-65.5 4	49242	N N	r or në v i villi ji i v re er dite ësuano	Increasing sand.	and a second
68-					Silty clay, brown, damp, medium plasticity, very stiff.	
. 70 -	s-71	7 8 0	NM			
.72					Total depth = $71-1/2$ feet. NM = Not measured due to OVM malfunction.	
A CONTRACT OF A	والوالية من ما عاد المارية الم المارية المارية	unant provided with the designation wave sync				
Alexandra Second	8970.8874.8424.8424.8424.84	ייני אונענעניין פאקטאראין אונע				
78-	Ville e skred skile (4.4 milet) sonet so miskel (972) e cijek (a.K.ind-4.4 milet)	Later H. A. Vento T. K. H. B. N. J. A. Ventovik, org.	adiry (r v a bite dick wy illing was a set of the set o			
80 -	alli (di shida fa di shi di shi shi shi shi shi shi shi shi shi sh	» که دیکه ایک ویکو ایک ویکو ایک				
unter takifing i general of the second		All Andrey South Constraints				
	() productive de la constantinação de la	76	Ya i	menonen an	LOG OF BORING B-11/MW-9	PLAT
N	orking ta) Re	store	Nature	ARCO Station 6113 785 East Stanley Boulevard Livermore, California	2

	lling				10 43-1,	/2 feet Slot size: 0.100-inch	
Ме		Cor	mpo	iny:	Explorat	on Geoservices Driller: Dave and Fred	
	fhod	Use		gnatur	re of Re	-Stem Auger Field Geologist: Barbara gistered Professiona ion No. <u>RCE 044600</u> State: CA	Siemins
Deptł	Samı No	ple •	Вожя	P.I.D.	USCS Code	Description	Well Const
~	NT ROMANNE PROMINENT C	er heren av seven av			~~~~~~	Asphalt (4 inches).	
- 0 -		forward a fear		na ana na kata ana ana ana ana ana ana ana ana ana	GP GW-GM	Sandy gravel, gray, damp, dense: baserock. Sandy gravel with silt and cobbles, brown, damp, dense;	2 2 2
2 -		ry drohi be prinkonsanių Arseptių V. Ling			G14G14	cobbles up to 4 inch diameter.	
4		-124 Summerson			And the second s		
	S-5	T	13 16	0	مريد من در مارد مريد. المريد مريد مريد مريد مريد مريد مريد مريد		V V
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10 -	S-10		18	0	a de annoca de la de la composición de		יל סל ס ס יל סי
12		ant traves a tour stravest voter visa			n a na man an an an a a a a a a a a a a		ס ס ס ס ס ס ס ס
14	S-15	A DESCRIPTION OF A DESC	13	/~~"0	GC	Clayey gravel with sand, brown with gray mottling, damp, very dense.	V V V V V V V V V V V V V V V V V V V V V
16			~~~/	<u>ل</u>	CL	Sandy clay, brown, damp, low plasticity, stiff.	
18 -					GW-GC	Sondy gravel with clay, brown, damp, very dense.	0 4 0 4 0 7 7 7 0 4 7 7
20 -	S-20	Н	18 28	4	renne Arabitation and a second		
		223	32 32		Deven a visit of order of the second se	(Section continues downward)	
	<u>A</u>					LOG OF BORING B-12/VW-2	PLAT
	N	Į 🎜		Y	VA	ARCO Station 1319	~ .
	work	nng	l@	Kesior	e Nature	785 East Stanley Boulevard Livermore, California	24

£ .			BLOWS	P.I.D.	Code	Description	Const	
	skygFallal €nu‴si utriaaboom				GW-GC	Sandy gravet with clay, brown, damp, very dense.		
- 24 -		na ana ana amin'ny fanana amin'ny fanana amin'ny fanana amin'ny fanana amin'ny fanana amin'ny fanana amin'ny fa			50	Cleyey sand, brown mottled gray, damp, medium dense	2 (V	
	5-25		0 ~ 0	3	S S = 1 1 1 1 1 1 1 1 1 1 1 1 1	Sandy clay with clayey sand lenses, brown mattlea gray, damp, low plasticity, stiff.		
		and an advantage of the state o	ee WAAA KII KII KA WAAAA		arunana care	Cloyey silt with sand, brown mottled gray, damp, low plasticity, hord.	ing of 12 Art in prime to get a starting to	
* 20 -	\$-30		- 15 CA	2		риказаностку, токала		
- 22		الله البرانية المحمد والمحمد و المحمد والمحمد و	A Comparison of a second secon		N/L	Gravelly silt with sand and clay, arange-brown mottled		
	5-35		ang vangen versen state stat	46		gray, damp, low plasticity, hard; obvious product odar.		
n. K Sur musiq	~ ~~		16 20	+ 20	9 6	en zi ne un ferenza internetario e secondario de la consecuencia de la consecuencia de la consecuencia de la co		i son galani galani gana i
		and energy of the state of the	ordoveržačio i versi njest i no simu je i v dije		Cally Straty a	Clayey gravel with sand, brown mattled with gray. maist, very dense; obvious product odor.	and a second second second second	
. 40 —	5-40		1220	14 14 14 14			and a star star star star star star star st	
- 43		مدیستورین کو توجیح واجد می در مد				ana		
- 4	15-4M		8	46	ju L	Grovelly cloy, orange-brown, damp, low plasticity, hard; abvious product odar.		
	ف ۳۰۰۰ دیر		14 25	-4 (J)			and the second s	
*8 -			79.99.0-47.97.99.000.000.000.000.000.000.000.000.					
	5-50		8 4 8	96	an an an an Anna an An	Decreasing gravel.		
	••••••••••••••••••••••••••••••••••••••		And			Total depth = 31 feet	Lange to a second state of the	



