Atlantic Richfield Company

Chuck Carmel
Environmental Business Manager

PO Box 1257
San Ramon, CA 94583
Phone: (925) 275-3803
Fax: (925) 275-3815
E-Mail: charles.carmel@bp.com

RECEIVED

2:27 pm, Nov 12, 2010

Alameda County
Environmental Health

November 12, 2010

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,

Chuck Carmel
Environmental Business Manager

Attachment

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

Prepared for:

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

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

Broadbent & Associates, Inc.
1324 Mangrove Ave., Suite 212
Chico, CA 95926
Voice (530) 566-1400
Fax (530) 566-1401

BROADBENT & ASSOCIATES, INC
ENVIRONMENTAL, WATER RESOURCES & ENGINEERING

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

PROFESSIONAL GEOLOGIST
MATTHEW G. HERRICK
No. 901
CERTIFIED HYDROGEOLOGIST
Exp 4/30/11
STATE OF CALIFORNIA

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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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.

COC	Soil		Ground Water	
	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.

Summary of Remediation Technologies Evaluated

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

6.1.1 No Action

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 Excavation

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 on-site 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 Dual-Phase Extraction and Treatment

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 In-Situ Chemical Oxidation

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 Enhanced Bioremediation

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 Air Sparging

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 Average	Below Average	Above Average	Above Average	Below Average
Dual Phase Extraction	Average	Below Average	Below Average	Average	Average
In-Situ Chemical Oxidation	Average	Average	Below Average	Average	Above Average
Enhanced Bioremediation	Above Average	Average	Below Average	Average	Unknown
Air Sparging	Above Average	Above Average	Above Average	Above Average	Above Average
Monitored Natural Attenuation	Above Average	Average	Below Average	Average	Unknown

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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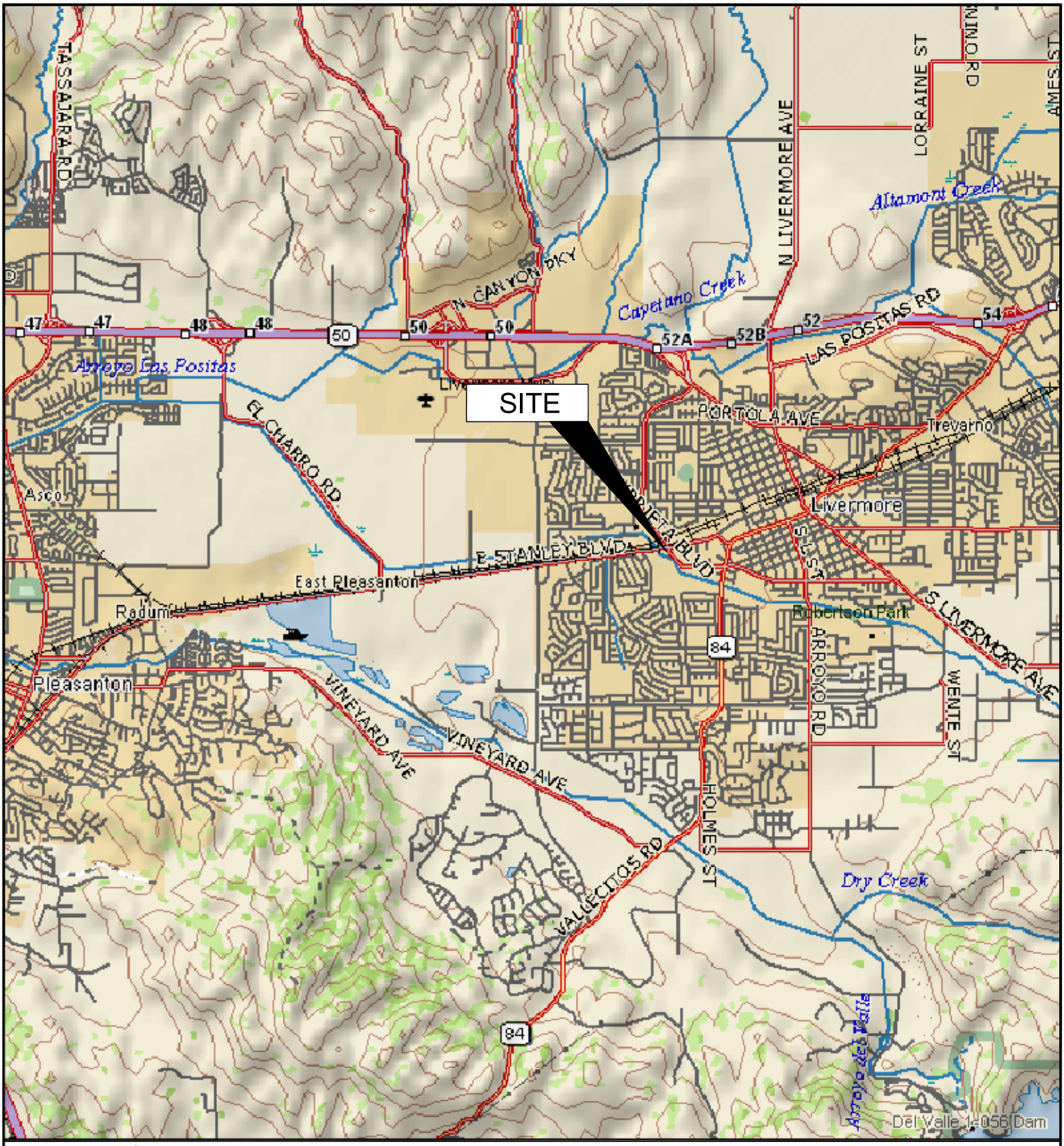

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0 1 2

APPROXIMATE SCALE (mi)

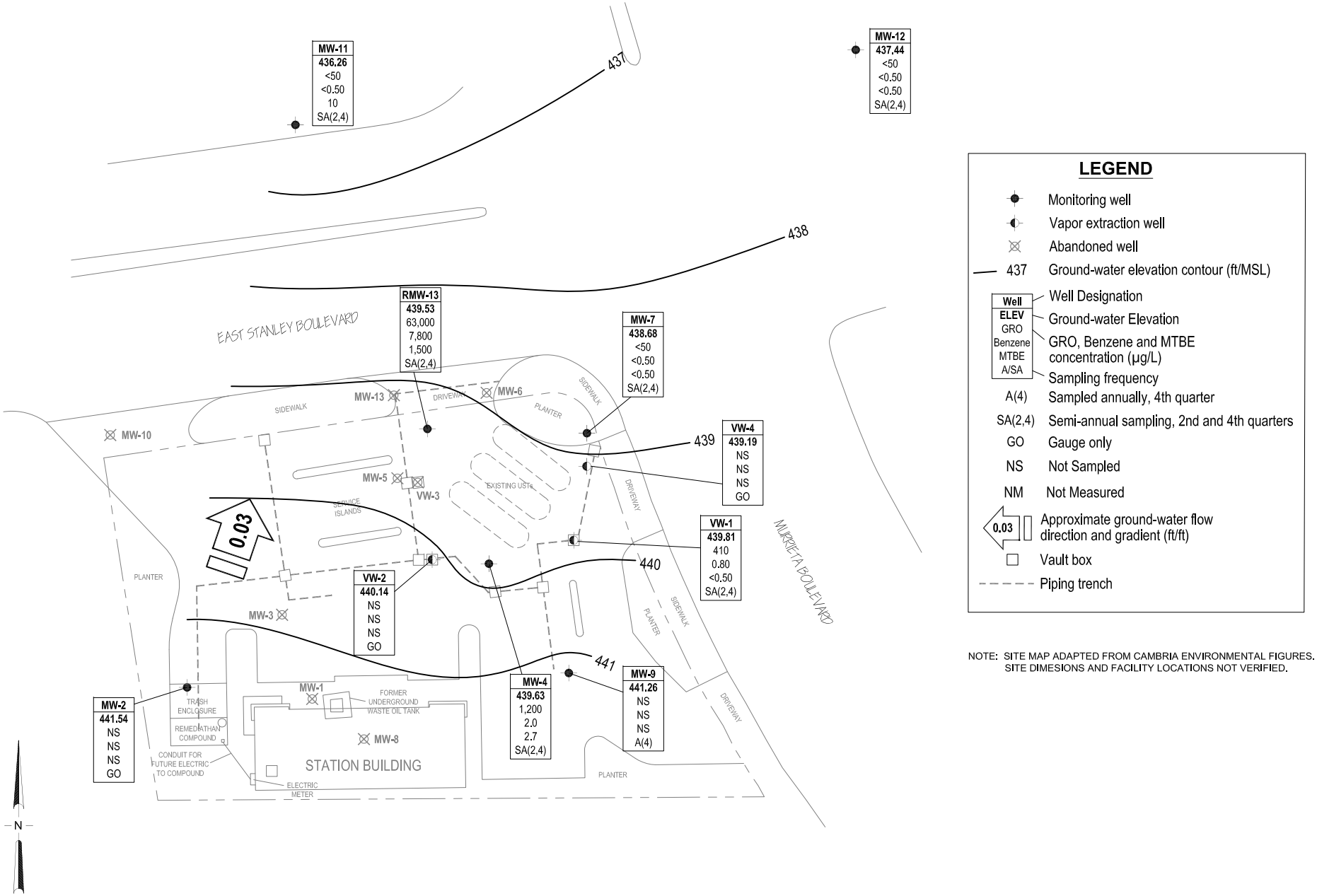
IMAGE SOURCE: DELORME

BROADBENT & ASSOCIATES, INC.
ENGINEERING, WATER RESOURCES & ENVIRONMENTAL
1324 Mangrove Ave. Suite 212, Chico, California 95926
Project No.: 06-82-637 Date: 7/27/2009

Station #6113
785 East Stanley Boulevard
Livermore, California

Site Location Map

Drawing
1



LEGEND

- Monitoring well
- Vapor extraction well
- Abandoned well
- 437 — Ground-water elevation contour (ft/MSL)
- Well Designation
- ELEV — Ground-water Elevation
- GRO, Benzene, MTBE — GRO, Benzene and MTBE concentration (µg/L)
- A/SA — Sampling frequency
- A(4) — Sampled annually, 4th quarter
- SA(2,4) — Semi-annual sampling, 2nd and 4th quarters
- GO — Gauge only
- NS — Not Sampled
- NM — Not Measured
- 0.03 — Approximate ground-water flow direction and gradient (ft/ft)
- Vault box
- Piping trench

NOTE: SITE MAP ADAPTED FROM CAMBRIA ENVIRONMENTAL FIGURES. SITE DIMESIONS AND FACILITY LOCATIONS NOT VERIFIED.

0 50 100
SCALE (ft)

BROADBENT & ASSOCIATES, INC.
ENGINEERING, WATER RESOURCES & ENVIRONMENTAL
1324 Mangrove Ave, Suite 212, Chico, California 95926
Project No.: 06-82-637 Date: 5/12/2010

Station #6113
785 East Stanley Boulevard
Livermore, California

Ground-Water Elevation Contour and Analytical Summary Map
April 12, 2010

Drawing
2

NOTE: SITE MAP ADAPTED FROM CAMBRIA ENVIRONMENTAL FIGURES. SITE DIMESIONS AND FACILITY LOCATIONS NOT VERIFIED.

0 50 100
SCALE (ft)

BROADBENT & ASSOCIATES, INC.
ENGINEERING, WATER RESOURCES & ENVIRONMENTAL
1324 Mangrove Ave, Suite 212, Chico, California 95926
Project No.: 06-82-637 Date: 11/3/2010

Station #6113
785 East Stanley Boulevard
Livermore, California

Site Map with Prohibited Ground Disturbance Area

Drawing
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

Well and Sample Date	P/NP	Comments	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in (µg/L)						DO (mg/L)	pH
								GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE		
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	P		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	P		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	P		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

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

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

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

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

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

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

Well and Sample Date	P/NP	Comments	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in (µg/L)						DO (mg/L)	pH
								GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE		
MW-3 Cont.															
10/03/2003	P	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	--	e	459.32	28.5	38.5	17.24	442.08	--	--	--	--	--	--	--	--
10/28/2004	P		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	P		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	P		456.55	21.0	**27.0**	17.95	438.60	100	<0.5	<0.5	<0.5	<0.5	38	--	--
11/11/1999	P		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	P		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	P		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	P	s	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	--

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

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

Well and Sample Date	P/NP	Comments	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in (µg/L)						DO (mg/L)	pH
								GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE		
MW-4 Cont.															
5/2/2001	P	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	P		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	P	a	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	P	c	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	P	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	P		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	P		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	P		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	P		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	P		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	P		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	**P**		**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	--	--	--	--	--	--	--	--

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

Well and Sample Date	P/NP	Comments	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in (µg/L)						DO (mg/L)	pH
								GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE		
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	P		455.84	43.0	63.0	17.47	438.37	8,300	690	370	90	440	1,400	--	--
11/11/1999	P		455.84	43.0	63.0	18.80	437.04	18,000	900	190	1,100	3,200	72	0.86	--
6/20/2000	P		455.84	43.0	63.0	17.14	438.70	10,200	618	122	832	2,020	<50.0	1.6	--
8/29/2000	P		455.84	43.0	63.0	18.60	437.24	12,300	436	166	711	2,120	517	0.79	--
11/29/2000	P	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	P		454.93	48.0	68.0	16.68	438.25	310	41	3.8	11	19	33	--	--
11/11/1999	P		454.93	48.0	68.0	16.12	438.81	<50	0.5	<0.5	<0.5	<1	<3	0.92	--
6/20/2000	P		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	P		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	P		454.93	48.0	68.0	20.30	434.63	<50.0	<0.500	<0.500	<0.500	1.03	<2.50	0.79	--

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

Well and Sample Date	P/NP	Comments	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in (µg/L)						DO (mg/L)	pH
								GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE		
MW-6 Cont.															
5/2/2001	P	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	P	s	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	P		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	P		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	P		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	P	a	454.93	48.0	**68.0**	20.05	434.88	60	13	1.7	1.7	3.5	8	2.8	--
05/01/2003	P	c	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	P	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	P		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	P		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	P		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	P		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	P		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	P	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	P	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	P	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	P		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	--	--

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Well and Sample Date	P/NP	Comments	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in (µg/L)						DO (mg/L)	pH
								GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE		
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	P		454.92	48.0	**68.0**	16.55	438.37	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--
11/11/1999	P		454.92	48.0	**68.0**	18.02	436.90	<50	<0.5	<0.5	<0.5	<1	<3	1.03	--
6/20/2000	P		454.92	48.0	**68.0**	16.50	438.42	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	1.3	--
8/29/2000	P		454.92	48.0	**68.0**	17.80	437.12	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	1.67	--
11/29/2000	P		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	P	s	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	--
8/15/2001	P		454.92	48.0	**68.0**	27.55	427.37	<50	<0.50	<0.50	<0.50	<0.50	<2.5	0.84	--
10/5/2001	P		454.92	48.0	**68.0**	27.59	427.33	<50	<0.50	<0.50	<0.50	<0.50	<2.5	0.62	--
1/21/2002	P	s	454.92	48.0	**68.0**	26.50	428.42	<50	<0.50	<0.50	<0.50	<0.50	15/21	0.65	--
4/26/2002	P		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	**68.0**	20.04	434.88	<50	1.2	<0.50	<0.50	0.77	41	4.8	--
05/01/2003	P	c	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	P	d	454.92	48.0	68.0	19.55	435.37	<50	<1.0	<1.0	<1.0	<1.0	49	5.7	7.1
04/06/2004	P		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	P		457.17	48.0	68.0	19.17	438.00	<50	<0.50	<0.50	<0.50	<0.50	14	6.7	6.9
04/13/2005	P		457.17	48.0	68.0	14.84	442.33	<50	<0.50	<0.50	<0.50	<0.50	1.7	2.3	6.9
10/27/2005	P		457.17	48.0	68.0	17.38	439.79	<50	<0.50	<0.50	<0.50	<0.50	2.3	2.16	7.0
04/12/2006	P		457.17	48.0	68.0	14.84	442.33	<50	<0.50	<0.50	<0.50	<0.50	1.1	3.0	7.2
10/31/2006	P		457.17	48.0	68.0	18.74	438.43	<50	<0.50	<0.50	<0.50	<0.50	<0.50	--	7.55
4/19/2007	P		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	P		457.17	48.0	68.0	37.23	419.94	140	68	6.8	<0.50	5.0	24	4.87	8.02
4/24/2008	P		457.17	48.0	68.0	24.47	432.70	<50	<0.50	0.99	<0.50	<0.50	22	1.96	7.24
10/15/2008	P		457.17	48.0	68.0	43.40	413.77	<50	<0.50	<0.50	<0.50	<0.50	8.2	2.31	7.14
4/28/2009	P		457.17	48.0	68.0	32.13	425.04	<50	<0.50	<0.50	<0.50	<0.50	<0.50	3.78	6.93
11/9/2009	P		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	**P**		**457.17**	**48.0**	**68.0**	**18.49**	**438.68**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**--**	**7.55**
MW-8															
3/23/1995	--	e	456.97	47.0	**67.0**	11.55	445.42	--	--	--	--	--	--	--	--
5/31/1995	--	e	456.97	47.0	**67.0**	12.37	444.60	--	--	--	--	--	--	--	--

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

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

Well and Sample Date	P/NP	Comments	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in (µg/L)						DO (mg/L)	pH
								GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE		
MW-8 Cont.															
8/31/1995	--	e	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	--	e	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	P		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	--	e	456.97	47.0	67.0	16.59	440.38	--	--	--	--	--	--	3.37	--
11/29/2000	P		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	--	e	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	P		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															

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

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

Well and Sample Date	P/NP	Comments	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in (µg/L)						DO (mg/L)	pH
								GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE		
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	--	e	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	--	e	456.18	48.0	68.0	25.08	431.10	--	--	--	--	--	--	--	--
6/4/1999	P		456.18	48.0	68.0	15.87	440.31	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--
11/11/1999	P		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	--	e	456.18	48.0	68.0	16.81	439.37	--	--	--	--	--	--	2.59	--
11/29/2000	P		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	--	e	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	P		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	--	e	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	P		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	P	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	P		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	P		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	--	--	--	--	--	--	--	--

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

Well and Sample Date	P/NP	Comments	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in (µg/L)						DO (mg/L)	pH
								GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE		
MW-9 Cont.															
10/31/2006	P		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	P		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	P		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	P		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	--	e	456.85	32.0	**52.0**	14.86	441.99	--	--	--	--	--	--	--	--
5/31/1995	--	e	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	--	e	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	--	e	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	--	e	456.85	32.0	**52.0**	17.19	439.66	--	--	--	--	--	--	--	--
11/11/1999	P		456.85	32.0	**52.0**	19.35	437.50	<50	<0.5	<0.5	<0.5	<1	<3	0.68	--
6/20/2000	--	e	456.85	32.0	**52.0**	17.92	438.93	--	--	--	--	--	--	2.9	--
8/29/2000	--	e	456.85	32.0	**52.0**	19.15	437.70	--	--	--	--	--	--	1.54	--
11/29/2000	P		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	--	e	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	P		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	--	--	--	--	--	--	--	--

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Well and Sample Date	P/NP	Comments	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in (µg/L)						DO (mg/L)	pH
								GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE		
MW-10 Cont.															
4/26/2002	--	e	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	P	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	P		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	P		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	P		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	P		455.07	38.0	**45.0**	18.39	436.68	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--
11/11/1999	P		455.07	38.0	**45.0**	18.62	436.45	<50	<0.5	<0.5	<0.5	<1	<3	1.01	--
6/20/2000	P		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

Well and Sample Date	P/NP	Comments	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in (µg/L)						DO (mg/L)	pH
								GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE		
MW-11 Cont.															
8/29/2000	--	h	455.07	38.0	**45.0**	19.50	435.57	--	--	--	--	--	--	--	--
11/29/2000	P		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	P		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	P		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	P		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	P	c	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	P	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	P		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	P		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	P		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	P		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	P		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	P		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	P		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	P		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	P		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	**P**		**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	--	--

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Well and Sample Date	P/NP	Comments	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in (µg/L)						DO (mg/L)	pH
								GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE		
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	P		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	P		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	P		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	P		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	P		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	--	--

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Well and Sample Date	P/NP	Comments	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in (µg/L)						DO (mg/L)	pH
								GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE		
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	P		--	--	--	24.61	--	15,000	160	68	1,700	3,200	4,900/5,200	0.71	--
4/26/2002	P		--	--	--	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	P	c	--	--	--	17.82	--	21,000	230	<50	1,900	2,300	1,600	1.9	--
10/03/2003	P	d	--	--	--	19.91	--	19,000	570	55	1,900	2,300	2,400	0.8	6.9
04/06/2004	P		457.91	--	--	17.14	440.77	15,000	470	35	1,600	1,300	1,800	2.0	6.7
10/28/2004	P		457.91	--	--	18.83	439.08	18,000	350	<25	1,900	1,800	1,800	0.8	6.7
04/13/2005	P		457.91	--	--	15.23	442.68	9,700	110	<25	860	280	920	0.9	6.9
10/27/2005	P		457.91	--	--	18.45	439.46	11,000	120	12	1,500	450	580	0.75	6.8
04/12/2006	P		457.91	--	--	15.06	442.85	4,700	65	<10	450	69	470	1.2	6.8
10/31/2006	P		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**	**y**	**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	P		--	24	45	17.40	--	2,360	27.6	11.6	26.3	33.2	110	4.47	--
11/29/2000	P		--	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	P	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	P	s	--	24.0	45	24.75	--	1,500	140	55	28	82	610/660	0.71	--
1/21/2002	P	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	P		--	24.0	45	24.27	--	370	26	2.1	6.6	1.7	48	0.5	--

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								GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE		
VW-1 Cont.															
4/26/2002	--	q	--	24.0	45	--	--	350	24	1.6	5.9	1.6	45	--	--
10/7/2002	P	b	--	24.0	45	19.20	--	410	25	2.2	8	4.3	88	1.7	--
05/01/2003	P	c	--	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		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	P		457.08	24.0	45	17.65	439.43	1,500	78	73	36	81	13	1.64	7.3
04/12/2006	P		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	P		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	P		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	P	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	**P**		**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	--	--	--	--	--	--	--	--

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								GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE		
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	P		--	15.5	**24**	17.93	--	25,400	3,540	10,600	1,280	43,000	44,700	--	--
11/29/2000	P	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	P	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	--	c	--	17	**30**	17.29	--	--	--	--	--	--	--	--	--
10/03/2003	P	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

Well and Sample Date	P/NP	Comments	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in (µg/L)						DO (mg/L)	pH
								GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE		
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**	--	--	--	--	--	--	--	--

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
µg/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.

Table 3. Summary of Fuel Additives Analytical Data

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

Well and Sample Date	Concentrations in (µg/L)								Comments
	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	
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	a
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

Table 3. Summary of Fuel Additives Analytical Data

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

Well and Sample Date	Concentrations in (µg/L)								Comments
	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	
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

Table 3. Summary of Fuel Additives Analytical Data

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

Well and Sample Date	Concentrations in (µg/L)								Comments
	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	
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	

Table 3. Summary of Fuel Additives Analytical Data

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

Well and Sample Date	Concentrations in (µg/L)								Comments
	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	
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	a
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	

Table 3. Summary of Fuel Additives Analytical Data

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

Well and Sample Date	Concentrations in (µg/L)								Comments
	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	
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

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.

Table 4. Historical Ground-Water Flow Direction and Gradient

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

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**

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
AGENCY
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: charles.carmel@bp.com*)
Atlantic Richfield Company
(A BP Affiliated Company)
P.O. Box 1257
San Ramon, CA 94583

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 µg/L and 7,800 µg/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

1. **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

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

cc: Matt Herrick, Broadbent & Associates, 1324 Mangrove Ave., Suite 212, Chico, CA 95926 (*Sent via E-mail to: mherrick@broadbentinc.com*)
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: cdizon@zone7water.com*)
Donna Drogos, ACEH (*Sent via E-mail to: donna.drogos@acgov.org*)
Paresh Khatri, ACEH (*Sent via E-mail to: paresh.khatri@acgov.org*)
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 other 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 (http://www.swrcb.ca.gov/ust/electronic_submittal/report_rqmts.shtml.

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.

Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC)	**REVISION DATE:** July 20, 2010
	ISSUE DATE: July 5, 2005
	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 do not 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.**
- **Do not 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 dehloptoxic@acgov.org
   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 ftp://alcoftp1.acgov.org
      (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 dehloptoxic@acgov.org 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 AM
To: '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

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.

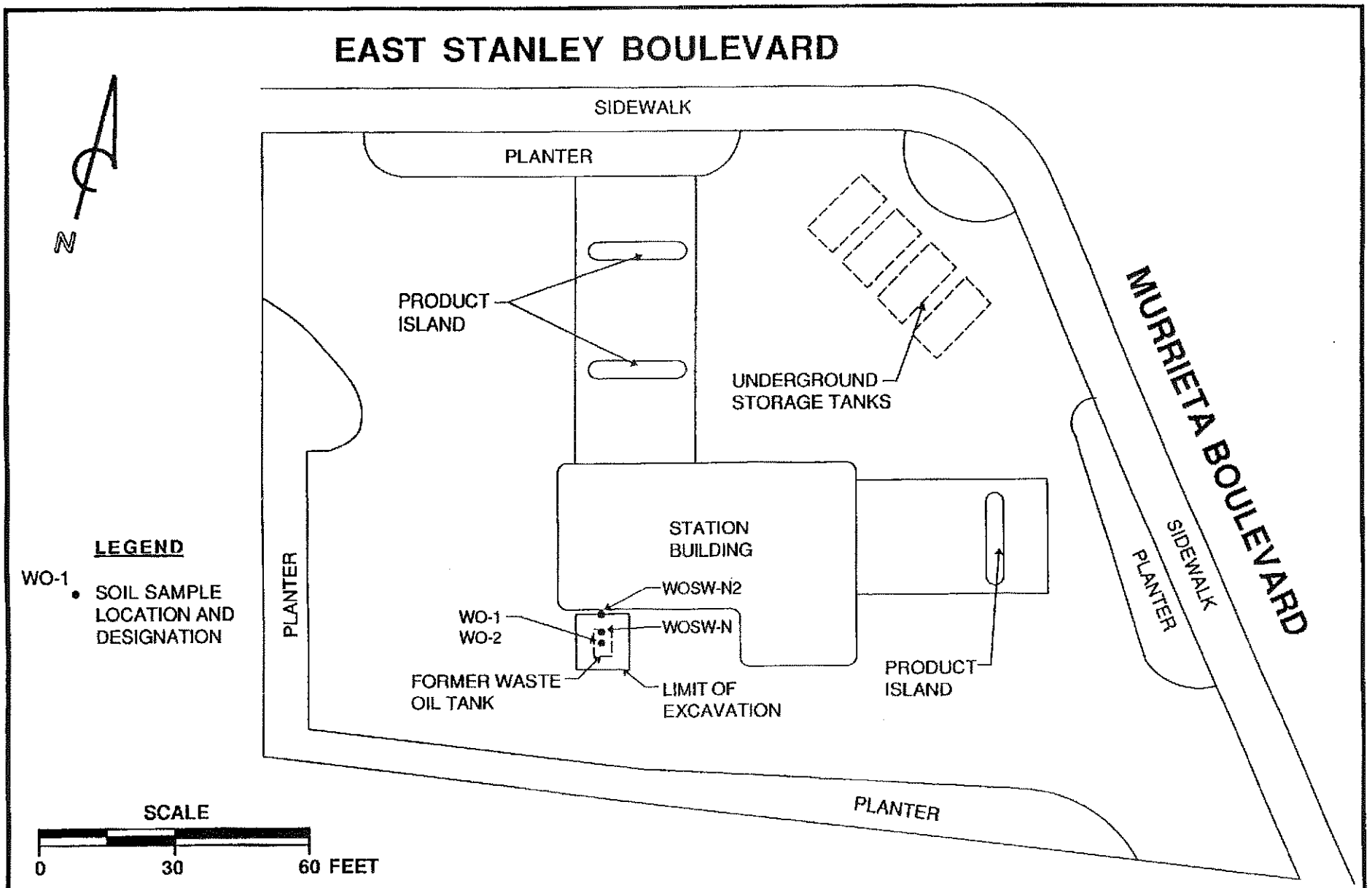
Jason R. Duda • Project Scientist

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



PACIFIC ENVIRONMENTAL GROUP, INC.

ARCO SERVICE STATION #6113
785 East Stanley Boulevard and Murrieta Boulevard
Livermore, California

SITE MAP

FIGURE: 2

PROJECT: 330-53.01

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	Depth (ft.)	Low Boiling Hydrocarbons	High Boiling Hydrocarbons		Oil & Grease
		Gasoline	Diesel	Oil	
WO-1	7 1/2	<5.	160.*	60.	660.
WO-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 samples taken after additional soil excavation on 2/3/89

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

	WO-1	WOSW-N	Designated Level*
Volatile Organic Compounds	ND	ND	
Semi-volatile Organic Compounds			
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.

TABLE 3
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF SOIL SAMPLES
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California
(Page 1 of 3)

Sample	B	T	E	X	TPHg	TPHd	TOG
September 1989							
S-14½-B1	<0.005	<0.005	<0.005	<0.005	<1.0	<10	<30
S-34½-B1	<0.005	<0.005	<0.005	<0.005	<1.0	<10	<30
S-44½-B1	<0.005	<0.005	<0.005	<0.005	<1.0	<10	<30
S-19-B2	<0.005	<0.005	<0.005	<0.005	<1.0	<10	<50
S-34-B2	<0.005	<0.005	<0.005	<0.005	<1.0	<10	<50
S-41-B2	<0.005	<0.005	<0.005	<0.005	<1.0	<10	<50
S-14-B3	<0.005	<0.005	<0.005	<0.005	<1.0	<10	<50
S-34-B3	<0.005	<0.005	<0.005	<0.005	<1.0	<10	<50
S-37½-B3	<0.005	<0.005	<0.005	<0.005	<1.0	<10	<50
February 1991							
S-14½-B4	<0.005	<0.005	<0.005	<0.005	<1.0	<10	<50
S-19½-B4	<0.005	<0.005	<0.005	<0.005	<1.0	<10	<50
S-29-B4	0.008	<0.005	<0.005	<0.005	<1.0	<10	<50
S-0221-SP(A-D)	<0.005	<0.005	<0.005	<0.005	<1.0	<10	NA
June 1992							
S-10½-B5	<0.005	<0.005	<0.005	<0.005	<1.0	NA	NA
S-20½-B5	1.4	2.0	13	67	1,200	NA	NA
S-30½-B5	1.1	0.30	1.1	6.0	150	NA	NA
S-40½-B5	17	32	14	150	230	NA	NA
S-50½-B5	0.012	<0.005	<0.005	<0.005	<1.0	NA	NA
S-10½-B6	<0.005	<0.005	<0.005	<0.005	<1.0	NA	NA
S-20½-B6	<0.005	<0.005	<0.005	<0.005	<1.0	NA	NA
S-30½-B6	0.45	0.079	0.035	0.15	23	NA	NA
S-45½-B6	0.70	0.021	<0.005	<0.005	1.9	NA	NA
S-50½-B6	0.056	<0.005	<0.005	0.006	<1.0	NA	NA
S-10½-B7	<0.005	<0.005	<0.005	<0.005	<1.0	NA	NA
S-20½-B7	0.43	1.3	0.35	2.5	21	NA	NA
S-30½-B7	0.094	0.20	<0.005	0.023	1.6	NA	NA
S-40½-B7	0.009	<0.005	<0.005	<0.005	<1.0	NA	NA
S-50½-B7	<0.005	<0.005	<0.005	<0.005	<1.0	NA	NA
S-10½-B8	<0.005	<0.005	<0.005	<0.005	<1.0	NA	NA
S-20½-B8	<0.005	0.22	0.42	2.1	68	NA	NA
S-30½-B8	0.043	<0.005	<0.005	<0.005	<1.0	NA	NA
S-45½-B8	0.022	<0.005	<0.005	<0.005	1.1	NA	NA

See notes on Page 3 of 3.

TABLE 3
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF SOIL SAMPLES
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California
(Page 2 of 3)

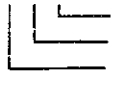
Sample	B	T	E	X	TPHg	TPHd	TOG
S-8½-B9	<0.005	<0.005	<0.005	<0.005	<1.0	<1.0	<30
S-20½-B9	<0.005	<0.005	<0.005	<0.005	<1.0	<1.0	74
S-30½-B9	<0.005	<0.005	<0.005	<0.005	<1.0	<1.0	<30
S-40½-B9	<0.005	<0.005	<0.005	<0.005	<1.0	<1.0	<30
S-50½-B9	<0.005	<0.005	<0.005	<0.005	<1.0	<1.0	<30
S-10-B10	<0.005	<0.005	<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	77
S-55-B10	<0.005	<0.005	<0.005	<0.005	<1.0	<1.0	<30
S-10½-B11	<0.005	<0.005	<0.005	<0.005	<1.0	NA	NA
S-20½-B11	<0.005	<0.005	<0.005	<0.005	<1.0	NA	NA
S-30½-B11	<0.005	<0.005	<0.005	<0.005	5.7	NA	NA
S-40½-B11	<0.005	<0.005	<0.005	<0.005	<1.0	NA	NA
S-50½-B11	<0.005	<0.005	<0.005	<0.005	<1.0	NA	NA
S-55½-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
August 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.

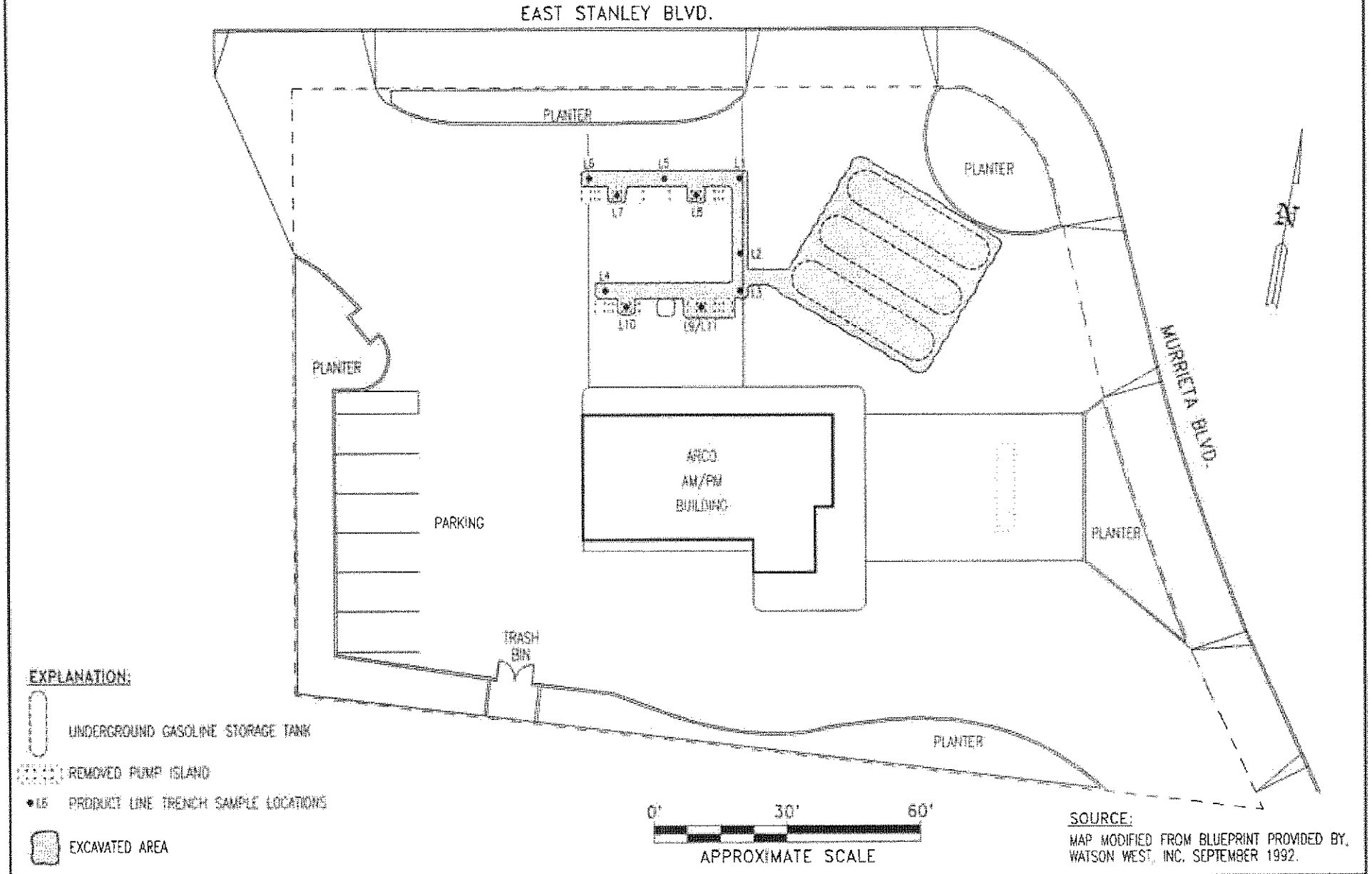
TABLE 3
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF SOIL SAMPLES
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California
(Page 3 of 3)

Sample	Cadmium	Chromium	Lead	Nickel	Zinc	VOC
June 1992						
S-8½-B9	<0.010	<0.010	<0.0050	0.051	0.47	ND*
S-50½-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*
Background average concentrations in soil (ppm)[1,2]	0.06	100	11.5	74	50	--

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
BTEX: Analyzed by EPA method 5030/8015/8020.
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
[1]Lindsay, W.L. 1979. Chemical Equilibria in Soil. John Wiley & Sons.
[2]Scot, L.M. December 1991. Background Metal Concentrations in Soils in Northern Santa Clara County, California". M.S. Thesis, University of San Francisco.
Composite soil sample S-0615-SP2(A-D) consists of four soil samples taken from stockpiled soil.
Sample designation:



Boring number
Sample depth in feet below ground surface
Soil sample



ROUX
ROUX ASSOCIATES
ENVIRONMENTAL SCIENCE AND MANAGEMENT

COMPILED BY:	T.R.
PREPARED BY:	R.P.
PROJECT MNGR.	P.S.
DATE:	03/93
SCALE:	AS SHOWN
PROJECT NO.	A154W01
FILE NAME:	AR6113XX

PREPARED FOR: ARCO Products Company

TITLE: LOCATION OF SOIL SAMPLES

ARCO FACILITY NO. 6113

FIGURE 3

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

Sample Designation	Date	Depth (feet bgs)	TPH-G	BTEX Distinction				Lead
				Benzene	Toluene	Ethylbenzene	Xylenes	
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
L5	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
L8	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

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

UST Excavation Areas and Sampling Locations

ARCO Service Station 6113
785 East Stanley Boulevard
Livermore, California

CAMBRIA

FIGURE
3

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
[redacted]	1/8/01	17.5	3,030	2.74	9.85	33.7	297	11.8	<9.81
EX-2	1/8/01	18.0	2,930	2.74	10.7	37.4	225	<6.25	<9.90

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 tert butyl ether

Table 3
Soil Analytical Results

November 9, 2001

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

Sample ID	Sample Depth (fbg)	TPHg (mg/kg)	Benzene (mg/kg)	Toulene (mg/kg)	Ethyl-benzene (mg/kg)	Xylene (mg/kg)	MTBE (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

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	3/11/2010	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.

Table 2
Historical Groundwater Elevation Data
Summary Report

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

Date: 02-10-95
Project Number: 0805-134.01

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-1	09-20-89	457.04	21.03	436.01	ND	NR	NR
MW-1	10-12-89	457.04	19.64	437.40	ND	NR	NR
MW-1	06-21-90	457.04	21.72	435.32	ND	NR	NR
MW-1	09-20-90	457.04	19.79	437.25	ND	NR	NR
MW-1	12-18-90	457.04	19.28	437.76	ND	NR	NR
MW-1	02-21-91	457.04	22.45	434.59	ND	NR	NR
MW-1	03-20-91	457.04	19.87	437.17	ND	NR	NR
MW-1	04-10-91	457.04	19.42	437.62	ND	NR	NR
MW-1	05-20-91	457.04	25.95	431.09	ND	NR	NR
MW-1	06-20-91	457.04	32.55	424.49	ND	NR	NR
MW-1	07-25-91	457.04	38.22	418.82	ND	NR	NR
MW-1	08-13-91	457.04	40.74	416.30	ND	NR	NR
MW-1	09-12-91	457.04	43.16	413.88	ND	NR	NR
MW-1	10-22-91	457.04	DRY	DRY	ND	DRY	DRY
MW-1	11-13-91	457.04	DRY	DRY	ND	DRY	DRY
MW-1	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	NR
MW-1	04-24-92	457.04	38.14	418.90	ND	NR	NR
MW-1	05-20-92	457.04	40.74	416.30	ND	NR	NR
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	DRY	DRY
MW-1	09-11-92	457.04	DRY	DRY	ND	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	457.04	Not surveyed: inaccessible due to construction activities				
MW-1	01-27-93	457.04	30.10	426.94	ND	NR	NR
MW-1	02-26-93	457.04	24.72	432.32	ND	NR	NR
MW-1	03-30-93	457.04	20.87	436.17	ND	NR	NR
MW-1	04-30-93	457.04	19.46	437.58	ND	NR	NR
MW-1	05-14-93	457.04	19.27	437.77	ND	NR	NR
MW-1	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

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

Date: 02-10-95
Project Number: 0805-134.01

Well Designation	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-2	09-20-89	457.74	20.67	437.07	ND	NR	NR
MW-2	10-12-89	457.74	18.98	438.76	ND	NR	NR
MW-2	06-21-90	457.74	21.88	435.86	ND	NR	NR
MW-2	09-20-90	457.74	19.90	437.84	ND	NR	NR
MW-2	12-18-90	457.74	19.32	438.42	ND	NR	NR
MW-2	02-21-91	457.74	23.02	434.72	ND	NR	NR
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	NR
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	NR
MW-2	08-13-91	457.74	37.20	420.54	ND	NR	NR
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	NR
MW-2	04-24-92	457.74	36.64	421.10	ND	NR	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	DRY	DRY
MW-2	07-28-92	457.74	DRY	DRY	ND	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	DRY	ND	DRY	DRY
MW-2	11-11-92	457.74	DRY	DRY	ND	DRY	DRY
MW-2	12-14-92	457.74	Not surveyed: inaccessible due to construction activities				
MW-2	01-27-93	457.74	32.87	424.87	ND	NR	NR
MW-2	02-26-93	457.74	Not surveyed: inaccessible due to construction activities				
MW-2	03-30-93	457.74	20.47	437.27	ND	NR	NR
MW-2	04-30-93	457.74	19.02	438.72	ND	NR	NR
MW-2	05-14-93	457.74	18.65	439.09	ND	NR	NR
MW-2	06-17-93	457.74	18.21	439.53	ND	NR	NR
MW-2	07-27-93	457.74	17.95	439.79	ND	NR	NR
MW-2	08-30-93	457.74	18.43	439.31	ND	NR	NR
MW-2	11-04-93	457.74	19.73	438.01	ND	NR	NR
MW-2	03-25-94	457.74	17.26	440.48	ND	NR	NR
MW-2	06-02-94	457.74	21.23	436.51	ND	NR	NR
MW-2	09-16-94	457.74	19.64	438.10	ND	N	0.014
MW-2	11-29-94	457.74	18.89	438.85	ND	N	0.025