ARCO Station 6113 785 East Stanley Boulevard Livermore, California

PROJECT

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Total depth of boring: 24 feet Diameter of boring: 12 inches							Casing diameter: Casing material:	Sch 40 PVC						
	drilled:				6-16-9		Slot size:	0.10~inch						
						Geoservices	Sand size:	Sand size: 3/8" peo gravel						
)riller:		****			John		Screen Interval:	MENNALMING AND						
Prilling	g metho	od:_	ini-à-acaianaca	H	ollow-Ster	n Auger	Field Geologist:	Zbigniew Ignatowicz	NEW CORPUSATION CONTRACTOR OF CONTRACTOR					
			Siç	gnoture	of Regi Registr	stered Profess ation No.: <u>CE</u>	sional: EC 1463 State: CA							
epth	Sampl No.	e	Blows	P.I.D.	USCS Code		Description		Well Const					
		Ward and a state				Pea gravel	bockfill.		v ⊽ v					
2 -		10.01010												
4		a language of the							0 ♥ 0 ▼ 0					
6 -		Ŧ	8											
e			0						7 - 7 7 7 7					
8~			790											
10 -	c 1-	Ŧ		7 9 10	7 9 10	7 9 10	7 9 0 8 126 20	790	7 9	10.5				
12 -	S-11		10 8 18	10.5	ML	Gravelly silt,	dark olive-gray, damp, low fine gravel ~10%.	plasticity, very stiff to						
14			5976	14.3			color change to dark green	ish—arav: rootlets						
	S-16		142	21.8										
16	S-16		5078 20 21	26.2	GW	Sandy grave damp	el, coarse-grained sand, fine very dense.	gravei, greenisn-gray,	×4					
18 -		H	21 20/5	373					644					
20 -	S-20.5		22/0 50/0	1096	Ţ.				124					
22 -	5-20.0		~~/ 7	1030		Cillus play	- 10% fine-grained sand, aliv	e-brown moist low to	부성-					
24	S-23.5		22 27	2800	CL	/ Sitty Cidy, ^ mediun	n plasticity, hard.	$\mathbf{c} = \mathbf{v}_1 \mathbf{v}_{\mathbf{H}1}, \dots \mathbf{v}_{\mathbf{N}5}, \dots \mathbf{v}_{\mathbf{N}5}$	121					
£7 ~						Total Depth	= 14 feet.							
26 -									AND ALL POTTE					
28 -									1008000-00000 vot 0					
-30 -									1660-1777					
32 -														
- 34									NAMA NAMA NA					
36 -		Newsauter												
38 -		Table Construction							- Andrew Vieweller					
40 ~				:										
		_	Ll	- 	innas as one i blekt stilt blekten ber		มมูกเหตุมายๆ ความสาวมาระเจาะเป็นสาวมีให้สาวมีให้สูงทุกปูร พระวิทราว () () () () () () () () () () () () () 							
		*		<i></i>		1	OG OF BORING	B-13/VW-3	PLATE					
	N a						ARCO Statio	n 6113						
	Worki	ng	to i	Restore	Nature		785 East Stanle	1	4					
	CT:	*******		69028	> ^ 7		Livermore, C							

					3.		Casing diameter:	4 inches	
Diame	ter of	borin	ıg: _	AND THE PROPERTY OF THE PROPER	12 i	nches	Cosing material:	Sch 40 PVC 0,10-inch	
	drilled:			·····	6-16-93		Slot size:	U, IU-IACH	
Drilling) Comp	any:	مەنبەيدىنى	EXI	John	eoservices	· · · · · · · · · · · · · · · · · · ·	3/8° peo grovel	
Jriller:		*****	and the proved of		ullan - Clam		Screen interval.	17 feet to 30 feet	
Drilling) metho	0:	C :		illow-Stem	Auger	Field Geologist:	Zbigniew Ignatowicz	and a second second second second
			Sigr	nature			ssional: CEG 1463 State: CA		2/ J
Depth	Sampl No,	e	SMORS	P.I.D.	USCS Code		Description		Well Const.
					a and a first of a local sector of the	Pea grave	I backfill.		2 2
· 2 -					GW	Sandy gra	vel, coarse-grained sand, fir	ne to coarse gravel, dark	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
4 -		1993 b	An or s webble			brow	n, damp, very dense.		7 7 7 7 7 7
6 -	S-5.5	т з 1884 5	00		A STREET, STREE				
-					CANNAR AND				V V
8 -					undel Million Chi				
10 -		Ц!	5		<u> </u>	C ¹¹	an a	man madum to biah	
12 -	S-11		6	129	CL/CH	Sitty cloy, plast	very dark grayish—brown, di Icity, hard.	anp, meann re mgn	V V V V
			معارك فليسرم فكالدي						2 Q 2 Q
14 -	S-14.5		6 9	49.8					
16 -			9			Moist, yell	ow-orange oxidation stains.		
18 -	S-17	900 50	1/0	45.6	GW	Sondy gro	avel, dark grøy, moist, very (dense.	
- 20 -	19-11-10-540-00	1451/285em							
- 22 -	and the state of t								pa Pa
~ 22 ~	S~23	50	1/3		∇	Wet.			
- 24 -		~	″ *		₹_	, voc.			Sa Pa
26 -	4		ر بنور بر المراجع الم						or 10
	S-28	∓‡	23						
- 28 -	S-28	i Ma	8	2570	<u>sc</u>	<u>Clayey sa</u>	nd, fine-grained, dark olive-	-gray, wet, dense	
- 30 -	s-30.5	Ш!	2	230	CL	Silty clay,	olive, moist, medium plasti	city, stiff.	<u>pyth</u>
- 32 -	<u> </u>				1924 (H. 1937) 1937 (H. 1977) 1978) 1977	Total Dep	th = 31 feet.	1999 allow observations and the prost of the first of the second s	
		-							
34 -	source and								
- 36 -									X.
- 38 -	a series of the		6						
- UC -									
- 40 -			annon vone						
							annan an Alban (Alban (Alban) an Alban) an Alban (Alban) an Alban) an Alban) an Alban) an Alban) an Alban) an A		
									PLATE
			, and the second s				LOG OF BORING	B - 14/VW - 4	
			WĄ		V A V		ARCO Stat		5
23.40,0411141211110	W Orki	ng l	****	ayan da kana kana kana kana kana kana kana	» Neture		785 East Stan	-	
ROJE	CT:		6	9028	3.07		Livermore,	California	