Table 2
Historical Groundwater Elevation Data
Summary Report

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

Date: 02-10-95
Project Number: 0805-134.01

Well Designation	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-3	09-20-89	456.97	20.98	435.99	ND	NR	NR
MW-3	10-12-89	456.97	19.66	437.31	ND	NR	NR
MW-3	06-21-90	456.97	21.72	435.25	ND	NR	NR
MW-3	09-20-90	456.97	19.72	437.25	ND	NR	NR
MW-3	12-18-90	456.97	19.21	437.76	ND	NR	NR
MW-3	02-21-91	456.97	22.36	434.61	ND	NR	NR
MW-3	03-20-91	456.97	19.79	437.18	ND	NR	NR
MW-3	04-10-91	456.97	19.35	437.62	ND	NR	NR
MW-3	05-20-91	456.97	25.86	431.11	ND	NR	NR
MW-3	06-20-91	456.97	32.45	424.52	ND	NR	NR
MW-3	07-25-91	456.97	38.06	418.91	ND	NR	NR
MW-3	08-13-91	456.97	38.40	418.57	ND	NR	NR
MW-3	09-12-91	456.97	DRY	DRY	ND	DRY	DRY
MW-3	10-22-91	456.97	DRY	DRY	ND	DRY	DRY
MW-3	11-13-91	456.97	DRY	DRY	ND	DRY	DRY
MW-3	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
MW-3	06-29-92	456.97	DRY	DRY	ND	DRY	DRY
MW-3	07-28-92	456.97	DRY	DRY	ND	DRY	DRY
MW-3	08-26-92	456.97	DRY	DRY	ND	DRY	DRY
MW-3	09-11-92	456.97	DRY	DRY	ND	DRY	DRY
MW-3	10-29-92	456.97	DRY	DRY	ND	DRY	DRY
MW-3	11-11-92	456.97	DRY	DRY	ND	DRY	DRY
MW-3	12-14-92	456.97	Not surveyed: inaccessible due to construction activities				
MW-3	01-27-93	456.97	30.36	426.61	ND	NR	NR
MW-3	02-26-93	456.97	24.96	432.01	ND	NR	NR
MW-3	03-30-93	456.97	21.45	435.52	ND	NR	NR
MW-3	04-30-93	456.97	19.43	437.54	ND	NR	NR
MW-3	05-14-93	456.97	19.37	437.60	ND	NR	NR
MW-3	06-17-93	456.97	19.38	437.59	ND	NR	NR
MW-3	07-27-93	456.97	20.10	436.87	ND	NR	NR
MW-3	08-30-93	456.97	20.98	435.99	ND	NR	NR
MW-3	11-04-93	456.97	20.91	436.06	ND	NR	NR
MW-3	03-25-94	456.97	17.57	439.40	ND	NR	NR
MW-3	06-02-94	456.97	21.30	435.67	ND	NR	NR
MW-3	09-16-94	456.97	20.03	436.94	ND	N	0.014
MW-3	11-29-94	456.97	19.13	437.84	ND	N	0.025

Table 2
Historical Groundwater Elevation Data
Summary Report

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

Date: 02-10-95
Project Number: 0805-134.01

Well Designation	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
MW-4	06-20-91	456.55	DRY	DRY	ND	DRY	DRY
MW-4	07-25-91	456.55	DRY	DRY	ND	DRY	DRY
MW-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	DRY
MW-4	05-20-92	456.55	DRY	DRY	ND	DRY	DRY
MW-4	06-29-92	456.55	DRY	DRY	ND	DRY	DRY
MW-4	07-28-92	456.55	DRY	DRY	ND	DRY	DRY
MW-4	08-26-92	456.55	DRY	DRY	ND	DRY	DRY
MW-4	09-11-92	456.55	DRY	DRY	ND	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	456.55	Not surveyed: inaccessible due to construction activities				
MW-4	01-27-93	456.55	DRY	DRY	ND	DRY	DRY
MW-4	02-26-93	456.55	23.60	432.95	ND	NR	NR
MW-4	03-30-93	456.55	20.87	435.68	ND	NR	NR
MW-4	04-30-93	456.55	19.73	436.82	ND	NR	NR
MW-4	05-14-93	456.55	19.75	436.80	ND	NR	NR
MW-4	06-17-93	456.55	19.69	436.86	ND	NR	NR
MW-4	07-27-93	456.55	20.40	436.15	ND	NR	NR
MW-4	08-30-93	456.55	21.10	435.45	ND	NR	NR
MW-4	11-04-93	456.55	21.60	434.95	ND	NR	NR
MW-4	03-25-94	456.55	18.59	437.96	ND	NR	NR
MW-4	06-02-94	456.55	21.41	435.14	ND	NR	NR
MW-4	09-16-94	456.55	20.51	436.04	ND	N	0.014
MW-4	11-29-94	456.55	19.77	436.78	ND	N	0.025

Table 2
Historical Groundwater Elevation Data
Summary Report

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

Date: 02-10-95
Project Number: 0805-134.01

Well Designation	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-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	Not surveyed: inaccessible due to construction activities				
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	Not surveyed:				
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	0.014
MW-5	11-29-94	455.84	19.72	436.12	ND	N	0.025
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
MW-6	11-11-92	454.93	^62.42	^392.51	0.03	NR	NR
MW-6	12-14-92	454.93	Not surveyed: inaccessible due to construction activities				
MW-6	01-27-93	454.93	Not surveyed: inaccessible due to construction activities				
MW-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
MW-6	04-30-93	454.93	18.76	436.17	ND	NR	NR
MW-6	05-14-93	454.93	^19.19	^435.74	0.01	NR	NR
MW-6	06-17-93	454.93	18.54	436.39	ND	NR	NR
MW-6	07-27-93	454.93	19.47	435.46	ND	NR	NR
MW-6	08-30-93	454.93	^20.33	^434.60	0.01	NR	NR
MW-6	11-04-93	454.93	^20.33	^434.60	0.01	NR	NR
MW-6	03-25-94	454.93	17.13	437.80	ND	NR	NR
MW-6	06-02-94	454.93	20.45	434.48	ND	NR	NR
MW-6	09-16-94	454.93	19.62	435.31	ND	N	0.014
MW-6	11-29-94	454.93	18.89	436.04	ND	N	0.025

Table 2
Historical Groundwater Elevation Data
Summary Report

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

Date: 02-10-95
Project Number: 0805-134.01

Well Designation	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-7	06-29-92	454.92	49.57	405.35	ND	NR	NR
MW-7	07-28-92	454.92	54.60	400.32	ND	NR	NR
MW-7	08-26-92	454.92	59.60	395.32	ND	NR	NR
MW-7	09-11-92	454.92	60.74	394.18	ND	NR	NR
MW-7	10-29-92	454.92	62.23	392.69	ND	NR	NR
MW-7	11-11-92	454.92	62.69	392.23	ND	NR	NR
MW-7	12-14-92	454.92	Not surveyed: inaccessible due to construction 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	454.92	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	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	N	0.014
MW-7	11-29-94	454.92	18.73	436.19	ND	N	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	NR
MW-8	09-11-92	456.97	61.97	395.00	ND	NR	NR
MW-8	10-29-92	456.97	63.51	393.46	ND	NR	NR
MW-8	11-11-92	456.97	64.21	392.76	ND	NR	NR
MW-8	12-14-92	456.97	Not surveyed: inaccessible due to construction activities				
MW-8	01-27-93	456.97	25.57	431.40	ND	NR	NR
MW-8	02-26-93	456.97	19.86	437.11	ND	NR	NR
MW-8	03-30-93	456.97	16.69	440.28	ND	NR	NR
MW-8	04-30-93	456.97	15.83	441.14	ND	NR	NR
MW-8	05-14-93	456.97	15.79	441.18	ND	NR	NR
MW-8	06-17-93	456.97	15.79	441.18	ND	NR	NR
MW-8	07-27-93	456.97	16.80	440.17	ND	NR	NR
MW-8	08-30-93	456.97	17.37	439.60	ND	NR	NR
MW-8	11-04-93	456.97	17.60	439.37	ND	NR	NR
MW-8	03-25-94	456.97	15.04	441.93	ND	NR	NR
MW-8	06-02-94	456.97	18.43	438.54	ND	NR	NR
MW-8	09-16-94	456.97	17.02	439.95	ND	N	0.014
MW-8	11-29-94	456.97	16.83	440.14	ND	N	0.025

Table 2
Historical Groundwater Elevation Data
Summary Report

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

Date: 02-10-95
Project Number: 0805-134.01

Well Designation	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-9	06-29-92	456.18	50.29	405.89	ND	NR	NR
MW-9	07-28-92	456.18	55.53	400.65	ND	NR	NR
MW-9	08-26-92	456.18	60.62	395.56	ND	NR	NR
MW-9	09-11-92	456.18	61.67	394.51	ND	NR	NR
MW-9	10-29-92	456.18	63.17	393.01	ND	NR	NR
MW-9	11-11-92	456.18	63.68	392.50	ND	NR	NR
MW-9	12-14-92	456.18	Not surveyed: inaccessible due to construction activities				
MW-9	01-27-93	456.18	26.48	429.70	ND	NR	NR
MW-9	02-26-93	456.18	Not surveyed: inaccessible due to construction activities				
MW-9	03-30-93	456.18	17.77	438.41	ND	NR	NR
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	NR
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
MW-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
MW-9	09-16-94	456.18	17.84	438.34	ND	N	0.014
MW-9	11-29-94	456.18	17.32	438.86	ND	N	0.025
MW-10	03-30-93	456.85	21.33	435.52	ND	NR	NR
MW-10	04-30-93	456.85	20.51	436.34	ND	NR	NR
MW-10	05-14-93	456.85	20.26	436.59	ND	NR	NR
MW-10	06-17-93	456.85	20.30	436.55	ND	NR	NR
MW-10	07-27-93	456.85	20.29	436.56	ND	NR	NR
MW-10	08-30-93	456.85	22.19	434.66	ND	NR	NR
MW-10	11-04-93	456.85	22.11	434.74	ND	NR	NR
MW-10	03-25-94	456.85	18.84	438.01	ND	NR	NR
MW-10	06-02-94	456.85	22.40	434.45	ND	NR	NR
MW-10	09-16-94	456.85	21.25	435.60	ND	N	0.014
MW-10	11-29-94	456.85	20.50	436.35	ND	N	0.025

Table 2
Historical Groundwater Elevation Data
Summary Report

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

Date: 02-10-95
Project Number: 0805-134.01

Well Desig-nation	Water Level Field Date	TOC Elevation ft-MSL	Depth to Water feet	Ground-Water Elevation ft-MSL	Floating Product Thickness feet	Ground-Water Flow Direction MWN	Hydraulic Gradient foot/foot
MW-11	03-30-93	455.07	20.78	434.29	ND	NR	NR
MW-11	04-30-93	455.07	20.71	434.36	ND	NR	NR
MW-11	05-14-93	455.07	20.01	435.06	ND	NR	NR
MW-11	06-17-93	455.07	20.18	434.89	ND	NR	NR
MW-11	07-27-93	455.07	21.31	433.76	ND	NR	NR
MW-11	08-30-93	455.07	21.09	433.98	ND	NR	NR
MW-11	11-04-93	455.07	21.40	433.67	ND	NR	NR
MW-11	03-25-94	455.07	18.28	436.79	ND	NR	NR
MW-11	06-02-94	455.07	21.78	433.29	ND	NR	NR
MW-11	09-16-94	455.07	20.98	434.09	ND	N	0.014
MW-11	11-29-94	455.07	20.67	434.40	ND	N	0.025
MW-12	03-30-93	455.04	21.33	433.71	ND	NR	NR
MW-12	04-30-93	455.04	20.23	434.81	ND	NR	NR
MW-12	05-14-93	455.04	19.97	435.07	ND	NR	NR
MW-12	06-17-93	455.04	20.00	435.04	ND	NR	NR
MW-12	07-27-93	455.04	20.94	434.10	ND	NR	NR
MW-12	08-30-93	455.04	21.79	433.25	ND	NR	NR
MW-12	11-04-93	455.04	21.95	433.09	ND	NR	NR
MW-12	03-25-94	455.04	18.74	436.30	ND	NR	NR
MW-12	06-02-94	455.04	22.21	432.83	ND	NR	NR
MW-12	09-16-94	455.04	21.62	433.42	ND	N	0.014
MW-12	11-29-94	455.04	20.82	434.22	ND	N	0.025

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
^ = Groundwater elevation (GWE) and depth to water (DTW) adjusted to include 80 percent of the floating product thickness (FPT):
[GWE = (TOC - DTW) + (FPT x 0.8)]

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

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

Date: 02-10-95
Project Number: 0805-134.01

Well Designation	Water Sample Field Date	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TOG or TRPH
		ppb	ppb	ppb	ppb	ppb	ppb
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-1	05-20-91	<30	<0.3	<0.3	<0.3	<0.3	NA
MW-1	08-13-91	Not sampled: dry well					
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 well					
MW-1	11-12-92	Not sampled: dry well					
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	120000
MW-1	08-30-93	<50	<0.5	<0.5	<0.5	<0.5	900
MW-1	11-04-93	<50	<0.5	<0.5	<0.5	<0.5	2900
MW-1	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	<600
MW-1	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	<500
MW-1	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	<500
MW-1	11-29-94	<50	<0.5	<0.5	<0.5	<0.5	<500
MW-2	09-20-89	<50	<0.5	<0.5	<0.5	1	<5000
MW-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
MW-2	12-18-90	<50	0.6	1.5	<0.5	1.9	<5000
MW-2	02-21-91	<50	<0.5	<0.5	<0.5	<0.5	<5000
MW-2	05-20-91	<30	<0.3	<0.3	<0.3	<0.3	<75000
MW-2	08-13-91	Not sampled: dry well					
MW-2	11-13-91	Not sampled: dry well					
MW-2	03-19-92	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-2	06-29-92	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-2	09-11-92	Not sampled: dry well					
MW-2	11-12-92	Not sampled: dry well					
MW-2	03-30-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-2	05-14-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-2	08-30-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-2	11-04-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-2	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-2	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-2	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-2	11-29-94	<50	<0.5	<0.5	<0.5	<0.5	NA

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

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

Date: 02-10-95
Project Number: 0805-134.01

Well Designation	Water Sample Field Date	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TOG or TRPH
		ppb	ppb	ppb	ppb	ppb	ppb
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: dry well					
MW-3	11-13-91	Not sampled: dry well					
MW-3	03-19-92	220	<1.1	<1.9	<0.6	<0.8	<5000
MW-3	06-29-92	Not sampled: dry well					
MW-3	09-11-92	Not sampled: dry well					
MW-3	11-12-92	Not sampled: dry well					
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	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-3	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-3	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-3	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-3	11-29-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-4	02-21-91	3500	410	7.6	30	47	<5000
MW-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 well					
MW-4	03-19-92	Not sampled: dry well					
MW-4	06-29-92	Not sampled: dry well					
MW-4	09-11-92	Not sampled: dry well					
MW-4	11-12-92	Not sampled: dry well					
MW-4	03-31-93	680	110	5.2	3	7.4	NA
MW-4	05-14-93	1200	200	6.2	15	9.2	NA
MW-4	08-30-93	620	22	0.9	3.6	2.1	NA
MW-4	11-04-93	320	11	<0.5	1.3	0.9	NA
MW-4	03-25-94	480	5.4	<0.5	1.6	1.7	NA
MW-4	06-02-94	270	4.2	<0.5	1	<1.7	NA
MW-4	09-16-94	250	1	<0.5	<0.6	<1	NA
MW-4	11-29-94	280	1.8	<0.5	<1.2	<0.8	NA

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

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

Date: 02-10-95
Project Number: 0805-134.01

Well Designation	Water Sample Field Date	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TOG or TRPH
		ppb	ppb	ppb	ppb	ppb	ppb
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: dry well					
MW-5	03-31-93	9700	1700	430	220	880	NA
MW-5	05-14-93	9800	1300	820	270	1100	NA
MW-5	08-30-93	Not sampled: well 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	NA
MW-5	06-02-94	500	25	7.4	6	33	NA
MW-5	09-16-94	1500	370	28	110	120	NA
MW-5	11-29-94	1100	280	11	82	31	NA
MW-6	06-29-92	8600	1800	460	52	450	NA
MW-6	09-11-92	Not sampled: well contained floating product					
MW-6	11-12-92	Not sampled: well contained floating product					
MW-6	03-31-93	Not sampled: well contained floating product					
MW-6	05-14-93	Not sampled: well contained floating product					
MW-6	08-30-93	Not sampled: well contained floating product					
MW-6	11-04-93	Not sampled: well contained floating product					
MW-6	03-25-94	530	<2.5	<2.5	<2.5	4.6	NA
MW-6	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-6	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-6	11-29-94	<50	1.3	<0.5	<0.5	<0.5	NA
MW-7	06-29-92	270	38	3.7	1.1	4.4	NA
MW-7	09-11-92	420	20	0.7	<0.5	<0.5	NA
MW-7	11-12-92	470	31	1	<0.5	0.8	NA
MW-7	03-31-93	190	20	1	<0.5	<0.5	NA
MW-7	05-14-93	170	17	0.6	<0.5	0.5	NA
MW-7	08-30-93	<50	1.8	<0.5	<0.5	0.5	NA
MW-7	11-04-93	<50	6.6	<0.5	<0.5	0.8	NA
MW-7	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-7	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-7	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-7	11-29-94	<50	<0.5	<0.5	<0.5	<0.5	NA

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

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

Date: 02-10-95
Project Number: 0805-134.01

Well Designation	Water Sample Field Date	TPHG ppb	Benzene ppb	Toluene ppb	Ethyl-benzene ppb	Total Xylenes ppb	TOG or TRPH ppb
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	06-29-92	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-9	09-11-92	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-9	11-12-92	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-9	03-31-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-9	05-14-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-9	08-30-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-9	11-04-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-9	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-9	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-9	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-9	11-29-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-10	03-31-93	230*	<0.5	<0.5	<1	0.6	NA
MW-10	05-14-93	440*	<10	<0.6	<0.9	<0.5	NA
MW-10	08-30-93	280*	<4	<0.5	<1.3	0.6	NA
MW-10	11-04-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-10	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-10	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-10	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-10	11-29-94	<50	<0.5	<0.5	<0.5	<0.5	NA

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

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

Date: 02-10-95
Project Number: 0805-134.01

Well Designation	Water Sample Field Date	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TOG or TRPH
		ppb	ppb	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	<50	<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
MW-12	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-12	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-12	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-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 (µg/l)
NA = Not analyzed
* = Chromatogram does not match the typical gasoline fingerprint.

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

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

Date: 02-10-95
Project Number: 0805-134.01

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	Nickel by EPA 6010
		ppb	ppb	ppb	ppb	ppb	ppb	ppb
MW-1	09-20-89	NA	<50	NA	NA	NA	NA	NA
MW-1	06-21-90	NA	<100	NA	NA	NA	NA	NA
MW-1	09-20-90	NA	<50	NA	NA	NA	NA	NA
MW-1	12-18-90	NA	<5000	NA	NA	NA	NA	NA
MW-1	02-21-91	NA	<5000	NA	NA	NA	NA	NA
MW-1	05-20-91	NA	<75000	NA	NA	NA	NA	NA
MW-1	08-13-91	Not sampled: dry well						
MW-1	11-13-91	Not sampled: dry well						
MW-1	03-19-92	NA	NA	NA	NA	NA	NA	NA
MW-1	06-29-92	Not sampled: dry well						
MW-1	09-11-92	Not sampled: dry well						
MW-1	11-12-92	Not sampled: dry well						
MW-1	03-30-93	NA	NA	NA	NA	NA	NA	NA
MW-1	05-14-93	NA	NA	NA	NA	NA	NA	NA
MW-1	08-30-93	NA	NA	NA	NA	NA	NA	NA
MW-1	11-04-93	NA	NA	NA	NA	NA	NA	NA
MW-1	03-25-94	NA	NA	NA	NA	NA	NA	NA
MW-1	06-02-94	NA	NA	NA	NA	NA	NA	NA
MW-2	09-20-89	NA	<50	NA	NA	NA	NA	NA
MW-2	06-21-90	NA	<100	NA	NA	NA	NA	NA
MW-2	09-20-90	NA	<50	NA	NA	NA	NA	NA
MW-2	12-18-90	NA	NA	NA	NA	NA	NA	NA
MW-2	02-21-91	NA	NA	NA	NA	NA	NA	NA
MW-2	05-20-91	NA	NA	NA	NA	NA	NA	NA
MW-2	08-13-91	Not sampled: dry well						
MW-2	11-13-91	Not sampled: dry well						
MW-2	03-19-92	NA	NA	NA	NA	NA	NA	NA
MW-2	06-29-92	NA	NA	NA	NA	NA	NA	NA
MW-2	09-11-92	Not sampled: dry well						
MW-2	11-12-92	Not sampled: dry well						
MW-2	03-30-93	NA	NA	NA	NA	NA	NA	NA
MW-2	05-14-93	NA	NA	NA	NA	NA	NA	NA

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

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

Date: 02-10-95
Project Number: 0805-134.01

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	Nickel by EPA 6010
		ppb	ppb	ppb	ppb	ppb	ppb	ppb
MW-3	09-20-89	NA	<50	NA	NA	NA	NA	NA
MW-3	06-21-90	NA	<100	NA	NA	NA	NA	NA
MW-3	09-20-90	NA	<50	NA	NA	NA	NA	NA
MW-3	12-18-90	NA	NA	NA	NA	NA	NA	NA
MW-3	02-21-91	NA	NA	NA	NA	NA	NA	NA
MW-3	05-20-91	NA	NA	NA	NA	NA	NA	NA
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	NA
MW-3	06-29-92	Not sampled: dry well						
MW-3	09-11-92	Not sampled: dry well						
MW-3	11-12-92	Not sampled: dry well						
MW-3	03-30-93	NA	NA	NA	NA	NA	NA	NA
MW-3	05-14-93	NA	NA	NA	NA	NA	NA	NA
MW-4	02-21-91	NA	NA	NA	NA	NA	NA	NA
MW-4	05-20-91	NA	NA	NA	NA	NA	NA	NA
MW-4	08-13-91	Not sampled: dry well						
MW-4	11-13-91	Not sampled: dry well						
MW-4	03-19-92	Not sampled: dry well						
MW-4	06-29-92	Not sampled: dry well						
MW-4	09-11-92	Not sampled: dry well						
MW-4	11-12-92	Not sampled: dry well						
MW-4	03-31-93	NA	NA	NA	NA	NA	NA	NA
MW-4	05-14-93	NA	NA	NA	NA	NA	NA	NA
MW-8	06-29-92	ND	<50	<3	1780	143	1310	5100
MW-8	09-11-92	NA	<50	13	3580	308	2620	10300
MW-8	11-12-92	NA	NA	28	3440	221	2550	9840
MW-8	03-30-93	NA	NA	NA	NA	NA	NA	NA
MW-8	05-14-93	NA	NA	NA	NA	NA	NA	NA
MW-9	11-12-92	NA	NA	10	1080	101	859	3070
MW-9	03-31-93	NA	NA	NA	NA	NA	NA	NA
MW-9	05-14-93	NA	NA	NA	NA	NA	NA	NA

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

APPENDIX C

Soil Boring and Well Construction Logs

Total depth of boring: 46 feet **Diameter of boring:** 6 inches **Date drilled:** 9-14-89

Casing diameter: 2 inches **Length:** 44 feet **Slot size:** 0.020-inch

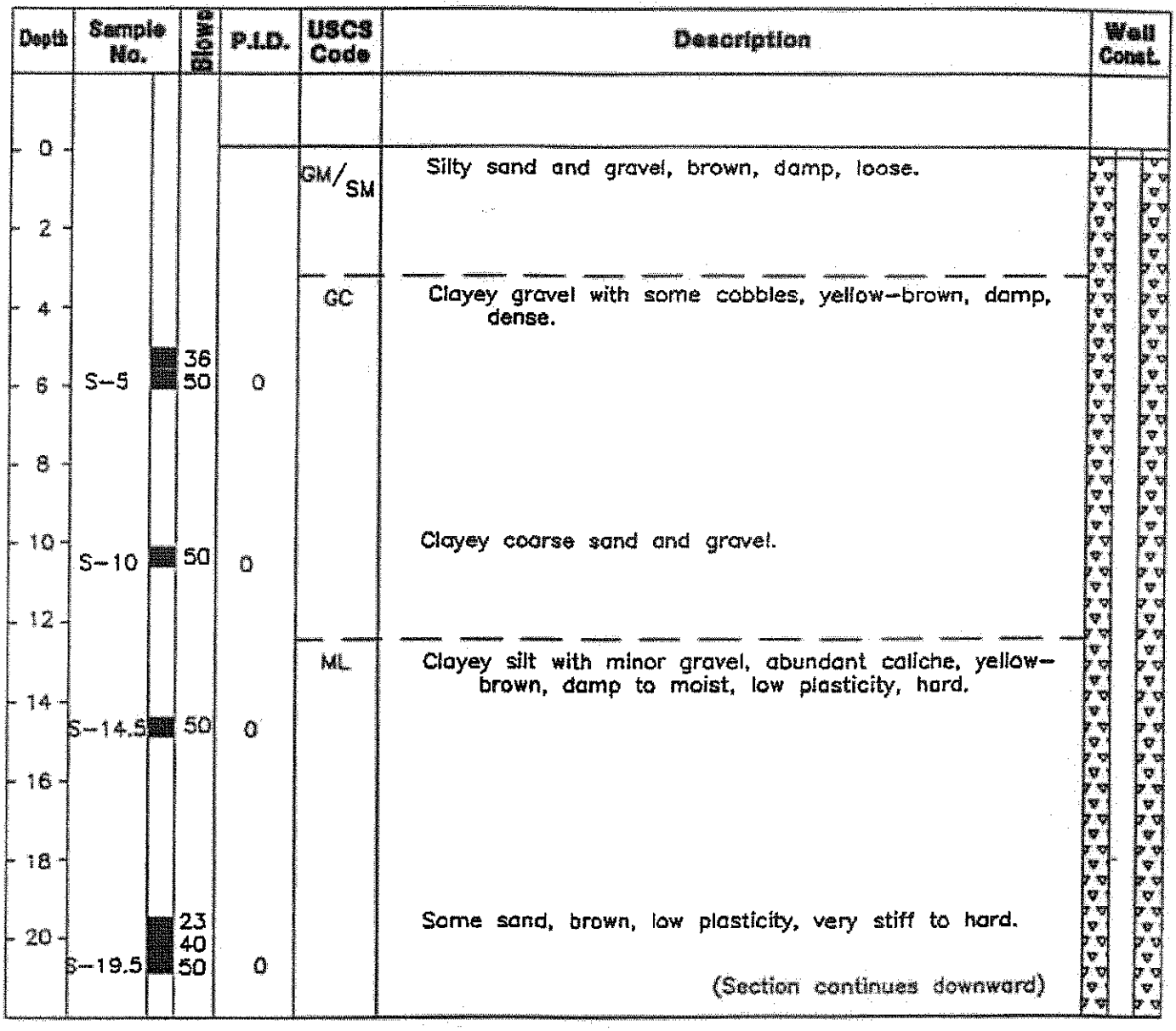
Screen diameter: 2 inches **Length:** 15 feet **Material type:** Sch 40 PVC

Drilling Company: Exploration Geoservices **Driller:** Mike & Curtis

Method Used: Hollow-Stem Auger **Field Geologist:** George & Bill

Signature of Registered Professional:

Registration No.: _____ **State:** CA



Applied GeoSystems

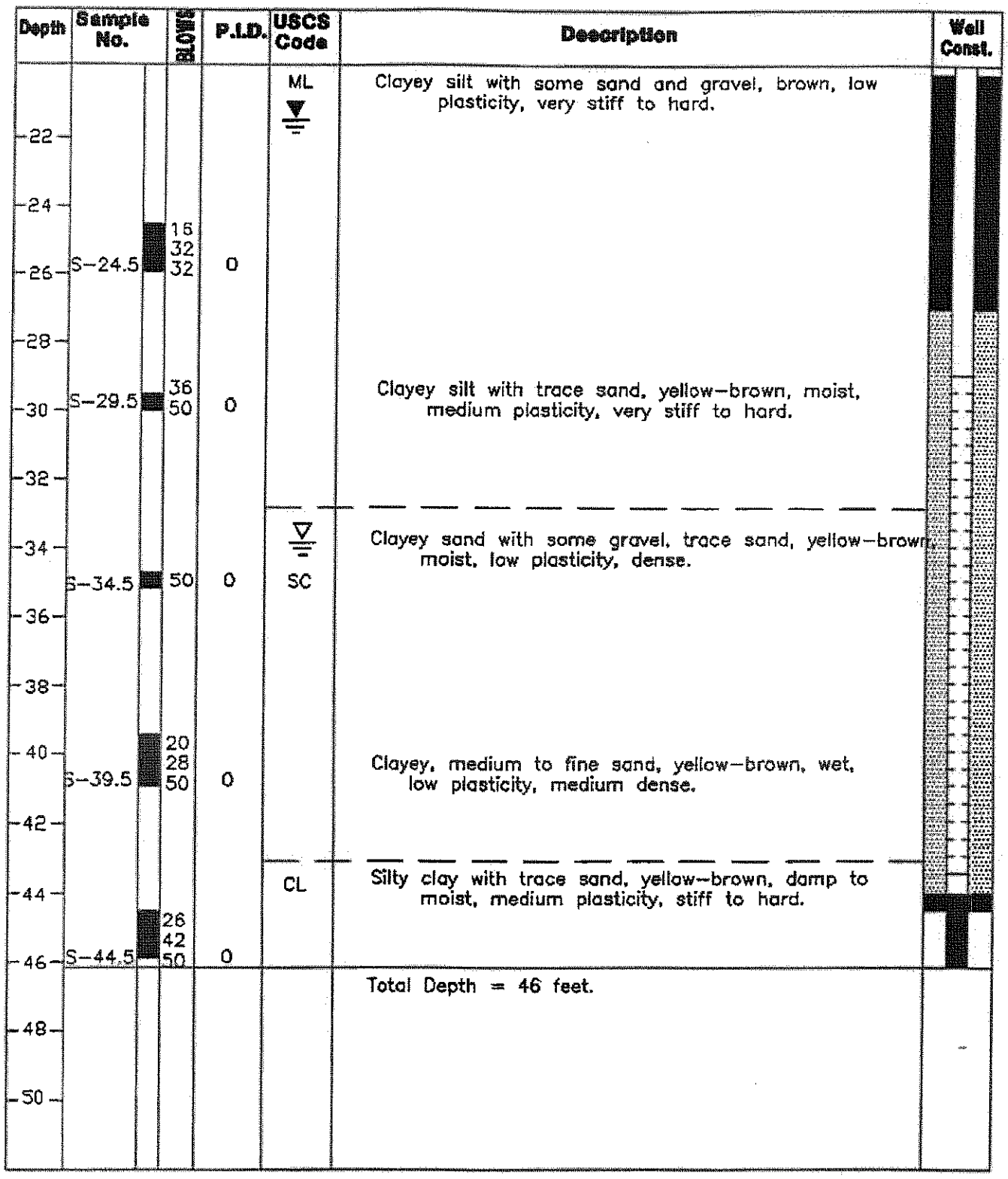
PROJECT NO. 69028-2

LOG OF BORING B-1/MW-1

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

PLATE

P - 4



Applied GeoSystems

PROJECT NO. 69028-2

LOG OF BORING B-1/MW-1

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

PLATE

P - 5

Total depth of boring: 40 feet **Diameter of boring:** 6 inches **Date drilled:** 9-13-89

Casing diameter: 2 inches **Length:** 10 feet **Slot size:** 0.020-inch

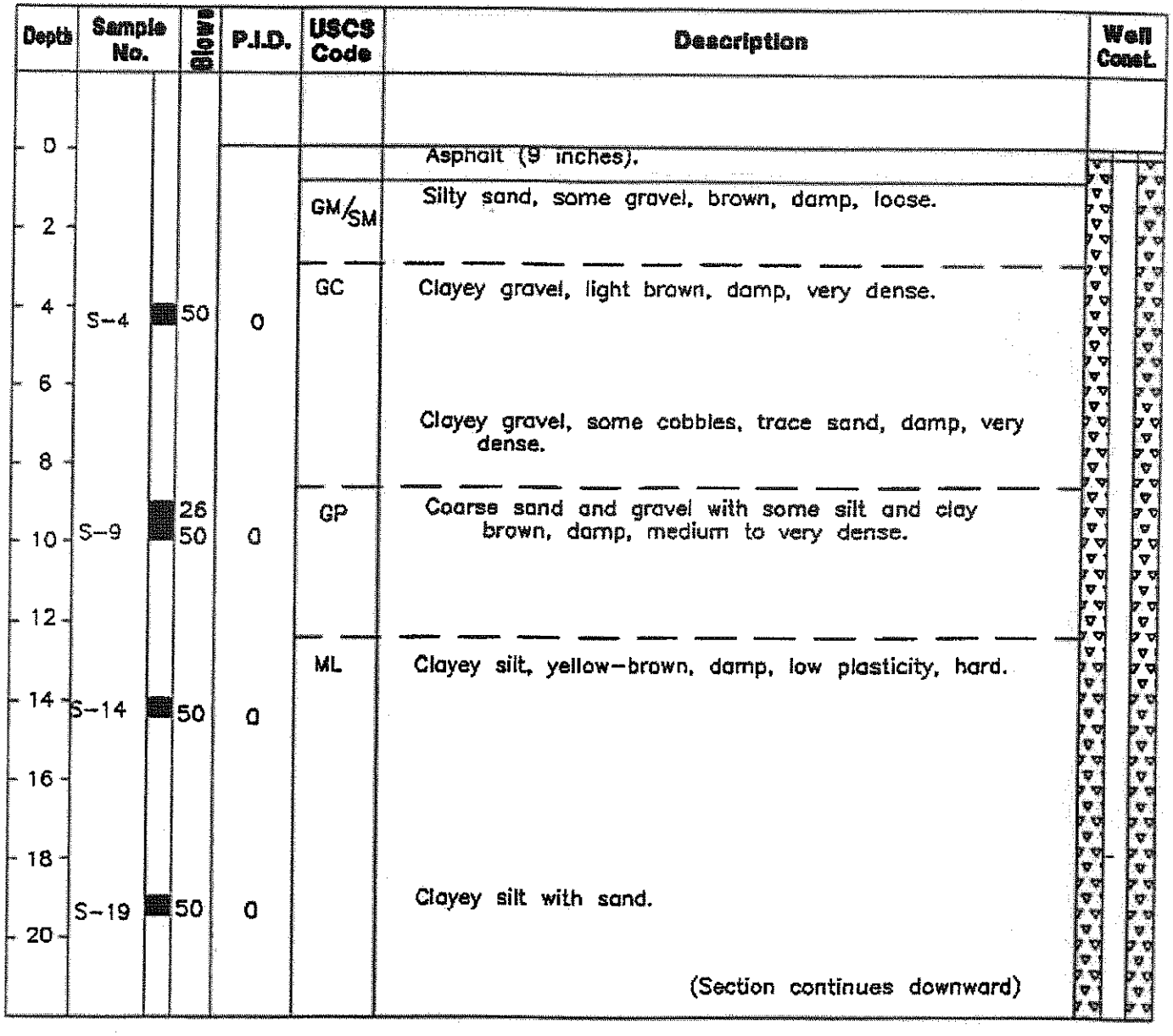
Screen diameter: 2 inches **Length:** 38 feet **Material type:** Sch 40 PVC

Drilling Company: Exploration Geoservices **Driller:** Mike & Curtis

Method Used: Hollow-Stem Auger **Field Geologist:** George & Bill

Signature of Registered Professional:

Registration No.: **State:** CA



Applied GeoSystems

PROJECT NO. 89028-2

LOG OF BORING B-2/MW-2

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

PLATE

P - 6

Depth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
22				ML	Clayey silt with sand, yellow–brown, damp, low plasticity, hard.	
24	S–24	15 40 30	0		Clayey silt, trace sand, yellow–brown, damp, very stiff.	
26						
28						
30	S–29	50	0		Clayey silt, some gravel.	
32				GC	Clayey gravel with sand, light brown, moist, dense to very dense.	
34	S–34	40 50	0			
36					Wet.	
38				CL	Silty clay, light brown, damp, very stiff.	
40	S–39	30 50 42	0			
	S–41	45 50	0			
42					Total Depth = 41–1/2 feet.	
44						
46						
48						
50						

Applied GeoSystems

PROJECT NO. 69028-2

LOG OF BORING B-2/MW-2

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

PLATE

P - 7

Total depth of boring: 39 feet **Diameter of boring:** 6 inches **Date drilled:** 9-14-89

Casing diameter: 2 inches **Length:** 10 feet **Slot size:** 0.020-inch

Screen diameter: 2 inches **Length:** 38-1/2 feet **Material type:** Sch 40 PVC

Drilling Company: Exploration Geoservices **Driller:** Mike & Curtis

Method Used: Hollow-Stem Auger **Field Geologist:** George Williams

Signature of Registered Professional: _____

Registration No.: _____ **State:** CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
0					Asphalt (9 inches).	
2				GM/SM	Silty fine sand and gravel, brown, damp, loose.	
4				GP	Gravel and cobbles, some fine sand and silt, brown, damp, loose.	
6						
8				ML	Clayey silt, some coarse sand, yellow-brown, damp, low plasticity, very stiff.	
10	S-9	40 24 29	0			
12						
14	S-14	30 50	0			
16						
18				CL/GC	Silty clayey, gravel with pebbles, yellow-brown, damp, loose.	
20	S-19	50	0		(Section continues downward)	

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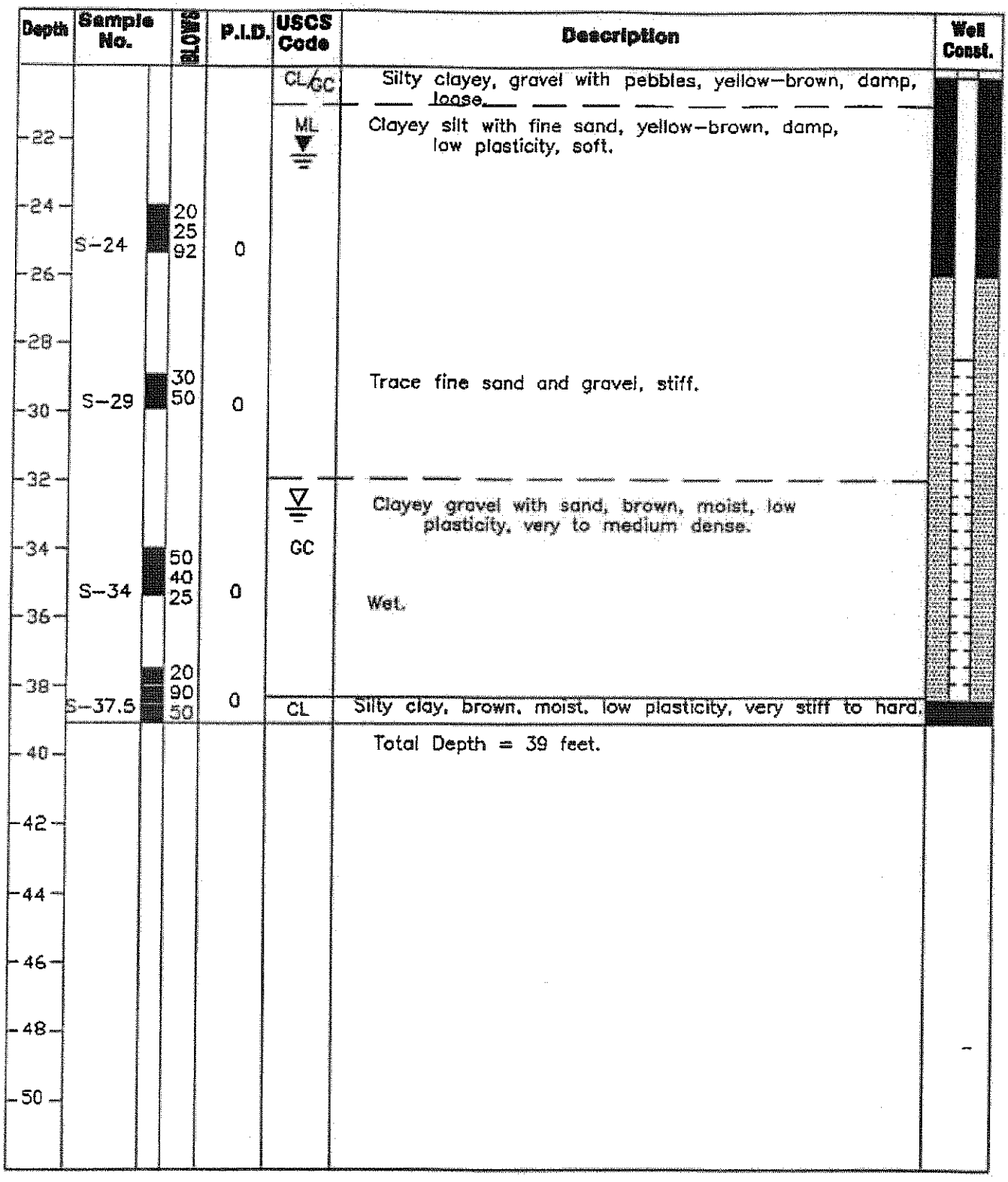
PROJECT NO. 69028-2

LOG OF BORING B-3/MW-3

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

PLATE

P - 8



Applied GeoSystems

PROJECT NO. 69028-2

LOG OF BORING B-3/MW-3

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

PLATE

P - 9

Depth of boring: 32-1/2 feet Diameter of boring: 10 inches Date drilled: 2-14-91

Well depth: 27 feet Material type: Sch 40 PVC Casing diameter: 4 inches

Screen Interval: 21 to 27 feet Slot size: 0.020-inch

Drilling Company: Exploration GeoServices Driller: John Collins

Method Used: Hollow-Stem Auger Field Geologist: Marc & Ken

Signature of Registered Professional:

Registration No.: CE 044600 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
0						
					Asphalt (4 inches).	
				SM	Silty sand with gravel, brown, damp, loose: Fill.	
2				SW	Sandy gravel, subangular to subrounded gravel to 6 inch., brown, damp, very dense.	
4	S-4	18 50/2"	0			
6					Gravel composed of chert and sandstone.	
8						
	S-9	25 50/4"	0			
10						
12						
				SM	Silty sand, some gravel, gray, damp, dense; noticeable product odor.	
		17				
14	S-14.5	30 40	24	CL	Sandy clay, some gravel, gray mottled with brown, damp, low to medium plasticity; noticeable product odor.	
16						
18						
	S-19.5	33 50/6"	5		Gray-brown, moist.	
20					(Section continues downward)	

Applied GeoSystems

PROJECT: 69028-4

LOG OF BORING B-4/MW-4

ARCO Service Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 4

Depth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
22				CL	Sandy clay, some gravel, gray-brown, moist, low to medium plasticity, hard.	
				SM	Silty sand, brown, very moist, dense.	
24		8				
	S-24.5	8	0	SC	Clayey sand, brown, wet, dense.	
		14				
26						
				CL	Sandy clay, gray mottled with brown, moist, low to medium plasticity, very stiff.	
28		28		CH	Silty clay, brown mottled with gray, damp, high plasticity, very stiff.	
	S-29	34	0			
		50				
30		19				
	S-30.5	3	0			
		35				
32					Total Depth = 32-1/2 feet.	
34						
36						
38						
40						
42						
44						
46						
48						
50						

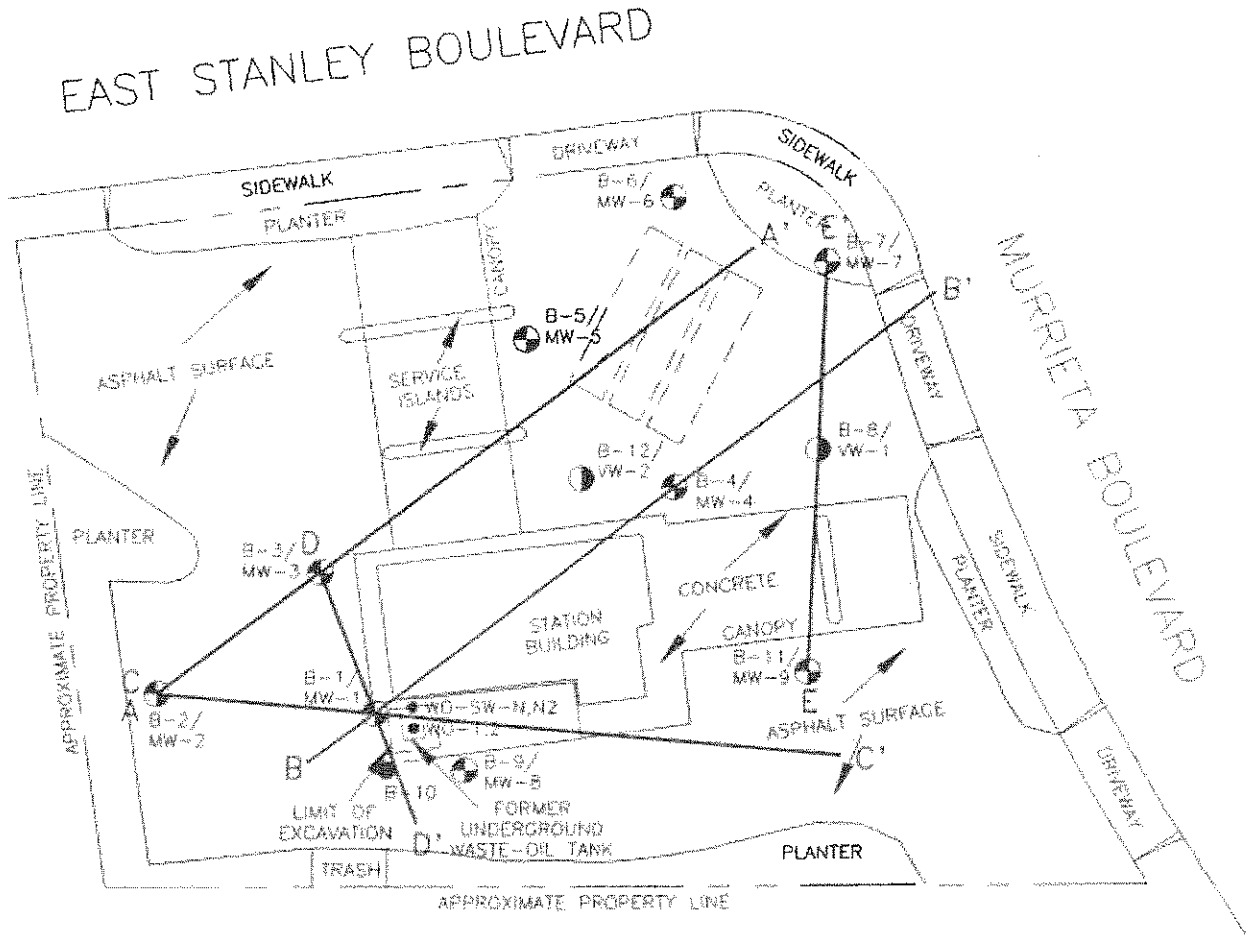
Applied GeoSystems

PROJECT 69028-4

LOG OF BORING B-4/MW-4

ARCO Service Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 5



EXPLANATION

- B-11/ MW-9 = Boring/monitoring well (RESNA, 09/89, 02/91, and 06/92)
- B-12/ VW-2 = Boring/vapor extraction well (RESNA, 06/92)
- B-10 = Boring (RESNA, 06/92)
- WO-SW-N,N2 = Soil sample collected by Pacific (1989)
- E — E' = Geologic cross section
- = Existing gasoline-storage tanks

N

Approximate Scale

40 20 0 40 80

feet

Source: Modified from plan supplied by Ron Archer, Civil Engineer Inc., October 1988.