Total depth of boring: <u>31-1/2 feet</u>	Casing diameter: NA	ment hat has been und the terminated street the a 1 best fill
Diameter of boring: 12 inches	Cosing moterial:	a va nova o un one das antes de nove our vite-
Date drilled: 6-16-93	Slot size: NA Sand size: NA	NAMES AND ADDRESS OF A DESCRIPTION OF A
Drilling Company: Exploration Geoservices		Leddeld I. (2020). A block currents
Driller: john	Screen Interval: MA	NY 2585A m ora amin'ny fanonananana
Drilling method: Hollow-Stem Auger	Field Geologist: Zbigniew Ignatowicz	
	ial: 1463 State: <u>CA</u>	
Depth Sample Some P.I.D. USCS Code	Description	Well Const
Steel box.		
- 2 GW Sandy gravel, 4	grayish—brown, slightly damp, dense.	
	gruyish—brown, angrity bonnp, benab.	7000
		7 7 7 7
6 - S - 6 $7 - 15$ 21 29 6.1		~ ~ ~
8 -		7 7 7 Y
		7 V V V
- 10		
12		
		$\bigtriangledown \lor \lor \lor$
ML Sandy silt, with	some gravel, dark grayish-brown, damp, low	
15 S-15.5 plasticity.	hard.	\ne_ \ne_ \ne_ \ne_ \ne_ \ne_ \ne_
	blive, damp, medium plasticity, hard.	$\neg \neg \nabla \nabla \nabla$
. 18		7 7 7 7 7 7 7 7
20 - 35 S-20.5 - 35 S-20.5 - 21 4		
S-20.5 mm so/2 21 4		
24 CL Sandy clay, do	irk greenish-gray, very moist, medium plasticity,	
		7 7 7 7 7 7
²⁶ S-26 s 25 34.2		
28		ំ ២ ២ ២ ២
- 30 13		2020
-30 - 13 - 31 - 31 - 31 - 31 - 28.6	11012 / 111010 / 110	V V V
- 32 - Total Depth =	31 - 1/2 feet.	
- 34 -		
		28 6 R
- 36 -		
- 38 -		
- 40 -		
		PLATE
	LOG OF BORING B-15	
	ARCO Station 6113	
Working to Restore Nature	785 East Stanley Boulevard	6
OJECT: 69028.07	Livermore, California	1

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Depth of boring: 54 1/2 feet Diameter of Well depth: 52 feet Material type:		hes Date drilled: 03/24/93 Casing diameter: 4 incres
Screen interval:32 to 52 feet	Slot size:	0.020-inch
Drilling Company: Exploration GeoServices	Driller:	John and Dennis
Method Used: Hollow-Stem Auger		Field Geologist: Barbara Sieminski
Signature of Registered Profe	ssional:	nana ana amin'ny faran'i Sali Bandi i Nganinana na amin'ny faritana amin'ny faritana amin'ny faritana amin'ny f

Registration No.: CES 1463 State: CA

Depth	Sampl No.	e Blows	P.1.D.	USCS Code	Description	Well Const.
- 0 -					Asprol 4 incresi	
				GP	Sandy grovel, gray, damp, dense; baserock	0 0 0 0 0 0
- 2 -		, ;	Anna bab of the South of the second	SP	Sandy, medium— to coarse—grained, brown, damp, dense	70 01 70 01
- 4 -		PA - APPA V F MANALANA	politika ann ann Ann an	GP	Sandy gravel, brown, damp, very dense.	⊽ ⊽ ⊽ ⊽ ⊽ ⊽
- 6 -	s–5.5	34 50	3 767			4 4 6 4 7 6 7 7 7 7
- 8 -		ana sangagan tang kana sa sa	SANGA CANANA AND CANANA			2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
- 10 -		11 50	/5"	vannandra Galdida Gal Van Mer Ver e	with cobbles.	र रि र र रि र र
. 12 -		and a second	un referende bel eksen Andrewe	n de la de la companya de la company		
- 14 -			the second se	ML	Clayey silt with sand, light brown mottled orange, damp, low plasticity, hard.	2 2 2 2 7 2 2 7 2 2
- 16 -	S- 15.5	5 0	\$ }/4"	GW-GC	Sandy gravel with clay, brown, damp, very dense.	
- 18 -	An and a second state of the second state of t	openiji se	Notable Provide the South State South State Sta			4444 4444 4444
- 20 -		50	555	e e a conserva e un a conserva e un a conserva e en esta e esta esta e	Increasing clay.	* 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
				алинин на санан санан Солон санан сан	(Section continues downward	
		.			LOG OF BORING B-17/MW-10	PLA
	Work	ting t	o Resta	pre Natura	ARCO Station 6113	Å
PRO	JECT:		69	028.11	Livermore, Canorina	

epth	Sampi No.	5	NO.	P.I.D.	USCS Code	Description	Well Const.					
			90. N. O.		GW-GC	Increasing businesses						
- 25	i	Additioner waarn an trans				Gravely sit with cay, and a amp, ow classicity, very stiff						
24-	S-15.5				and a second							
26 -	S-42.7			6		Sanay c.ay, brown, moist, medium plasticity, very stiff						
28 –					r 2. Kees National & Holds							
-30 -	5-30 S		10		ML I	Sandy silt with clay, trace gravel, grayish-brown mottled orange, moist. low plasticity, hard						
-32		Factoria -	φ υ συς	A MARY								
-34 -	<u>s-35</u>		10	10	0	NO.	10	10	A State And A second and a second	ang ang again	Clayey sand with fine gravel, brown, moist, medium dense.	and the second sec
- 36 -		Ш	1001			Sandy silt, brown, moist, low plosticity, hard.						
- 38 -		ana a anggaggy tauna disebutikan katalog		 In the second distance of the se		Clayey gravel, brown, wet, very dense.	990)-486 880- 142 880- 1					
- 40	5-40		26 30 50	4			name international constants					
- 42	una parta da con de mos demando	in the state of th		nemocodo Idibido Moduli 1921, VPRESSIPE		Sandy gravel, brown, wet, very dense.						
-44 -		a se designed de la promotor en anemano a compañía de la promotor en anemano en a			C.P		en operation of the second secon					
- 46 -	5-45.	5	23 50	¥5" ⁰	er werden der son der bestehen der der Bertrater werden der der Stellen With er Britter der Bertrater		r					
- 48-												
- 50 -	and the second se	X	50		na mangala ang sa		ger a ser an					
a and the second se		Vento of the				(Section continues downwa	rd)					
					<i>a a</i> r	LOG OF BORING B-17/MW-10	PLAT					
	Vorkia	g îc	, R	PA lestore	Nature	ARCO Station 6113 785 East Stanley Boulevard Livermore, California	5					
RO.	IECT		e	5902	8.11		A COLOR OF COLOR					

						(see ees)	st,
tan ing para tan ing		****	USCS Code GP	Sandy	gravel, brown, wet, very dense.	Section 2015	**
1912			nood				
- 54		- <u>m</u> 1 - Č		1990auuuu araanafee di kan kostaatiinjastakka roore			
			, a Copyregative an all the second	Tota	al deoth = $54 \ 1/2$ feet.		
	a solution of the second		noneco e o			4	
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r a		Fa			APCO Station 6113		
oriting R	o R	estore	Nature		785 East Stanley Boulev	ard	6
			and descriptions and the second se		Toto	Total decit. = 54 1/2 Feet. Total decit. = 54 1/2 Feet. LOG OF BORING B-17/MW ARCO Station 6113 785 East Stanley Boulev Livermore, California	Total death = 54 1/2 Feet.

					eet Slot size: 0.020-inch	
					n GeoServices Driller: John and Dennis	
e†ł	nod U				Stem Auger Field Geologist: Barbara	Sieminski
		S	-		istered Professional:	
				Registrati	on No.: CEG 1463 State: CA	
						wywanawy in fan Sin yn ywedin 17 y 1970 yw 1 yw 197
	Samp	e	\$ P,I.D	USCS	Description	Well Const.
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inners in Alfal				4 gaar (* 6 10 10 4		and an and a
)					Sondy gravel with clay, damp. brownish-gray, very dens	
				GW-GC	Schay graver with cidy, domp, brownian groy, fory com	7 77
				the C-	Clayey gravel with sand, brown, damp, very dense	
					Sandy gravel with clay and cobbles, dark brown, damp, very dense; gravel up to 3" diameter.	27 27 77 27
viation(oran) Provid	$\zeta_{i}^{*} = \frac{z_{i}^{*}}{z_{i}}$		1 5 o	G₩-ĞC	very dense; gravel up to 3" diometer.	
5 -		12	5			
						2 1 2 2 1 2 2 1 2
3 -						
<u>°</u>	S-10		3 0		Decreasing clay; color change to gravish-brown.	
		and in the	40.0%	10 m		
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	S-15		3 2			
6 -	1	-				
	an of the second second			ML.	Clayey silt with sand, trace fine gravel, light brown	
ē.					mottled gray, damp, low plasticity, hard.	
			6	eri kepitalan) Kran		
<u>}</u> 0 -	S-20		56 0 50 5	nar i na su na su na		4 6 4
	n de regel de la de la de la de	had we		erereri k. valički V		
					(Section continues downwa	
	A				LOG OF BORING B-18/MW-11	PLA
		喇 蠱			ARCO Station 6113	

Jeptn	Sample No,		BLOWS	P.I.D.	USCS Code	Description	Const.									
			36 50,	G.	ML.	Clayey silt with sand, trace fine gravel. light brown mottled gray, damp, low plasticity, hard.										
-22		Minute in Addition in Second				1 Manual Manualizati (1990-1995) Manualization (1992-1994) Manualization (1992-1994) Manualization (1992-1994)										
- 204	S-25			Ē	\$C	Clayey sond, fine-grained, brown, moist, med:um dense.										
- 25 -			26		ML	Sandy silt with clay, light brown, moist, low plasticity, hard.										
-29		and the second se			sector	Cloyey sand, fine-grained, brown, moist, medium										
- 30 -	S-30		12 17 22	0		dense. Clayey silt with sand, light brown, damp, row to medium plasticity, hard.										
				a namana na kata na kat	or your or your or you do not share the second of the seco											
- 34 -	5-35	m	7	000000000 ############################			0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0									
- 36			17 18	e and a second s	A A A A A A A A A A A A A A A A A A A	Increasing clay.										
- 38 -	annen an			revenues and a set of the life		Cloyey sand, fine-grained, brown, moist, medium	Group and									
- 40-	S-40		8	8 14 26	8 14 26	8 14 26	8 14 26	8 14 26	8 14 26	8 14 26	8 14 26	8 14 26	0		dense.	n
	and the second of the second of the second of the second	1.000 Control of Contr		n under an a sur a sur a sur anna an anna anna anna anna anna anna	jų sykologijo karantininijo savinininijo sir visioni (19 kg.) (19 kg.) Antonio karantinininininininininininininininininini											
- 4 4 -		<u></u>	-				4 12				, \$		GL.	Silly clay with sond, brown, damp, medium plasticity, hard.		
- 46 -	S-45		2885	D	an a											
- 49 ·		4	15 28 40	Ó		Total depth = $47 \ 1/2$ feet.										
.	122012012010000	unanter a phone house and the	AN LODG ANNOUNCE TO THE OF A PARTY				an fan fol ferm ferst ar ferman									
							anna (1) a start of the start o									
*********				W A		LOG OF BORING B-18/MW-11	PLAT									
	Norking	7 Ø		Besløre	Nature	ARCO Station 6113 785 East Stanley Boulevard Livermore, California	8									

Depth of boring: 37 1/2 feet Diameter of	boring: 8 inc	hesDate_drilled:03/23/93
Well depth: <u>34 1/2 feet</u> Material type:	Sch 40 PVC	Casing diameter: 2 inches
Screen interval: 18 to 34 1/2 feet	Slot size:	0.020-inch
Drilling Company: Exploration GeoServices	Driller:	John and Dennis
Method Used: Hollow-Stem Auger	\$77.625.527.625.529.444	Field Geologist: Barbara Sieminski
Signature of Registered Profe	ssional:	2019/04/2010 01/04/2014/04/2014/04/2014/2014/2014/201
Registration No.: CEG	463 State:	