RESNA
Working to Restore Nature

PROJECT: 69028.07

GENERALIZED SITE PLAN
ARCO Service Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 2

Depth of boring: 64 feet Diameter of boring: 10 inches Date drilled: 06/08/92

Well depth: 63 feet Material type: Sch 40 PVC Casing diameter: 4 inches

Screen interval: 43 to 63 feet Slot size: 0.020-inch

Drilling Company: HEW Drilling Driller: Casto and Marcelino

Method Used: Hollow-Stem Auger Field Geologist: Barbara Sieminski

Signature of Registered Professional: [signature]

Registration No.: RCE 044600 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
					Asphalt.	
0					Asphalt (4 inches).	
				GW	Sandy gravel, brown, damp, dense: baserock.	
				GC	Clayey gravel with sand and cobbles, brown, damp, dense.	
2					Color change to gray.	
				SP	Medium- to coarse-grained sand, brown, damp, dense.	
				GW	Sandy gravel, grayish-brown, damp to moist, medium dense.	
4						
	S-5.5	5 10 8	0			
6						
8						
10	S-10.5	8 25 25	0		Dense.	
12						
				ML	Gravelly silt with clay, brown, damp, low plasticity, very stiff.	
14						
	S-15.5	10 15 20	193	GW/GC	Sandy gravel with clay, gray, damp, dense; obvious product odor.	
16						
18						
20	S-20.5	3 4 6	295	ML	Clayey silt, brown mottled with gray, low plasticity, stiff; obvious product odor.	

(Section continues downward)

RESNA
Working to Restore Nature

PROJECT: 69028.07

LOG OF BORING B-5/MW-5

ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 4

Depth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
52				GC	Clayey gravel with sand, brown mottled with gray, moist, dense; obvious product odor.	
				SC	Clayey sand, medium-grained, brown mottled with gray, moist to wet, dense; obvious product odor.	
54				GW/GC	Sandy gravel with clay, brown, wet, very dense.	
				▽		
56	S-55.5	25 50/4"	57			
58						
60	S-60.5	22 50/5"	45		With cobbles.	
62						
	S-63.5	24 50/5"	3			
64					Total depth = 64 feet.	
66						
68						
70						
72						
74						
76						
78						
80						

RESNA
Working to Restore Nature

PROJECT 69028.07

LOG OF BORING B-5/MW-5

ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 6

Depth of boring: 69 feet Diameter of boring: 10 inches Date drilled: 06/09/92

Well depth: 68 feet 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: Casto and Marcelino

Method Used: Hollow-Stem Auger Field Geologist: Barbara Sieminski

Signature of Registered Professional:

Registration No.: RCE 044600 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
					Asphalt.	
0					Asphalt (4 inches).	
				GP	Sandy gravel, gray, damp, dense: baserock.	
2				GC	Clayey gravel, brown, damp, dense.	
				GW	Sandy gravel with cobbles, grayish-brown, moist, medium dense.	
4						
6	S-5.5	10 11 15	8			
8						
10	S-10.5	3 6 10	0	CL	Sandy clay, trace fine gravel, dark brown, damp, low to medium plasticity, stiff.	
12						
				ML	Gravelly silt with sand, brown, damp, low plasticity, very stiff.	
14						
16	S-15.5	8 11 15	0			
				ML	Clayey silt with sand, brown mottled with gray, damp, low plasticity, very stiff; noticeable product odor.	
18						
20	S-20.5	6 7 10	33			
					(Section continues downward)	

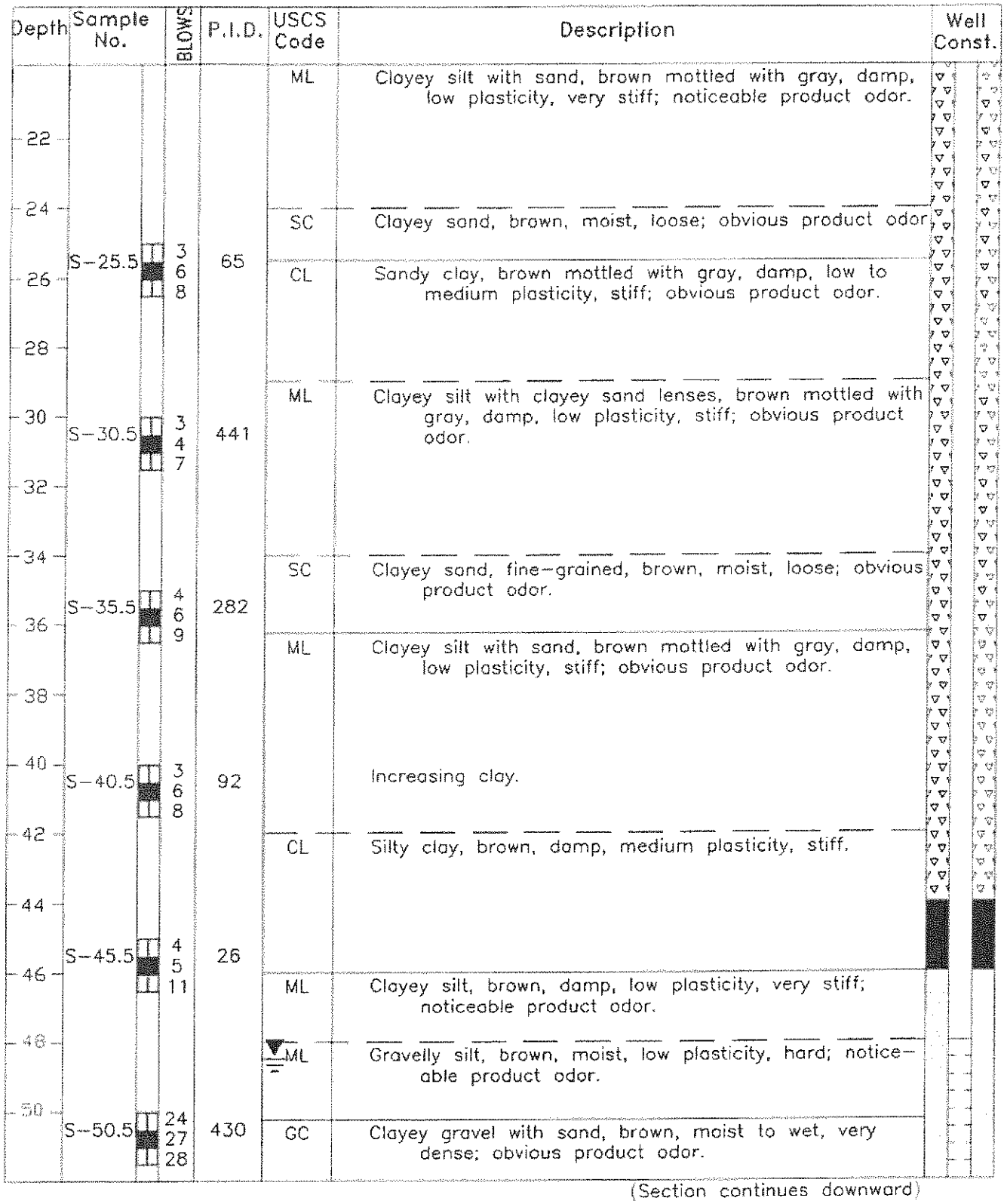
RESNA
Working to Restore Nature

PROJECT: 69028.07

LOG OF BORING B-6/MW-6

ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 7



(Section continues downward)

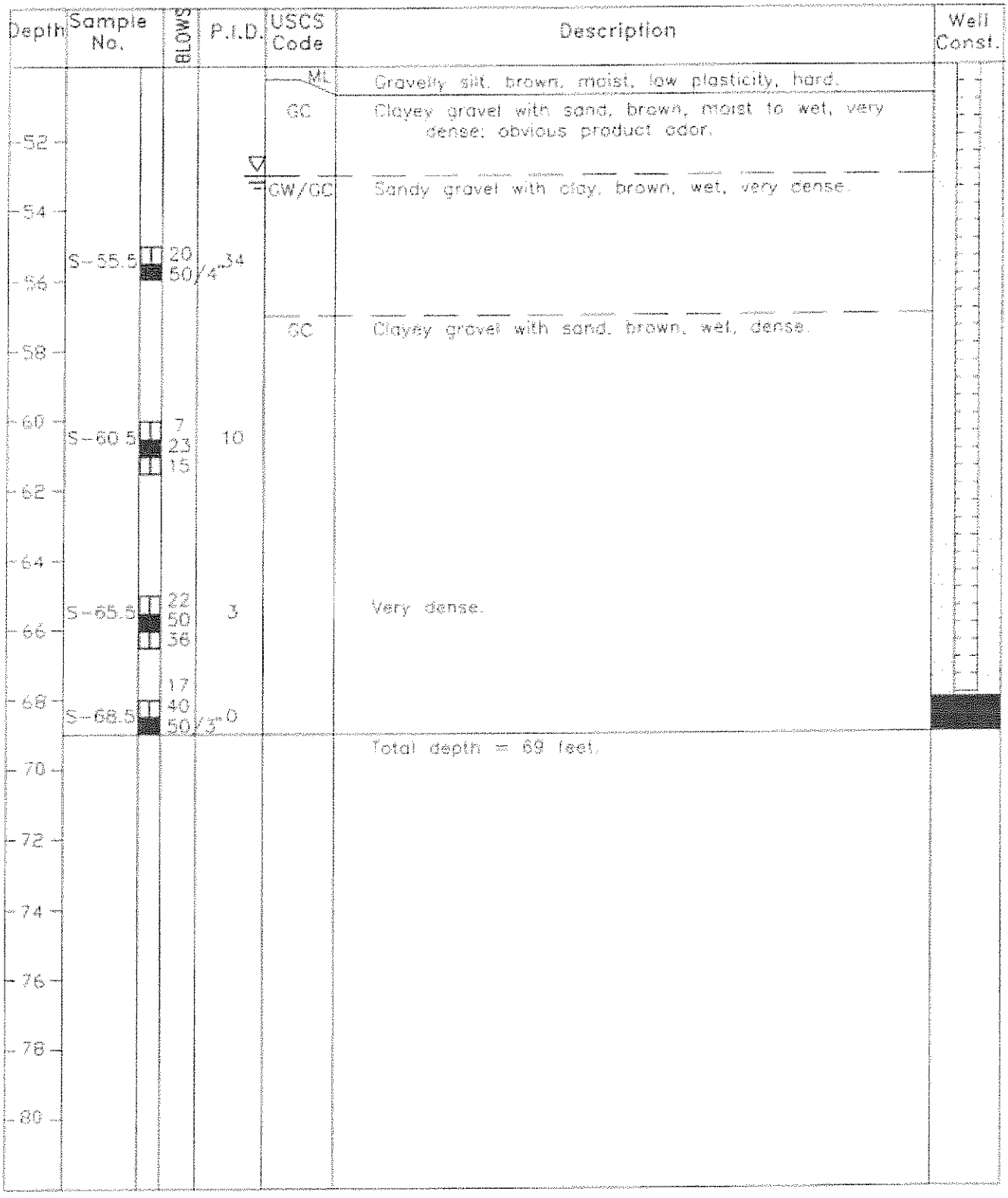
RESNA
Working to Restore Nature

PROJECT 69028.07

LOG OF BORING B-6/MW-6

ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 8



RESNA
Working to Restore Nature

PROJECT 69028.07

LOG OF BORING B-6/MW-6

ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 9

Depth of boring: 68-1/2 feet Diameter of boring: 10 inches Date drilled: 06/10/92

Well depth: 68 feet 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: Costa, Marcelino, and Louis

Method Used: Hollow-Stem Auger Field Geologist: Barbara Sieminski

Signature of Registered Professional:

Registration No.: RCE 044600 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
0						
0				SM	Silty sand, brown, damp, loose: fill.	
2				GW	Sandy gravel, brown, damp, dense.	
4						
6	S-5.5	7 24 15	0			
8						
10	S-10.5	10 6 8	0	CL	Sandy clay, dark brown, damp, low to medium plasticity, stiff.	
12						
14				GC	Clayey gravel with sand, brown, damp, dense.	
16	S-15.5	5 11 22	0		Color change to grayish-brown; increasing sand.	
18						
20	S-20.5	7 21 28	511		Moist; obvious product odor.	

(Section continues downward)

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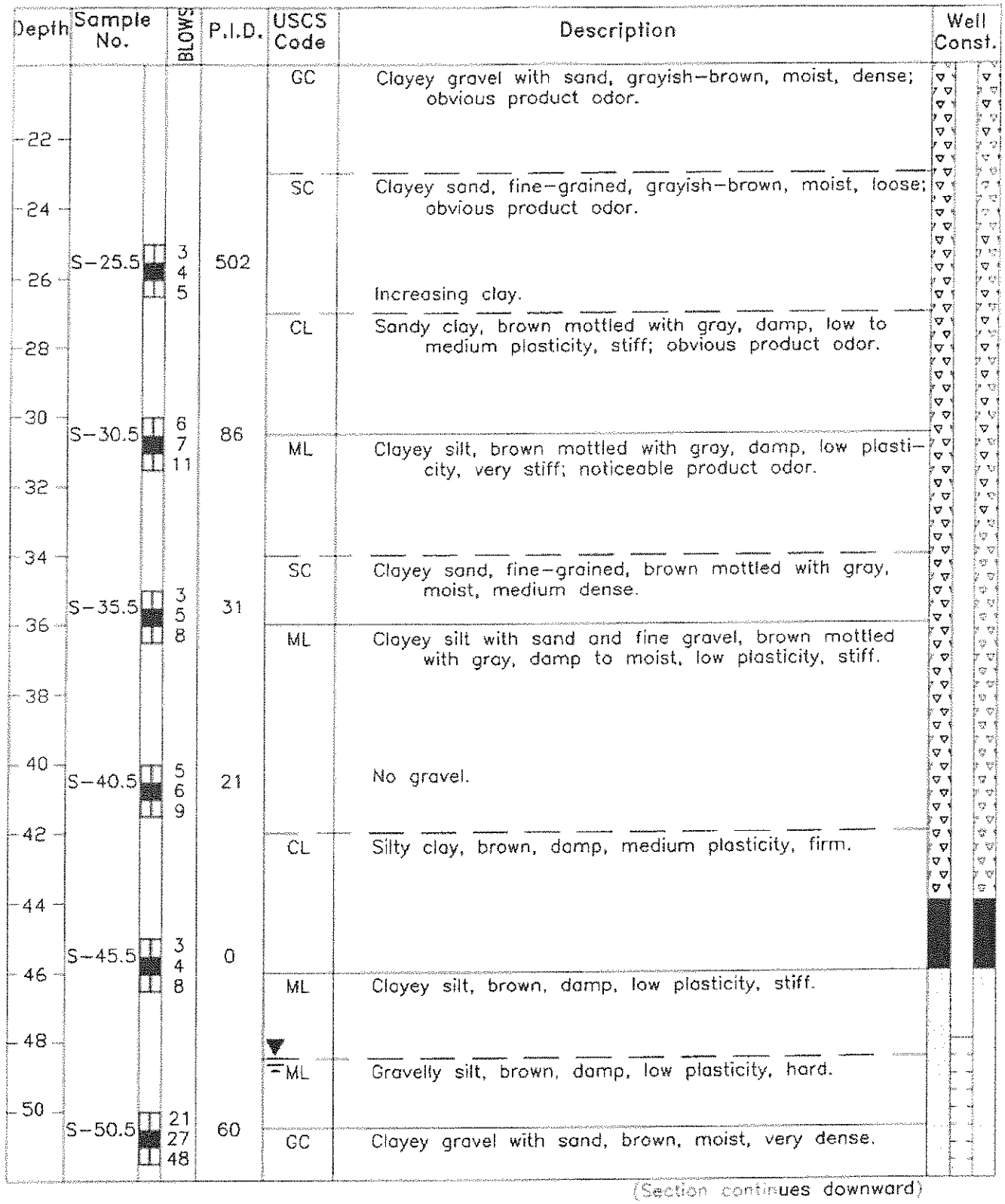
PROJECT: 69028.07

LOG OF BORING B-7/MW-7
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE
10



(Section continues downward)

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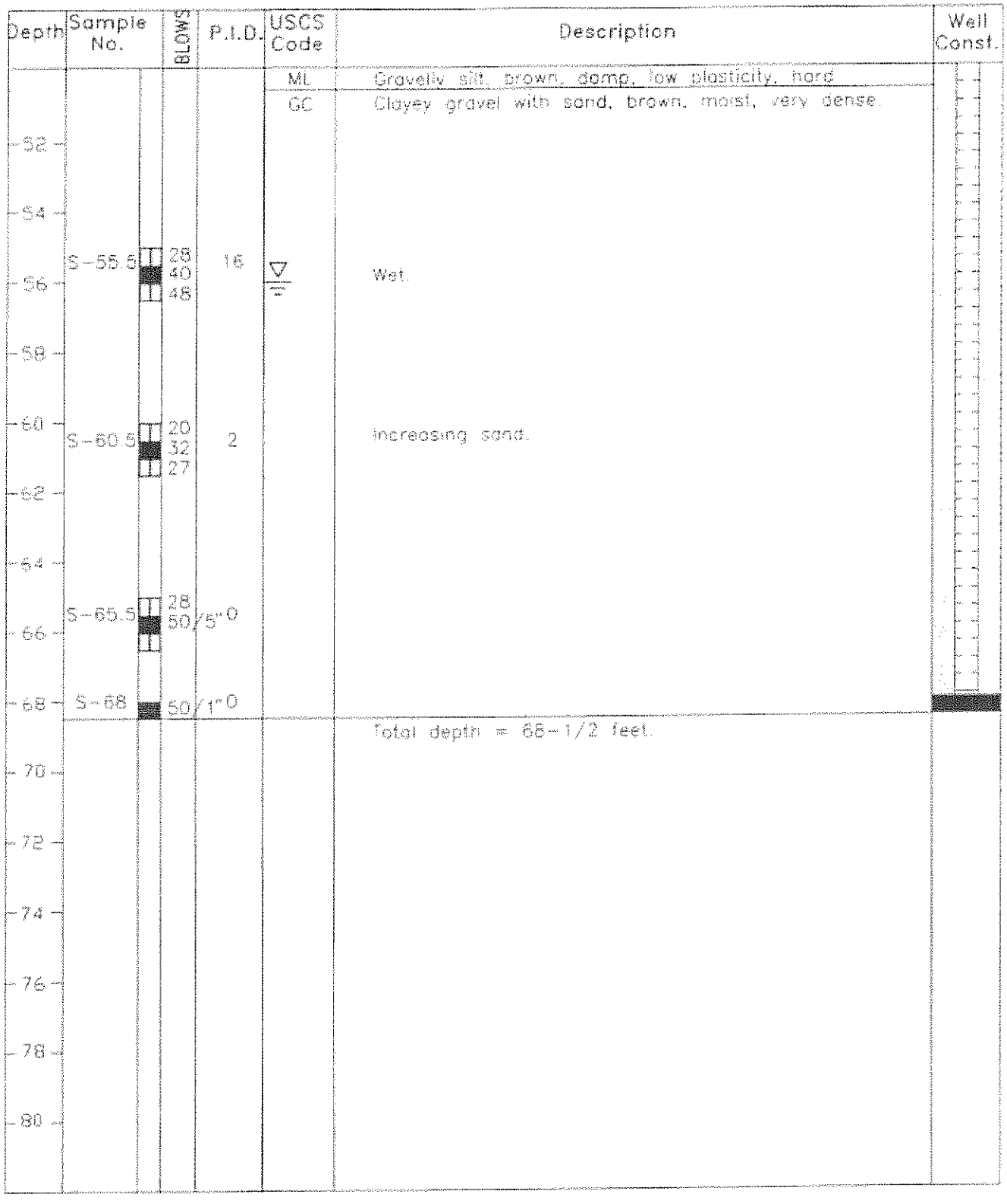
LOG OF BORING B-7/MW-7

ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 11



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LOG OF BORING B-7/MW-7
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE
12

Depth of boring: 46-1/2 feet Diameter of boring: 10 inches Date drilled: 06/15/92