epn	Samp No.	ç	Blow	P.I.D.	USCS Code		Description	Well Const.
0 -				ananaug (\$100 t M+ \$11 + \$10 + \$	GW	Sandy gr	avel, brown, damp, very dense.	 4 4
2 -		والاتبار تدريب مستعمل ومندر والانتساء والمتعامل			GC	Clayey g	ravel, dark brown, domp, very dense.	
4 ~			23 25 30	p	<u> </u>	Sandy gi	ravel with clay, damp, very dense.	
8 -	-	And a second			or () (), iv () is fight to its first output of the			
10 -	- S-10			0	CL	Sandy c plasti	lay, trace fine gravel, brown, damp, medium city, hard.	
- 2 -	1	eres encemantiska talta 144 62.0 %			ML	Gravelly plasti	silt with sand, grayish—brown, damp, low city, hard.	
- 14 -	S-15		108024					
- 18 -			second acceleration and A Gold		GW-GC	Sandy g	rovel with clay, brown, moist, very dense.	10-000 miles
- 20 -	ron or or other and the second se		50	250				, jegen - er og en en er og en en en er og en en en er og en en en er og en 1. jegen - en
and and a state of the state of	<u> </u>	, 	1	<u> </u>			(Section continues downwo	srd)
						1	LOG OF BORING B-19/MW-12	PLAT
	Worl	kin,	g 14	p Resid	bre Natura		ARCO Station 6113 785 East Stanley Boulevard Livermore, California	9

r co juro i li	Sampl No.		BLOWS	P.I.D.	USCS Code	Description	Well Const.
					\$ * -\$6	Sandy gravel with clay, brown, moist, very dense.	
	nover the second se	Statute and statements			*	Becoming wet.	
100 - 100 -	S-24 5		50 /	çî î	ана аналана на селото се		
- 36 -	Serve Server	And a second			n bere men en e		
an ang ang ang ang ang ang ang ang ang a		en en fan de service de la fan en			and any service on a strategy was written and		2;
er 333 and	S-29.5		507	6" 0	ven a f ranzen en e lektive Volgija gev		د در می می می می این ایر
	na bababahan a saga bahan a sa sa bahan sa bida	and he was not a second se			suite and	Silty sand, fine-grained, brown, wet, dense.	and a set of the set o
- 24 -	an and the second s						
- 36 -	S-35.		284	0 0	ML	Sondy silt with clay, brown, damp, low plasticity, hard	
ain, da	ar v sando A ve ando Y v		26 36 50	a o	ĠL.	Silty clay with sand, brown, damp, medium plasticity, hard.	
- 38 -				n ya kata na mana na ma	a na a na an	Total depth = 37 1/2 feet.	
					o y a ang a sa ang ang ang ang ang ang ang ang ang an		лл в ластичната челователения «1924 м)
-* 4d -							n (general resources a resource of the
- 46 -				an a			, processing and the second second second
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			E 17 19 19 19 19 19 19 19 19 19 19 19 19 19				men ek man dit bej japolystemen ek orma
4994 (Pr. 177) ann an Anna	A		7	P a		LOG OF BORING B-19/MW-12	PLA
1	Workin	g (1		estore	Natwre	ARCO Station 6113 785 East Stanley Boulevard Livermore, California	-



Cambria Environmental Technology, Inc. 1144 - 65th St. Oakland, CA 94608 Telephone: (510) 420-0700 Fax: (510) 420-9170

BORING/WELL LOG

JOB/SITI LOCATIC PROJEC DRILLER DRILLINI BORING LOGGEE	CLIENT NAME ARCO JOB/SITE NAME ARCO 6113 LOCATION 785 East Stanley Blvd., Livermore PROJECT NUMBER 438-1611 DRILLER V&W Drilling DRILLING METHOD Hollow-stem auger BORING DIAMETER 8" LOGGED BY Matt Meyers REVIEWED BY Ron Scheele REMARKS Hand Augered to 5' below ground surface.							WELL DEVELOPMENT DATE (YIELD) NA GROUND SURFACE ELEVATION				
	I PHg (ppm) 33 BLOW COUNTS		EXTENT EXTENT	DEPTH (ft bgs)	ed to 5	GRAPHIC LOG	7			CONTACT DEPTH (ft bgs)	WELL DIAGRAM	
NA	50/8-	MW-13 -5.0			GW		gravel; very high esti Sandy GRAVEL (GW	moist; dense; 40% sand, 6 mated permeability; 10% o /): Medium gray; very dens 6 sand, 50% gravel; high et wore gravels	0.6 5.0	Portland Type		
NA	7 4 9	MW-13 -10.0	MX II	 - 10 	 ML		Sandy SILT (ML); D	ark gray-brown; medium de 5% sand, 75% silt; low esti	mated	7.5	 Bentonite Seal Monterey Sand #2/12 	
NA	50/6*	MW-13 -15.0			SМ		<u>Silty SAND</u> (SM): Da saturated; 10% silt, 9 permeability.	ark gray-brown; very dense 10% sand; high estimated	; 	17.5		
ULT.GDT 2/15/02 VV	3 7 9	MW-13 -20	1XX	 20 				Nive-gray; stiff; saturated; 2 asticity; low estimated perm			 ✓ 2"-diameter, 0.010" Slotted Schedule 40 PVC 	
13/APCO6113.GPJ DEFA	3 7 10	MW-13 -25	W		ML		@ 28' very stiff; 2% d diameter.	ooarse sand, 2% gravel to 2	2-inch			
WELLLOG (PID/TPHG) HVARCO6113APICO6113.GPJ DEFAULT.GDT 2/15/02 X X X	8 15 45	MW-13 -30	W				@ 30' mottled; hard; staining	15% clay; 85% silt; iron-ox 	ide ,, /	30.5	Bottom of Boring @ 30 ft	
MELLLLO											PAGE 1 OF 1	