Well depth: 45 feet Material type: Sch 40 PVC Casing diameter: 4 inches

Screen interval: 25 to 45 feet Slot size: 0.100-inch

Drilling Company: HEW Drilling Driller: Casto, Marcelino, and Louis

Method Used: Hollow-Stem Auger Field Geologist: Barbara Sieminski

Signature of Registered Professional

Registration No. RCE 044600 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
					Asphalt.	
0					Asphalt (4 inches).	
				GP	Sandy gravel, gray, dry, dense; baserock.	
				SM	Silty sand, brown, damp, loose.	
2				GW	Sandy gravel with cobbles, grayish-brown, damp, medium dense.	
4						
	S-5.5	8 11 8	0			
6						
8						
				CL	Sandy clay, dark brown, damp, low to medium plasticity, very stiff.	
10	S-10.5	7 8 10	0			
12						
				GW/GC	Sandy gravel with clay, brown, damp, dense.	
14						
	S-15.5	19 21 17	3			
16						
18						
20	S-20.5	13 19 23	572		Color change to gray; obvious product odor.	
					(Section continues downward)	

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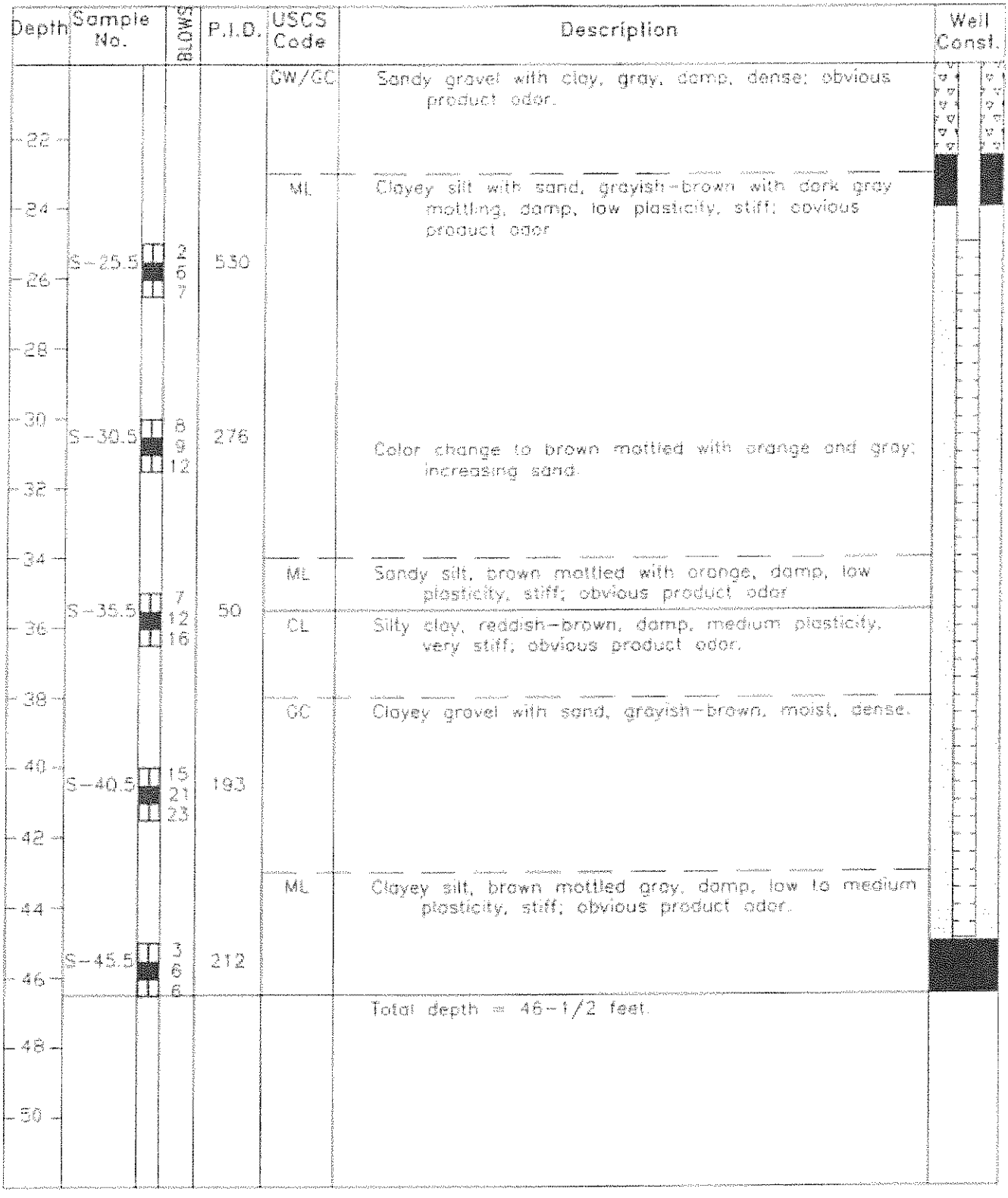
LOG OF BORING B-8/VW-1

ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 13



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LOG OF BORING B-8/VW-1

ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE
14

Depth of boring: 68-1/2 feet Diameter of boring: 10 inches Date drilled: 06/11/92

Well depth: 67 feet Material type: 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 Professional: [signature]

Registration No.: RCE 044600 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
					Asphalt.	
0					Asphalt (4 inches).	
				GP	Sandy gravel, gray, dry, dense; baserock.	
				SM	Silty sand with gravel, brown, damp, loose.	
2				GW	Sandy gravel with cobbles, grayish-brown, damp, medium dense.	
4						
6	S-5.5	5 10 15	0			
8	S-8.5	8 14 29	0			
10	S-10	8 12 9	0			
12						
14						
16	S-15.5	9 11 17	0	ML	Clayey silt, brown, damp, low to medium plasticity, very stiff	
18				ML	Sandy silt, brown mottled with orange, damp, low plasticity, very stiff.	
20	S-20.5	6 12 16	0		(Section continues downward)	

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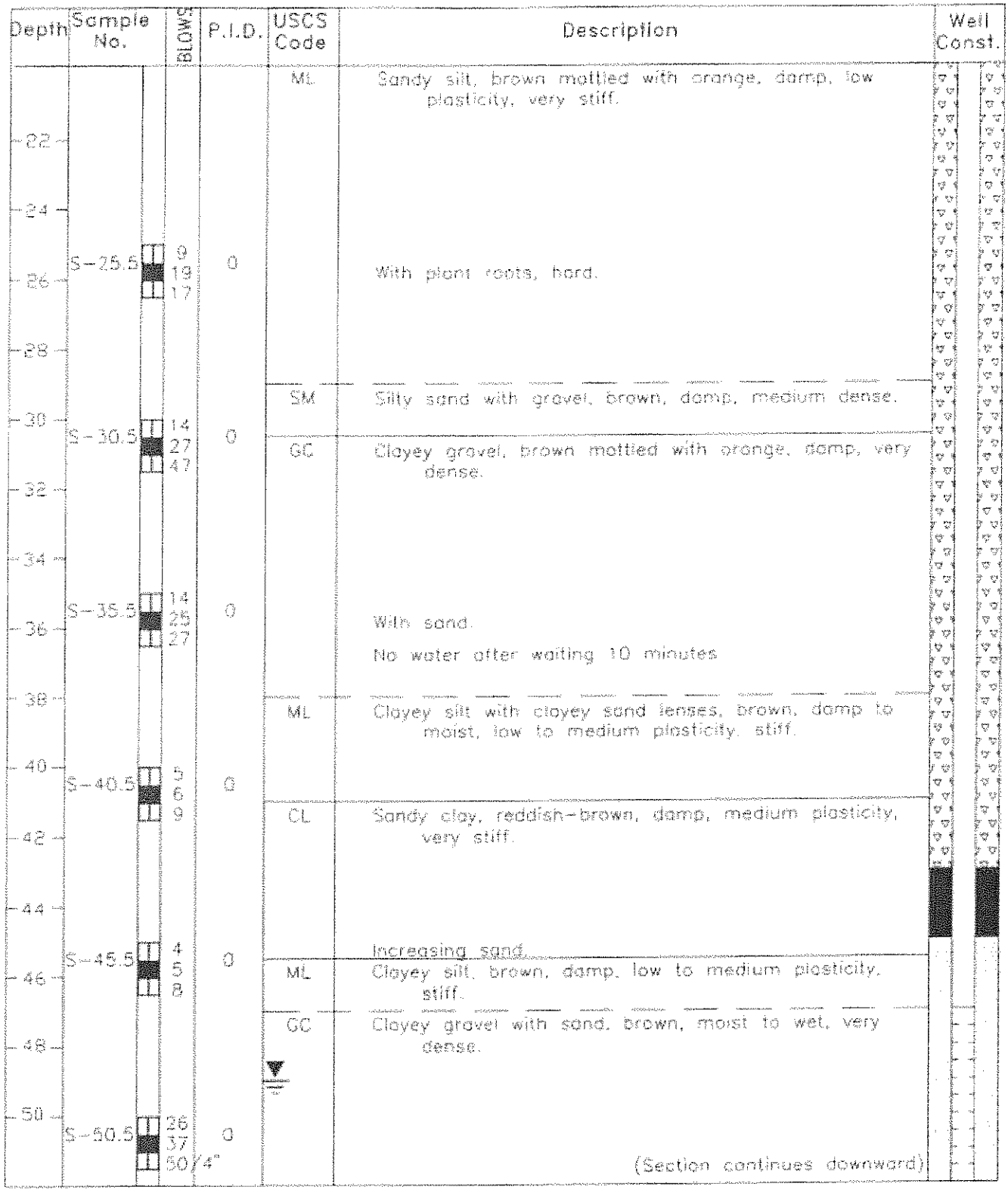
LOG OF BORING B-9/MW-8
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE
15



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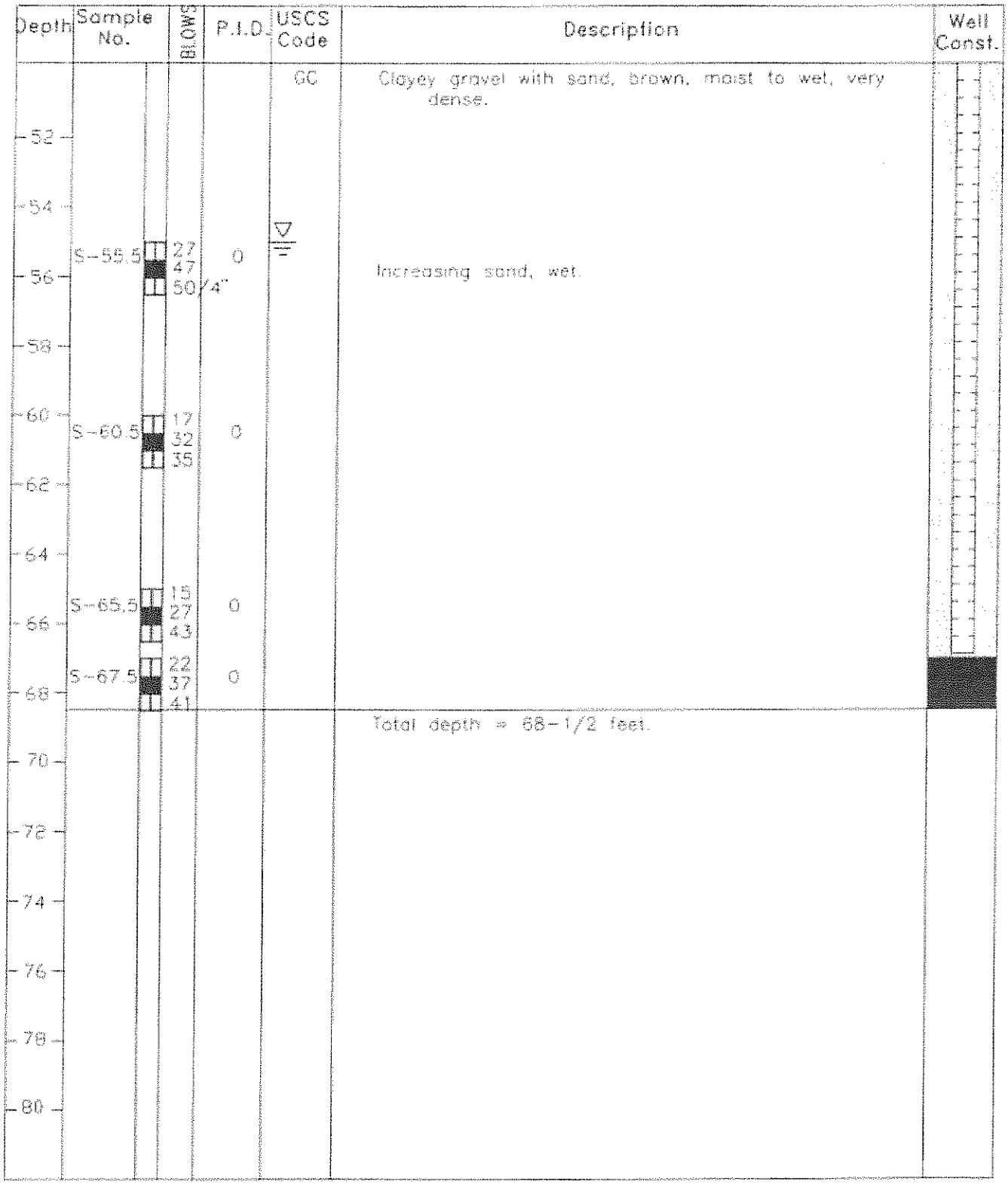
PROJECT 69028.07

LOG OF BORING B-9/MW-8

ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE
16



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LOG OF BORING B-9/MW-8

ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE
17

Depth of boring: 60-1/2 feet Diameter of boring: 8 inches Date drilled: 06/08/92

Well depth: N/A Material type: 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 Field Geologist: Barbara Sieminski

Signature of Registered Professional:

Registration No. RCE 044600 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
					Asphalt.	
0					Asphalt (4 inches).	
				GP	Sandy gravel, gray, dry, dense; baserock.	
2				SM	Silty sand with gravel, brown, damp, loose.	
				GW	Sandy gravel with cobbles, grayish-brown, damp, dense.	
4						
	S-5	8 15 16	0			
6						
8						
10	S-10	50 26 27	0		Very dense.	
12						
				ML	Clayey silt, brown, damp, low to medium plasticity, hard.	
14						
	S-15	10 15 18	0			
16						
18				ML	Sandy silt, brown mottled with orange, damp, low plasticity, very stiff.	
20	S-20	7 11 15	0			

(Section continues downward)

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LOG OF BORING B-10

ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 18

Depth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
22				ML	Sandy silt, brown mottled with orange, damp, low plasticity, very stiff.	
24						
	S-25	9 15 28	0		Increasing sand, trace gravel, hard.	
26						
28						
					Increasing gravel.	
30	S-30	10 17 30	0	GC	Clayey gravel with sand, brown mottled with orange, damp, dense.	
32						
34						
	S-35	13 16 23	0		Increasing sand, moist.	
36						
38				CL	Sandy clay, brown, damp to moist, low to medium plasticity, very stiff.	
	S-40	5 10 11	0			
40						
42						
44				ML	Clayey silt, brown, moist, low plasticity, stiff.	
	S-45	5 7 15	0	GC	Clayey gravel with sand, brown, moist, medium dense.	
46						
48				▼		
50	S-50	18 46 48	0		Increasing sand, moist to wet, very dense.	
					(Section continues downward)	

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LOG OF BORING B-10

ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE
19

Depth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
52				GC	Clayey gravel with sand, brown, moist to wet, very dense.	
54	S-55	27 47 50/4"	0			
56						
58					Wet.	
60	S-60	50 30 38	0			
					Total depth = 60-1/2 feet.	
62						
64						
66						
68						
70						
72						
74						
76						
78						
80						

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LOG OF BORING B-10

ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 20

Depth of boring: 71-1/2 feet Diameter of boring: 10 inches Date drilled: 06/12/92

Well depth: 68 feet 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: Costa, Marcelino, and Louis

Method Used: Hollow-Stem Auger Field Geologist: Barbara Sieminski

Signature of Registered Professional:

Registration No.: RCE 044600 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
					Asphalt.	
0					Asphalt (4 inches).	
				GP	Sandy gravel, gray, dry, dense; baserock.	
2				SM	Silty sand, dark brown, damp, loose.	
				GW	Sandy gravel with cobbles, grayish-brown, damp, very dense.	
4						
6	S-5.5	17 21 25	0			
8						
10	S-10.5	5 6 7	0	CL	Sandy clay, trace gravel, dark brown, damp, medium plasticity, stiff.	
12						
14				ML	Clayey silt with sand, trace gravel, brown mottled with orange, damp, low plasticity, hard.	
16	S-15.5	9 17 19	0			
18				ML	Sandy silt, grayish-brown, damp, low plasticity, very stiff.	
20	S-20.5	7 9 14	0		(Section continues downward)	

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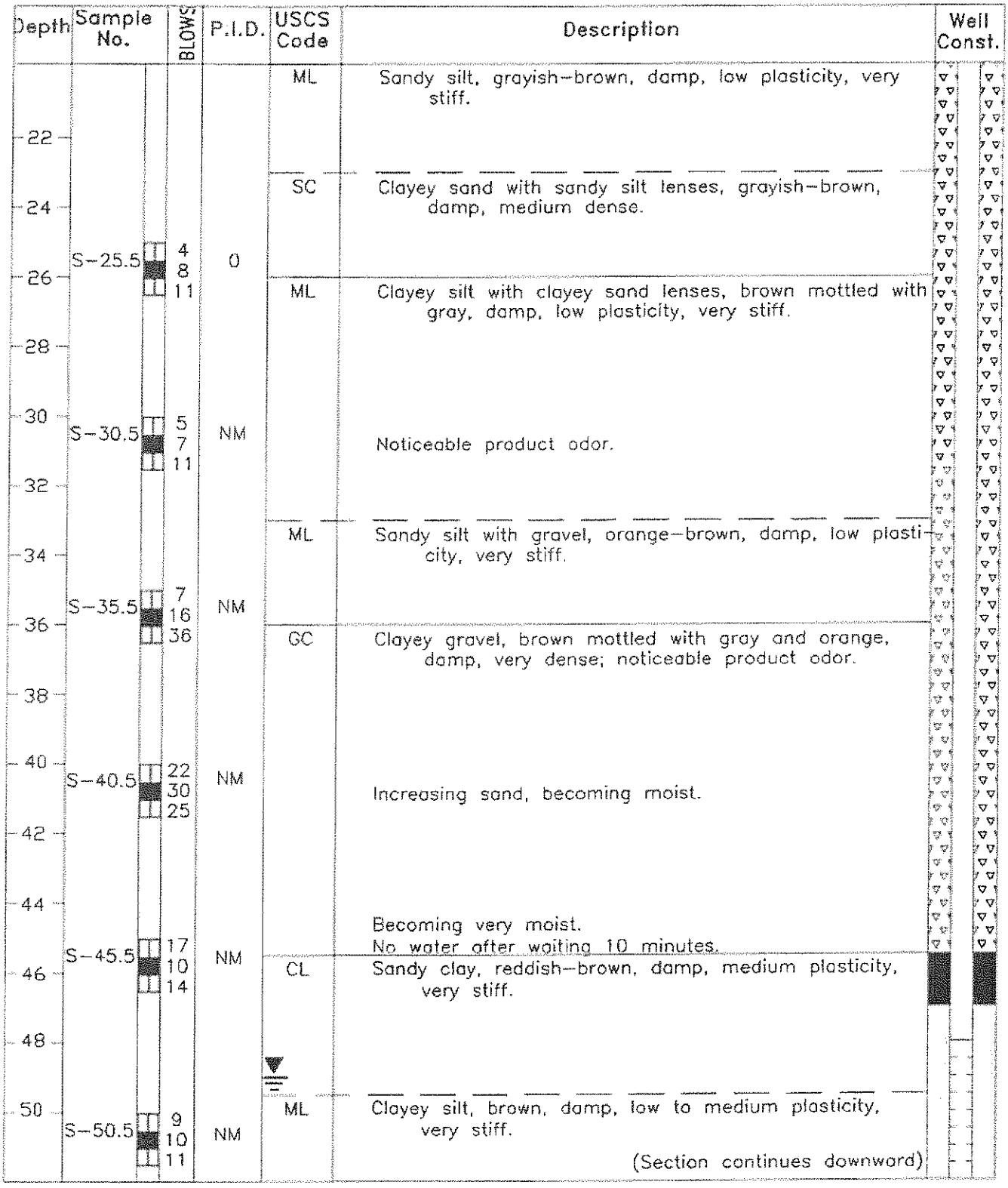
LOG OF BORING B-11/MW-9
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE
21