e	BROADE					rhold	OGIC AND MONITOR WELL CONSTRUCTION	LOG
PRO	JECT NAME: <u>A</u>					SITE A	DRESS: 785 E. Stanley Blvd. Livermore, CA	
PRO	JECT NUMBER	: 06-82-63	7			LEGAL	DESC: APN:	
LOG	GED BY:E	ric Farrar				FACILIT	Y ID OR WAIVER: NOI NUMBER:	
DATI	E:3/11/20	10	START	: 104	5	DRILLIN	IG COMPANY: <u>Cascade</u> DRILLER: <u>Tory Sal</u>	azer
WEL	LID: <u>RMW-1</u>	3	STOP:	134	5	DRILLIN	IG METHOD: Hollow Stem Auger SAMPLE METHOD: Split Spoon	
DEPTH (FEET)	MONITOR WELL CONSTRUCTION DIAMETER: 4"	Sample ID	PID	MOIST	JRE COLOR	CONSI	STENCY CLASSIFICATION REMAR	
			-					
2 — 4 — 6 — 8 — 10 — 12 — 14 — 16 — 18 —	BENTONITE GROUT	RMW13@ 14.5-15.0	7.1 ppm	Damp	Gray -green		Silty sand with gravel to ½", iron oxide staining	
20 — 22 —		RMW13@ 21.0-21.5	1,052 ppm	Moist	Lt. brown to brown	Soft	Silty clay with little gravel to $\frac{1}{2}$ ", It.brown to brown, clay 30% chert with some sand at 20'	
24 — 26 — 28 — 20		RMW13@ 25.5-26.0	150 ppm	Damp	Lt. brown to brown /gray	Stiff	Silty clay, clay to 90%	
30 32 34	0.02"	RMW13@ 31.0-31.5	87.8 ppm		Brown /gray Iron oxide	Soft	Silt with some clay, fine, clay to 40%, iron oxide staining	
36		PTH: <u>36</u>	335 ppm		GE NO:	Semi- loose	Silty sand, poorly sorted, fine to ¼", weathered 1 Image: Estimated Ground Water Depth: 3	1.15'
1695 SU AGA (OH/	WARRY APPLIES ONLY AT TH INNEE AT THIS LOCATION WIT	in location and at The H the passage of 194	NTIME OF LOOOPERS	SUBPURFACE C TED IS A OMPLE	POROLFIONG SEAY OF FROSTRON OF ACTUA	TEP AT COHER D L CONDERIGES E	orantens and Krannenkis Krannenkis	99,046

APPENDIX D

Soil Vapor Extraction Pilot Testing Data



Additional Subsurface Investigation and VET ARCO Station 6113, Livermore, California

December 21, 1992 69028.07

TABLE 2 VAPOR EXTRACTION TEST FIELD MONITORING DATA ARCO Station 6113 785 East Stanley Boulevard Livermore, California (Page 1 of 2)

uent Air	Stream from	n VW-1			<u>VW-2</u>	<u>MW-4</u>	Observat	ion Wells <u>MW-6</u>	<u>MW-7</u>	<u>MW-9</u>
Flow	% LEL	Applied Vacuum	%O₂	Biapsed Time (min)	Induced Vacuum	Induced Vacuum	Induced Vacuum	Induced Vacuum	Induced Vacuum	Induce Vacuur
10.9	NM	5	NM	0	NM	NM	NM	NM	NM	NM
21.3	NM	10	NM	10	0	0.04	0	0	0	0
29.4	NM	15	NM	15	NM	NM	NM	NM	NM	NM
40.9	NM	25	NM	20	NM	NM	NM	NM	NM	NM
43.8	24	35	3.5	25	0	0.04	0.01	0.01	0	0.01
46.0	54	50	5	35	0	0.05	0.01	0.01	0.01	0.01
49.6	54	51	5	40	0.01	0.05	0.01	0.01	0.01	0.02
50.2	NM	60	NM	50	NM	NM	NM	NM	NM	NM
	om well VW	Infact):		,	54.5	37.11	74.9	65.7	38.7	48
		-1 (2000)			28-49-5	21-27	43-63	48-68	48-68	48-68
reen Interval (feet): epith to Water (DTW, feet):					Dry	Dry	57.2	56.9	56.9	57.8

									ion Wells	¥ 4337 **	-
	1	nfluent Air S	stream from	<u>MW-5</u>	-	<u>VW-1</u>	<u>VW-2</u>	<u>MW-4</u>	<u>MW-6</u>	<u>MW-7</u>	<u>MW-9</u>
	Flow	% LEL-	Applied Vacuum	% O ₁	Elapsed Time (min)	Induced Vacuum	Induced Vacuum	Induced Vacuum	Induced Vacuum	Induced Vacuum	Induced Vacuum
-	10.9	NM	5	NM	0	NM	NM	NM	NM	NM	NM
	21.3	NM	10	NM	5	NM	NM	NM	NM	NM	NM
	24.9	84	20	15	20	0.05	0.04	0.015	0.50	0.44	0.015
	34.5	72	28	12	30	0.04	0.04	0.015	0.90	0.90	0.02
*	34.5	72	28	12	35	0.04	0.06	0.01	1.2	1.2	0.015
	30.7	12	24	2.5	40	0.04	0.06	0.01	1.2	1.25	0.015
	34.5	90	28	17	50	0.04	0.06	0.01	1.4	1.3	0.015
	38.3	24	30	5	60	0.04	0.06	0.01	1.6	1.4	0.015
	28.5	24	20	4	75	0.04	0.06	0.01	1.2	1.15	0.015
	28.5	78	20	10.5	90	0.04	0.06	0.01	1.25	1.15	0.015
	28.5	78	20	10	110	0.04	0.06	0.01	1.25	1.15	0.015
$\overline{\mathbf{n}}$	etance f	rom well MV	V-5 (feet):	<u>,, </u>	<u></u>	74.9	31.5	45	47.1	74	88
		erval (feet):				26-45	28-49.5	21-27	48-68	48-68	48-68
		Water (DTW	, feet):		to the CO County DEPEND	Dry 6121 isot	Dry	Dry	56.9	56.9	57.8

Vapor extraction well MW-5 screened from 43 to 63 feet. DTW - 57.21 feet *The I.C. engine operation sputtered at applied vacuums higher than 20° W.C. on MW-5 due to the low oxygen content in extracted vapor.

Notes: Flow measured in cubic feet per minute (CFM).

Concentration measured as percent Lower Explosive Limit (%LEL) by volume on Combustible Gas Meter.

Vacuum measured in inches of water column.

NM = Not Measured.