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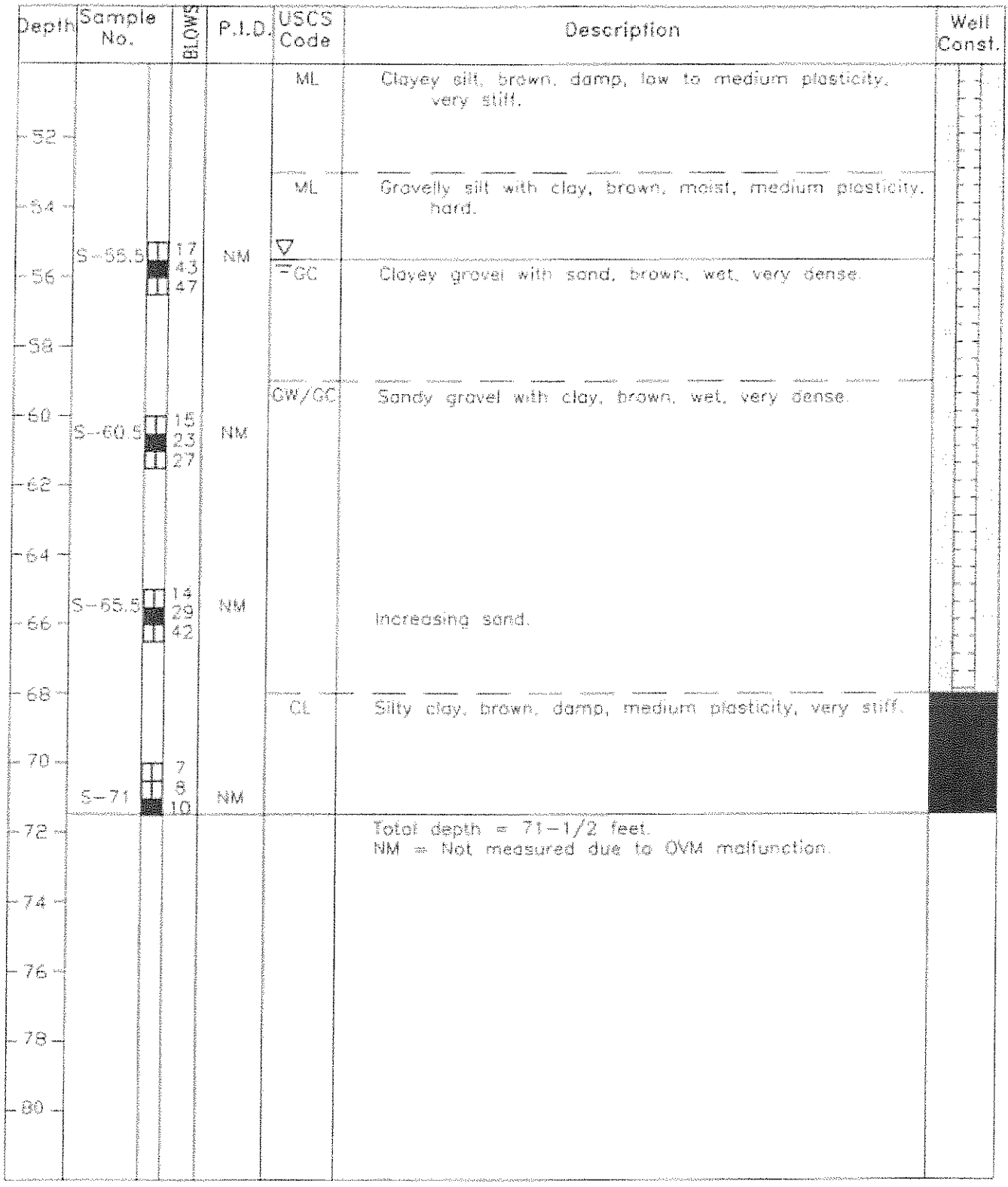
LOG OF BORING B-11/MW-9

ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE
22



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LOG OF BORING B-11/MW-9

ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 23

Depth of boring: 51 feet Diameter of boring: 12 inches Date drilled: 08/04/92

Well depth: 49-1/2 feet Material type: Sch 40 PVC Casing diameter: 4 inches

Screen interval: 28 to 49-1/2 feet Slot size: 0.100-inch

Drilling Company: Exploration Geoservices Driller: Dave and Fred

Method Used: Hollow-Stem Auger Field Geologist: Barbara Sieminski

Signature of Registered Professional

Registration No. RCE 044600 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
					Asphalt (4 inches).	
0				GP	Sandy gravel, gray, damp, dense; baserock.	
				GW-GM	Sandy gravel with silt and cobbles, brown, damp, dense; cobbles up to 4 inch diameter.	
2						
4						
	S-5	13 16 19	0			
6						
8						
10	S-10	30 18 31	0			
12						
14				GC	Clayey gravel with sand, brown with gray mottling, damp, very dense.	
	S-15	13 50/3"	0			
16				CL	Sandy clay, brown, damp, low plasticity, stiff.	
18				GW-GC	Sandy gravel with clay, brown, damp, very dense.	
20	S-20	18 28 32	4			
					(Section continues downward)	

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LOG OF BORING B-12/VW-2
ARCO Station 1319
785 East Stanley Boulevard
Livermore, California

PLATE
24

Depth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
22				GW-GC	Sandy gravel with clay, brown, damp, very dense.	
24				SC	Clayey sand, brown mottled gray, damp, medium dense.	
	S-25	5 7 8	3	CL	Sandy clay with clayey sand lenses, brown mottled gray, damp, low plasticity, stiff.	
28				ML	Clayey silt with sand, brown mottled gray, damp, low plasticity, hard.	
30	S-30	13 18 22	2			
32				ML	Gravelly silt with sand and clay, orange-brown mottled gray, damp, low plasticity, hard; obvious product odor.	
34						
36	S-35	11 16 20	46			
38				GC	Clayey gravel with sand, brown mottled with gray, moist, very dense; obvious product odor.	
40	S-40	18 24 30	1416			
42						
44				CL	Gravelly clay, orange-brown, damp, low plasticity, hard; obvious product odor.	
	S-45	8 14 25	46			
48						
50	S-50	8 14 18	96		Decreasing gravel.	
					Total depth = 51 feet	

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LOG OF BORING B-12/VW-2

ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 25

Total depth of boring:	24 feet	Casing diameter:	4 inches
Diameter of boring:	12 inches	Casing material:	Sch 40 PVC
Date drilled:	6-16-93	Slot size:	0.10-inch
Drilling Company:	Exploration Geoservices	Sand size:	3/8" pea gravel
Driller:	John	Screen Interval:	15-1/2 feet to 24 feet
Drilling method:	Hollow-Stem Auger	Field Geologist:	Zbigniew Ignatowicz

Signature of Registered Professional: _____

Registration No.: CEG 1463 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
2					Pea gravel backfill.	
4						
6		6 8 8				
8						
10		7 9				
12	S-11	10 8 18 25 26	10.5	ML	Gravelly silt, dark olive-gray, damp, low plasticity, very stiff to hard; fine gravel ~10%.	
14		50/6 25 45 52	14.3 21.8		Fine gravel, color change to dark greenish-gray; rootlets.	
16	S-16	50/6 14 30 47	26.2	GW	Sandy gravel, coarse-grained sand, fine gravel, greenish-gray, damp, very dense.	
18		50/6 50/6	373			
20	S-20.5	50/6 50/6	1096			
22					Silty clay, ~10% fine-grained sand, olive-brown, moist, low to medium plasticity, hard.	
24	S-23.5	22 27	2800	CL	Total Depth = 14 feet.	
26						
28						
30						
32						
34						
36						
38						
40						

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LOG OF BORING B-13/VW-3
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 4

Total depth of boring:	31 feet	Casing diameter:	4 inches
Diameter of boring:	12 inches	Casing material:	Sch 40 PVC
Date drilled:	6-16-93	Slot size:	0.10-inch
Drilling Company:	Exploration Geoservices	Sand size:	3/8" pea gravel
Driller:	John	Screen Interval:	17 feet to 30 feet
Drilling method:	Hollow-Stem Auger	Field Geologist:	Zbigniew Ignatowicz

Signature of Registered Professional: _____

Registration No.: CEG 1463 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
					Pea gravel backfill.	
2				GW	Sandy gravel, coarse-grained sand, fine to coarse gravel, dark brown, damp, very dense.	
4						
6	S-5.5	30 50				
8						
10		15		CL/CH	Silty clay, very dark grayish-brown, damp, medium to high plasticity, hard.	
12	S-11	24 26	129			
14		6				
	S-14.5	9 9	49.8		Moist, yellow-orange oxidation stains.	
16						
	S-17	50/0	45.6	GW	Sandy gravel, dark gray, moist, very dense.	
18						
20						
22						
	S-23	50/3		▽	Wet.	
24						
26						
		23				
28	S-28	25 18	2570	SC	Clayey sand, fine-grained, dark olive-gray, wet, dense.	
				CL	Silty clay, olive, moist, medium plasticity, stiff.	
30		12				
	S-30.5	18	230			
32					Total Depth = 31 feet.	
34						
36						
38						
40						

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PROJECT: 69028.07

LOG OF BORING B-14/VW-4
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 5

Total depth of boring:	31-1/2 feet	Casing diameter:	NA
Diameter of boring:	12 inches	Casing material:	NA
Date drilled:	6-16-93	Slot size:	NA
Drilling Company:	Exploration Geoservices	Sand size:	NA
Driller:	John	Screen Interval:	NA
Drilling method:	Hollow-Stem Auger	Field Geologist:	Zbigniew Ignatowicz

Signature of Registered Professional:

Registration No.: CEG 1463 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const
					Steel box.	
2				GW	Sandy gravel, grayish-brown, slightly damp, dense.	
4						
6	S-6	15 21 29	6.1			
8						
10	S-10.5	25 50/6	7.0			
12						
14				ML	Sandy silt, with some gravel, dark grayish-brown, damp, low plasticity, hard.	
16	S-15.5	27 50/3	17.8			
18				CL	Gravelly clay, olive, damp, medium plasticity, hard.	
20	S-20.5	35 50/2	21 4			
22						
24				CL	Sandy clay, dark greenish-gray, very moist, medium plasticity, hard.	
26	S-26	11 18 25	34.2			
28						
30	S-31	13 31 18	28.6			
32					Total Depth = 31-1/2 feet.	
34						
36						
38						
40						

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PROJECT: 69028.07

LOG OF BORING B-15
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 6

Depth of boring: 54 1/2 feet Diameter of boring: 10 inches Date drilled: 03/24/93

Well depth: 52 feet Material type: Sch 40 PVC Casing diameter: 4 inches

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 Professional:

Registration No.: CEG 1463 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
0					Asphalt (3 inches)	
				GP	Sandy gravel, gray, damp, dense; baserock	
2				SP	Sandy, medium- to coarse-grained, brown, damp, dense.	
4				GP	Sandy gravel, brown, damp, very dense.	
6	S-5.5	34 50/6"	3			
8						
10		50/5"			With cobbles.	
12						
				ML	Clayey silt with sand, light brown mottled orange, damp, low plasticity, hard.	
14						
16	S-15.5	24 50/4"	5	GW-GC	Sandy gravel with clay, brown, damp, very dense.	
18						
20	S-20	50/5"	5		Increasing clay.	

(Section continues downward)

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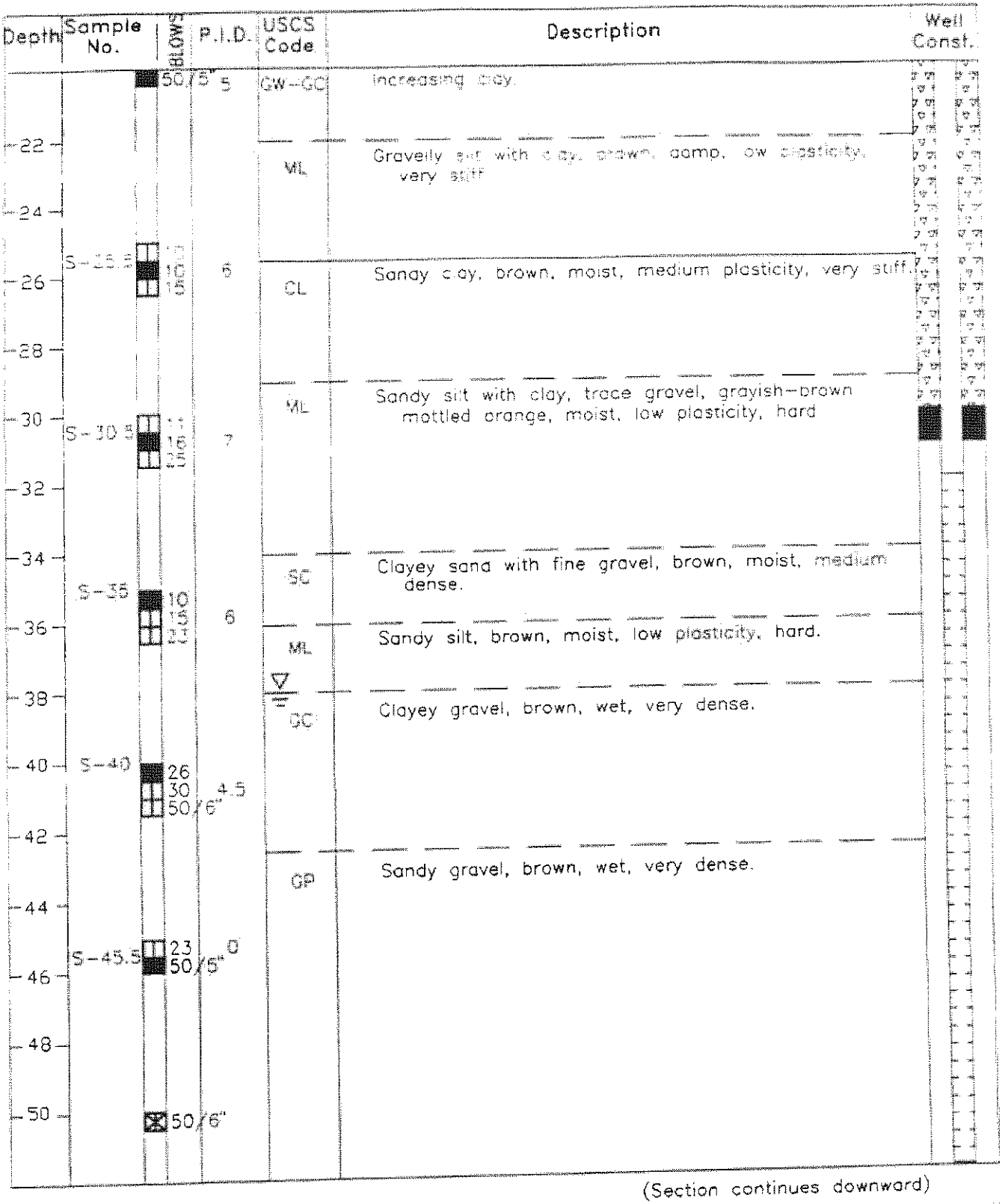
LOG OF BORING B-17/MW-10

ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 4



(Section continues downward)

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LOG OF BORING B-17/MW-10

ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 5

PROJECT 69028.11

Depth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
52				GP	Sandy gravel, brown, wet, very dense.	
54	S-54	50/4"				
					Total depth = 54 1/2 feet.	
56						
58						
60						
62						
64						
66						
68						
70						
72						
74						
76						
78						
80						

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LOG OF BORING B-17/MW-10

ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 6

Depth of boring: 47 1/2 feet Diameter of boring: 8 inches Date drilled: 03/23/93

Well depth: 45 feet Material type: Sch 40 PVC Casing diameter: 2 inches

Screen interval: 38 to 45 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 Professional:

Registration No.: CEG 1463 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
0						
				GW-GC	Sandy gravel with clay, damp, brownish-gray, very dense	
4				GC	Clayey gravel with sand, brown, damp, very dense	
	S-5	21 25 25	0	GW-GC	Sandy gravel with clay and cobbles, dark brown, damp, very dense; gravel up to 3" diameter.	
10	S-10	31 33 31	0		Decreasing clay; color change to grayish-brown.	
15	S-15	48 33 35	2			
				ML	Clayey silt with sand, trace fine gravel, light brown mottled gray, damp, low plasticity, hard.	
20	S-20	16 36 50/5"	0			

(Section continues downward)

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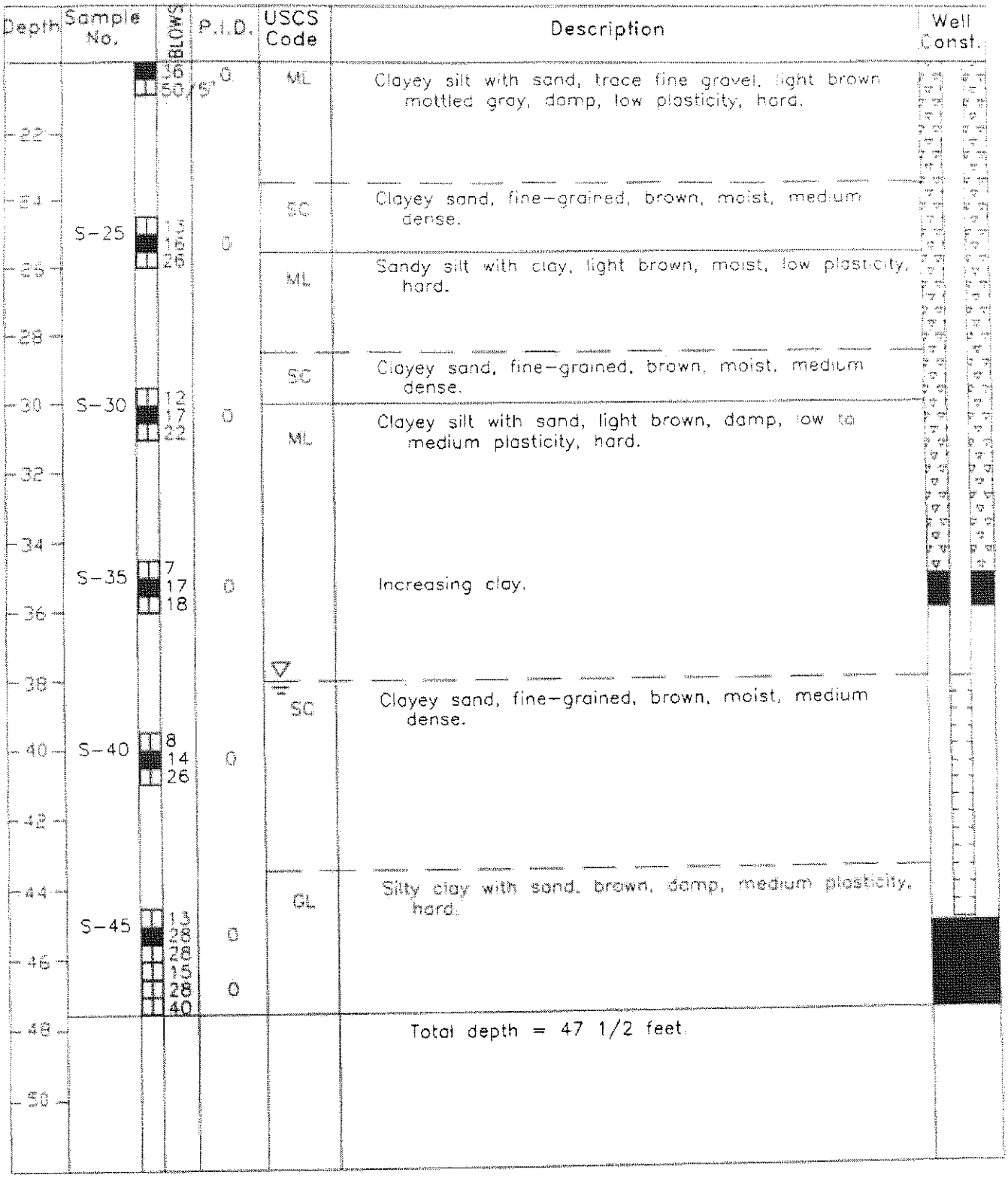
LOG OF BORING B-18/MW-11

ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 7

PROJECT: 69028.11



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PROJECT 69028.11

LOG OF BORING B-18/MW-11

ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 8

Depth of boring: 37 1/2 feet Diameter of boring: 8 inches Date drilled: 03/23/93

Well depth: 34 1/2 feet 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 Field Geologist: Barbara Sieminski

Signature of Registered Professional:

Registration No.: CEG 1463 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
0				GW	Sandy gravel, brown, damp, very dense.	
4		23 25 30	0	GC	Clayey gravel, dark brown, damp, very dense.	
6				GW-GC	Sandy gravel with clay, damp, very dense.	
10	S-10	11 16 21	0	CL	Sandy clay, trace fine gravel, brown, damp, medium plasticity, hard.	
12				ML	Gravelly silt with sand, grayish-brown, damp, low plasticity, hard.	
14	S-15	15 18 22	0			
18				GW-GC	Sandy gravel with clay, brown, moist, very dense.	
20		50/3"	0			

(Section continues downward)

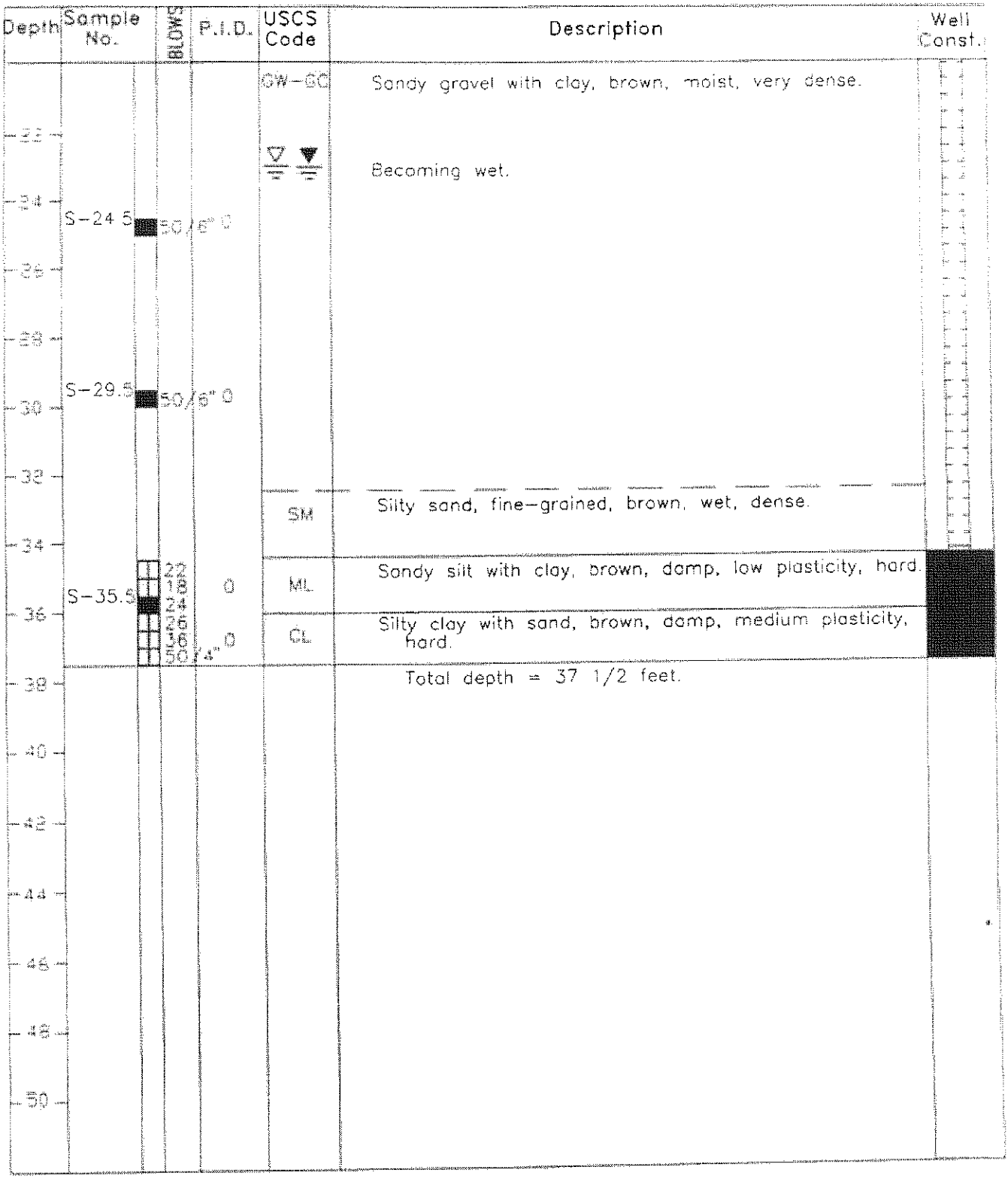
RESNA
Working to Restore Nature

PROJECT: 69028.11

LOG OF BORING B-19/MW-12

ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 9



RESNA
Working to Restore Nature

PROJECT 69028.11

LOG OF BORING B-19/MW-12

ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

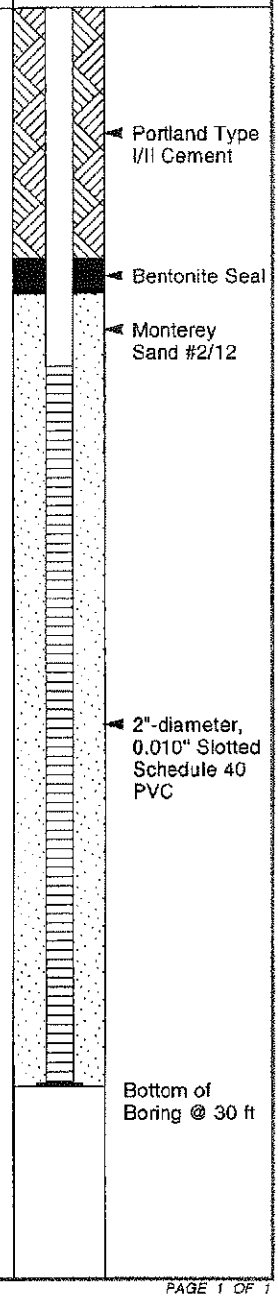
PLATE
10

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

BORING/WELL LOG

CLIENT NAME	ARCO	**BORING/WELL NAME**	MW-13
JOB/SITE NAME	ARCO 6113	**DRILLING STARTED**	09-Nov-01
LOCATION	785 East Stanley Blvd., Livermore	**DRILLING COMPLETED**	09-Nov-01
PROJECT NUMBER	438-1611	**WELL DEVELOPMENT DATE (YIELD)**	NA
DRILLER	V&W Drilling	**GROUND SURFACE ELEVATION**	
DRILLING METHOD	Hollow-stem auger	**TOP OF CASING ELEVATION**	NA
BORING DIAMETER	8"	**SCREENED INTERVAL**	10 to 30 ft bgs
LOGGED BY	Matt Meyers	**DEPTH TO WATER (First Encountered)**	13.0 ft (09-Nov-01)
REVIEWED BY	Ron Scheele	**DEPTH TO WATER (Static)**	NA
REMARKS	Hand Augered to 5' below ground surface.		