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Additional Subsurface Investigation and VET ARCO Station 6113, Livermore, California

TABLE 2
VAPOR EXTRACTION TEST FIELD MONITORING DATA
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California
(Page 2 of 2)

п.	ant Air	Stream from	• VW-7			VW-1	MW-3	MW-4	ion Wells MW-5	MW-6	MW-7
цп	Flow	% LEL-	Applied	%O,	Elapsed	Induced	Induced	Induced	Induced	Induced	Induced
	1104		Vacuum		Time (min)	Vacuum	Vacuum	Vacuum	Vacuum	Vacuum	Vacuum
	22.9	NM	9	NM	0	NM	NM	NM	NM	NM	NM
	37.4	NM	20	NM	2	NM	NM	NM	NM	NM	NM
	44.4	NM	30	NM	4	NM	NM	NM	NM	NM	NM
	46.1	NM	48	NM	6	NM	NM	NM	NM	NM	NM
#	43.5	NM	54	NM	8	NM	NM	NM	NM	NM	NM
ú	48.5	NM	60	NM	10	NM	NM	NM	NM	NM	NM
	47.8	36	50	17	15	0.07	0.05	0.09	0.07	0	0
	53.5	48	50	16	30	0.08	0.04	0.1	0.08	0	0
	49.7	42	50	12	45	0.07	0.05	0.09	0.07	0	0
	47.8	36	50	17	60	0.09	0.04	0.1	0.07	0	0
	47.8	54	50	7	75	0.09	0.04	0.105	0.06	0	0
	47.8	72	48	11	90	0.095	0.04	0.12	0.06	0	0
	53.6	60	49	13	110	0.095	0.04	0.12	0.06	0	0
	48.4	48	49	15	120	0.095	0.04	0.12	0.06	0	0
	45.2	NM	40	NM	130	0.08	0.04	0.1	0.06	0	0
	36.4	NM	30	NM	140	0.06	0.04	0.075	0.04	0	0
	27.0	NM	20	NM	150	0.06	0.02	0.06	0.04	0	0
	10.7	NM	10	NM	170	0.04	0.02	0.04	0.03	0	0
n.			1 7 (faat):			54.5	59.4	18.11	31.5	58.5	66.7
		om well VW	-2 (ICCI):			26-45	25-40	21-27	43-63	48-68	48-68
		rval (feet):	·			Dry	Dry	Dry	57.2	56.9	56.9
De	pth to Y	Vater (DTW	, reerj:		8 to 49.5 feet. DT	•	a.r.y	<i></i>	<i></i>		

Flow measured in cubic feet per minute (CFM).

Concentration measured as percent Lower Explosive Limit (%LEL) by volume on Combustible Gas Meter.

Vacuum measured in inches of water column.

NM = Not Measured.



Additional Subsurface Investigation and VET ARCO Station 6113, Livermore, California

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TABLE 6 LABORATORY ANALYSES OF AIR SAMPLES ARCO Station 6113 785 East Stanley Boulevard Livermore, California										
Sample ID	Sample Location	Elapsed Time of Sample	TPHg	В	Т	E	x			
AS-VW1-35	VW-1	35	45,000	900	89	27	68			
AS-VW2-30	VW-2	30	52,000	510	58	15	35			
AS-VW2-EFF	VW-2	35	630	33	5	2	6			
AS-VW2-120	VW-2	120	37,000	350	34	10	21			
AS-MW5-90	MW-5	90	130,000	530	120	17	39			

Concentrations reported in milligrams per cubic meter (mg/m³). Effluent sample collected from stack of internal combustion engine.

 TPHg:
 Total petroleum hydrocarbons as gasoline (analyzed by EPA Methods 8015 and 8020).

 B:
 Benzene

 T:
 Toluene

 E:
 Ethylbenzene

 X:
 Total Xylene Isomers

 BTEX:
 Analyzed by EPA Methods 8015 and 8020

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Additional Subsurface Investigation and VET ARCO Station 6113, Livermore, California

TABLE 7
ESTIMATED RADIUS OF INFLUENCE AND
PROJECTED INITIAL HYDROCARBON EXTRACTION RATES
DURING VAPOR EXTRACTION TEST
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

Vapor Well	Elapsed Time	Applied Vacuum	Air Flowrate	Initial TPHg Vapor Concentration	Projected TPHg Removal Rate	Estimated ROI
VW-1	35 min	50	46 scfm	45,000 mg/m ³	186.0 lb/day	15 to 20
VW-2	30 min	50	48 scfm	52,000 mg/m ³	220 lb/day	15 to 20
V₩-2	120 min	50	48 scfm	37,000 mg/m ³	160.0 lb/day	15 to 20
MW-5	90 min	20	28 scfm	130,000 mg/m ³	330 lb/day	10 to 75

Applied vacuum measured in inches of water column.

min = Elapsed time in minutes.

sofm = Air flowrate measured in standard cubic feet per minute.

mg/m³ = Milligrams per cubic meter

TPHg = Total petroleum hydrocarbons as gasoline (analyzed by EPA Method 8015/8020).

ROI = Effective radius of influence in feet.

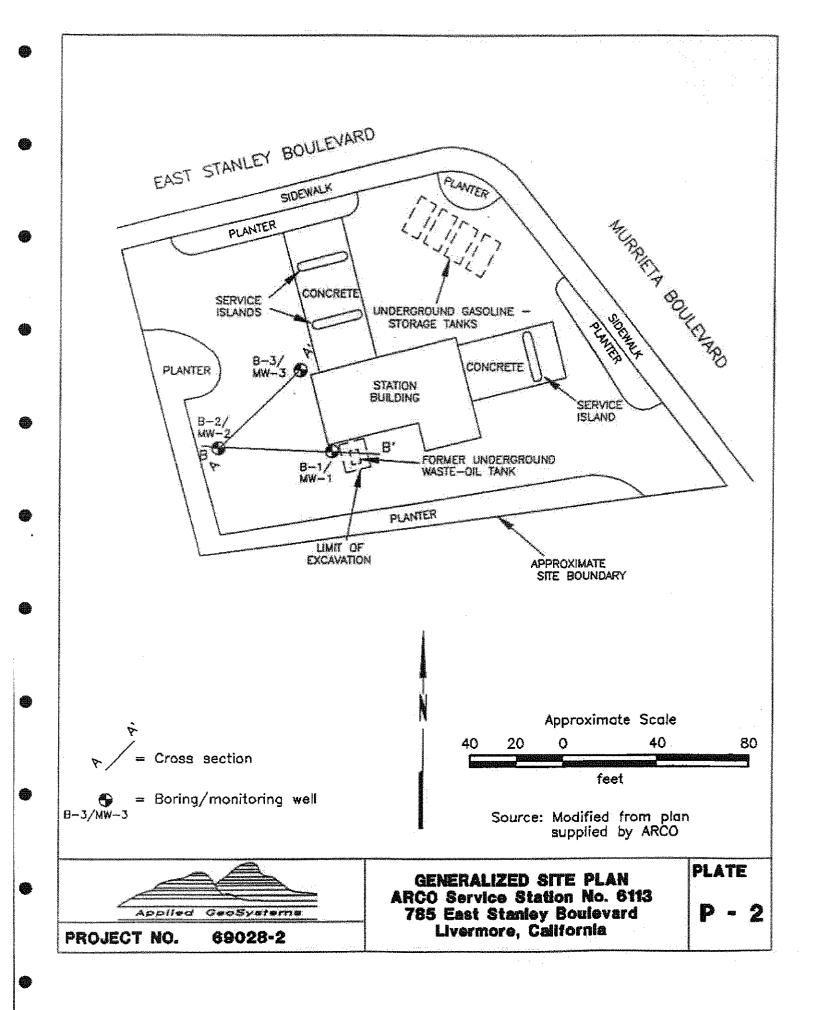
lb/day = Removal rate measured in pounds per hour.

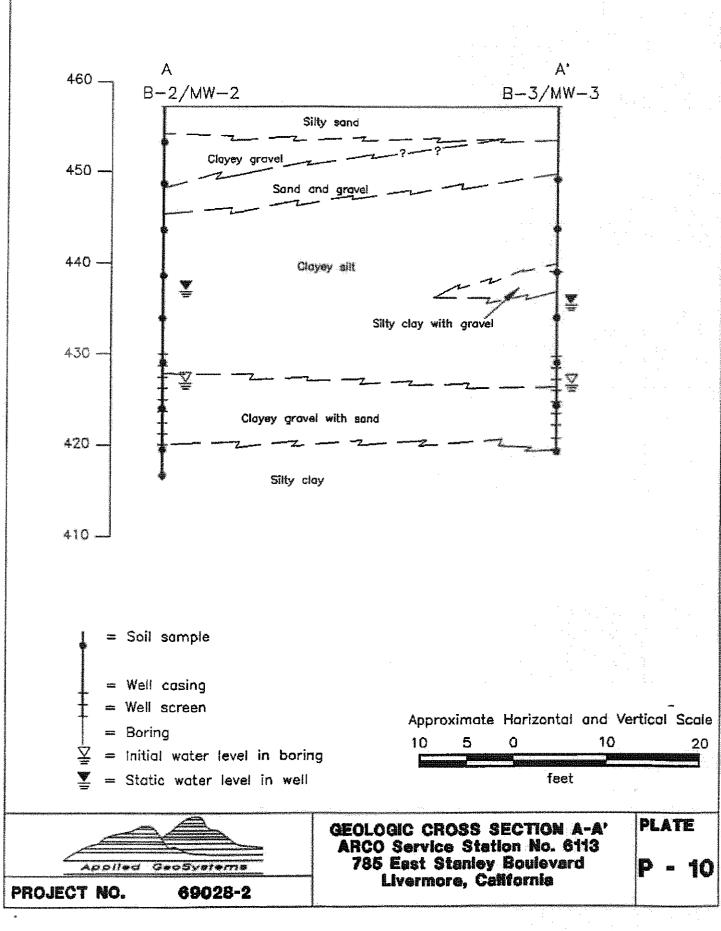
TPHg removal rate = air flowrate (ft³/min) X Air concentration (mg/m³) X [1440 min/day] X [0.02832 m³/ft³]

454,000 mg/lb

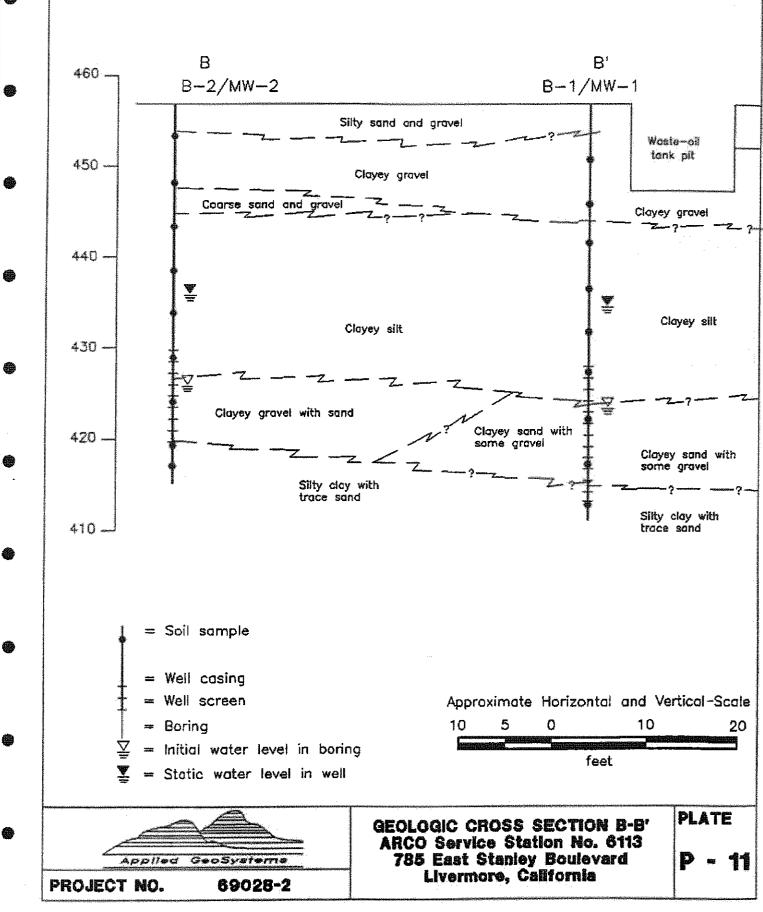
APPENDIX E

Geologic Cross-Sections





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