PID (ppm)	TPHg (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (ft bgs)
								CONCRETE	0.6
								FILL: Medium gray; moist; dense; 40% sand, 60% gravel; very high estimated permeability; 10% cobbles.	
NA		50/6"	MW-13 -5.0		5	GW		**Sandy GRAVEL** (GW): Medium gray; very dense; moist; 10% clay, 40% sand, 50% gravel; high estimated permeability; some large gravels.	5.0
									7.5
NA		7 4 6	MW-13 -10.0		10	ML		**Sandy SILT** (ML): Dark gray-brown; medium dense; damp; 10% gravel, 15% sand, 75% silt; low estimated permeability.	
								▽	13.0
NA		50/6"	MW-13 -15.0		15	SM		**Silty SAND** (SM): Dark gray-brown; very dense; saturated; 10% silt, 90% sand; high estimated permeability.	
									17.5
NA		3 7 9	MW-13 -20		20	ML		**Clayey SILT** (ML): Olive-gray; stiff; saturated; 25% clay, 75% silt; low plasticity; low estimated permeability; iron-oxide staining.	
NA		3 7 10	MW-13 -25		25			@ 28' very stiff; 2% coarse sand, 2% gravel to 2-inch diameter.	
NA		6 15 45	MW-13 -30		30			@ 30' mottled; hard; 15% clay; 85% silt; iron-oxide staining.	30.5



WELL LOG (PID/TPHG) H:\ARCO\6113\ARCO6113.GPJ DEFAULT.GDT 2/15/02

BROADBENT & ASSOCIATES, INC.
ENGINEERING, WATER RESOURCES & ENVIRONMENTAL

LITHOLOGIC AND MONITOR WELL CONSTRUCTION LOG

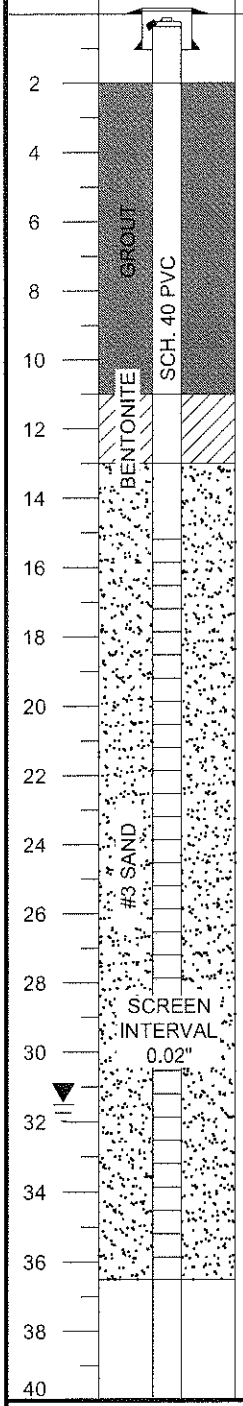
PROJECT NAME: ARCO 6113 | SITE ADDRESS: 785 E. Stanley Blvd. Livermore, CA

PROJECT NUMBER: 06-82-637 | LEGAL DESC: | APN:

LOGGED BY: Eric Farrar | FACILITY ID OR WAIVER: | NOI NUMBER:

DATE: 3/11/2010 | START: 1045 | DRILLING COMPANY: Cascade | DRILLER: Tory Salazer

WELLID: RMW-13 | STOP: 1345 | DRILLING METHOD: Hollow Stem Auger | SAMPLE METHOD: Split Spoon



SAMPLE ID	PID	MOISTURE	COLOR	CONSISTENCY	GRAIN SIZE CLASSIFICATION	REMARKS & ODORS
RMW13@ 14.5-15.0	7.1 ppm	Damp	Gray -green		Silty sand with gravel to ½", iron oxide staining	
RMW13@ 21.0-21.5	1,052 ppm	Moist	Lt. brown to brown	Soft	Silty clay with little gravel to ½", lt.brown to brown, clay 30% chert with some sand at 20'	
RMW13@ 25.5-26.0	150 ppm	Damp	Lt. brown to brown /gray	Stiff	Silty clay, clay to 90%	
RMW13@ 31.0-31.5	87.8 ppm		Brown /gray	Soft	Silt with some clay, fine, clay to 40%, iron oxide staining	
	335 ppm		Iron oxide with gray	Semi-loose	Silty sand, poorly sorted, fine to ¼", weathered	

TOTAL BORING DEPTH: 36.5' | PAGE NO: 1 OF 1 | ESTIMATED GROUND WATER DEPTH: 31.15'

APPENDIX D

Soil Vapor Extraction Pilot Testing Data

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

Influent Air Stream from VW-1					Observation Wells					
Flow	% LEL	Applied Vacuum	$\%O_2$	Elapsed Time (min)	VW-2 Induced Vacuum	MW-4 Induced Vacuum	MW-5 Induced Vacuum	MW-6 Induced Vacuum	MW-7 Induced Vacuum	MW-9 Induced Vacuum
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
Distance from well VW-1 (feet):					54.5	37.11	74.9	65.7	38.7	48
Screen Interval (feet):					28-49.5	21-27	43-63	48-68	48-68	48-68
Depth to Water (DTW, feet):					Dry	Dry	57.2	56.9	56.9	57.8

Vapor extraction well VW-1 screened from 26 to 45 feet. DTW - Dry

Influent Air Stream from MW-5					Observation Wells					
Flow	% LEL	Applied Vacuum	$\%O_2$	Elapsed Time (min)	VW-1 Induced Vacuum	VW-2 Induced Vacuum	MW-4 Induced Vacuum	MW-6 Induced Vacuum	MW-7 Induced Vacuum	MW-9 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
Distance from well MW-5 (feet):					74.9	31.5	45	47.1	74	88
Screen Interval (feet):					26-45	28-49.5	21-27	48-68	48-68	48-68
Depth to Water (DTW, feet):					Dry	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.

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

Influent Air Stream from VW-2					Observation Wells					
Flow	% LEL	Applied Vacuum	$\%O_2$	Elapsed Time (min)	VW-1 Induced Vacuum	MW-3 Induced Vacuum	MW-4 Induced Vacuum	MW-5 Induced Vacuum	MW-6 Induced Vacuum	MW-7 Induced 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
* 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
Distance from well VW-2 (feet):					54.5	59.4	18.11	31.5	58.5	66.7
Screen Interval (feet):					26-45	25-40	21-27	43-63	48-68	48-68
Depth to Water (DTW, feet):					Dry	Dry	Dry	57.2	56.9	56.9

Vapor extraction well VW-2 screened from 28 to 49.5 feet. DTW - Dry
*The I.C. engine operation sputtered at applied vacuums higher than 50" W.C. on VW-2.

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.

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	B	T	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/m^3).
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

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

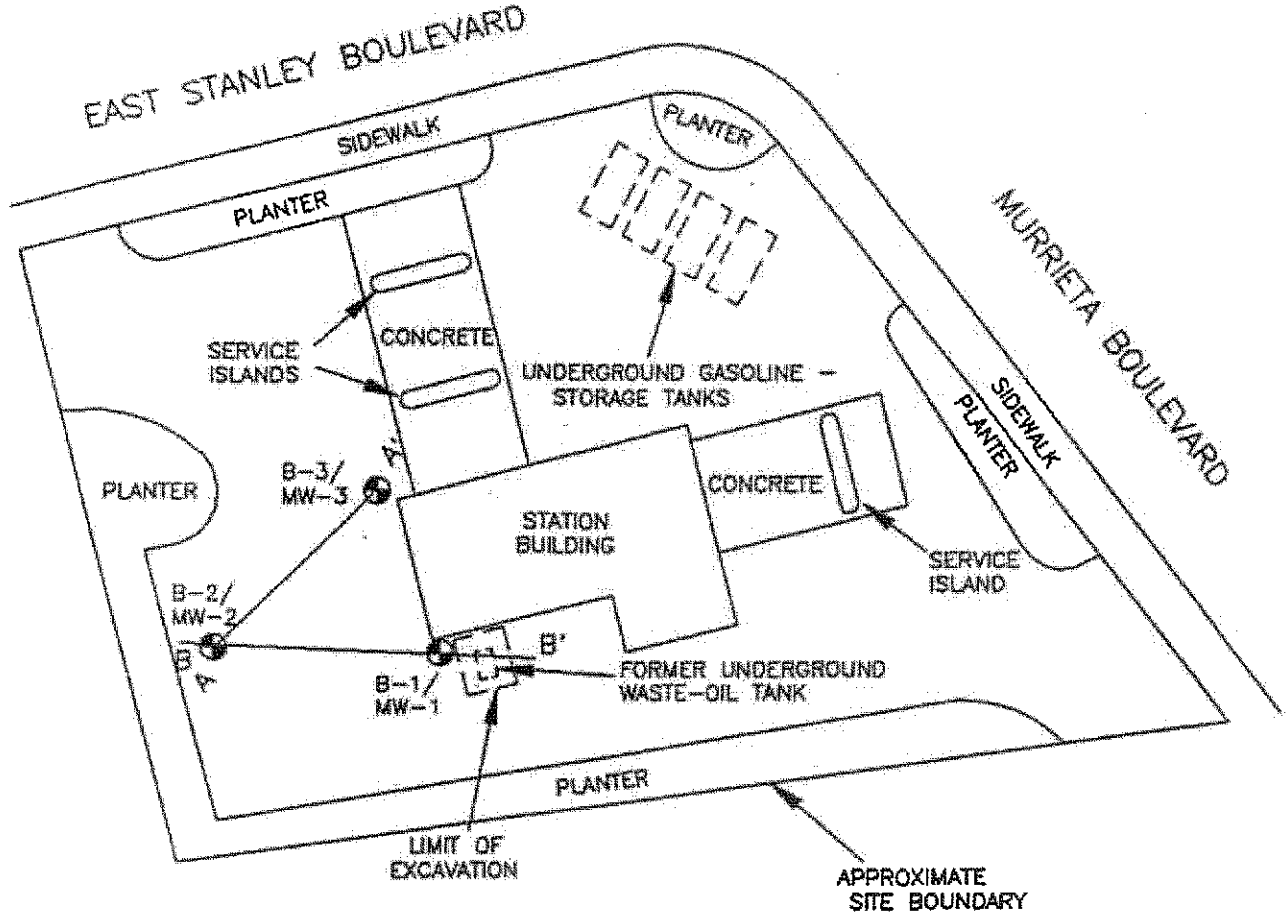
Vapor Well	Elapsed Time	Applied Vacuum	Air Flowrate	Initial TPHg Vapor Concentration	Projected TPHg Removal Rate	Estimated ROI
VW-1	35 min	50	46 scfm	45,000 mg/m^3	186.0 lb/day	15 to 20
VW-2	30 min	50	48 scfm	52,000 mg/m^3	220 lb/day	15 to 20
VW-2	120 min	50	48 scfm	37,000 mg/m^3	160.0 lb/day	15 to 20
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.
scfm = Air flowrate measured in standard cubic feet per minute.
mg/m^3 = 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.

$$\text{TPHg removal rate} = \text{air flowrate (ft}^3\text{/min)} \times \text{Air concentration (mg/m}^3\text{)} \times \frac{[1440 \text{ min/day}] \times [0.02832 \text{ m}^3\text{/ft}^3]}{454{,}000 \text{ mg/lb}}$$

APPENDIX E

Geologic Cross-Sections



A — A' = Cross section

B-3/MW-3 = Boring/monitoring well

N

Approximate Scale

40 20 0 40 80

feet

Source: Modified from plan supplied by ARCO

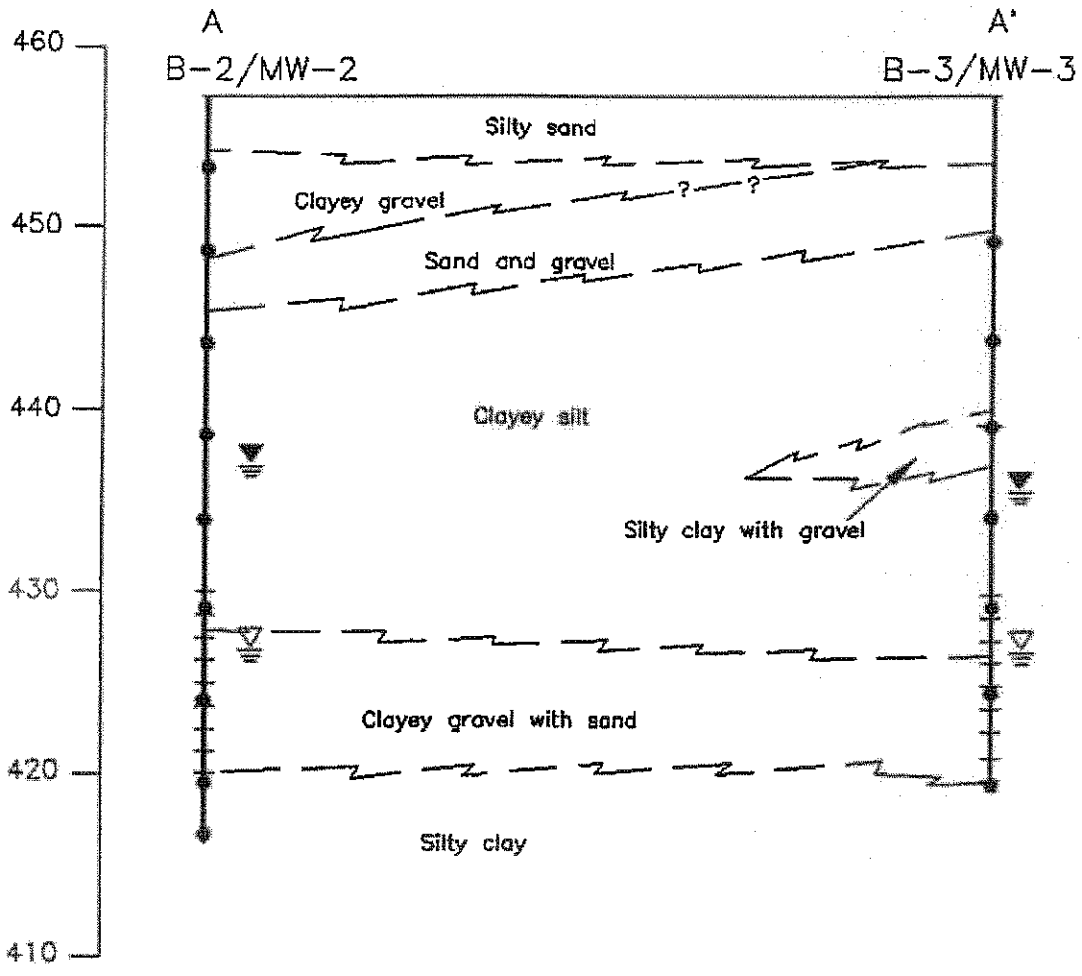
Applied GeoSystems

PROJECT NO. 69028-2

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

PLATE

P - 2



= Soil sample

= Well casing

= Well screen

= Boring

= Initial water level in boring

= Static water level in well

Approximate Horizontal and Vertical Scale

10 5 0 10 20

feet

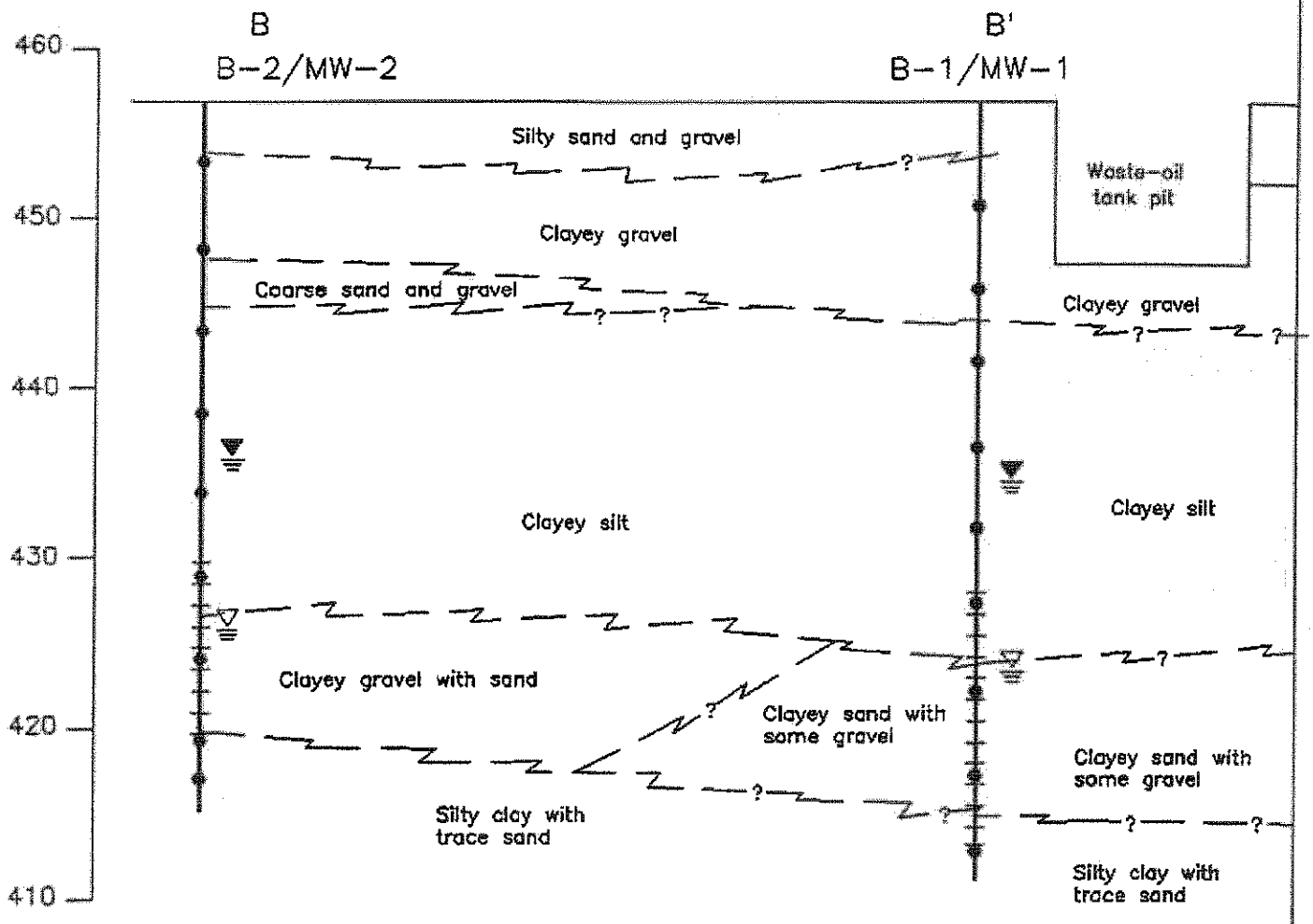
Applied GeoSystems

PROJECT NO. 69028-2

GEOLOGIC CROSS SECTION A-A'
ARCO Service Station No. 6113
785 East Stanley Boulevard
Livermore, California

PLATE

P - 10



= Soil sample

= Well casing

= Well screen

= Boring

= Initial water level in boring

= Static water level in well

Approximate Horizontal and Vertical Scale

10 5 0 10 20

feet

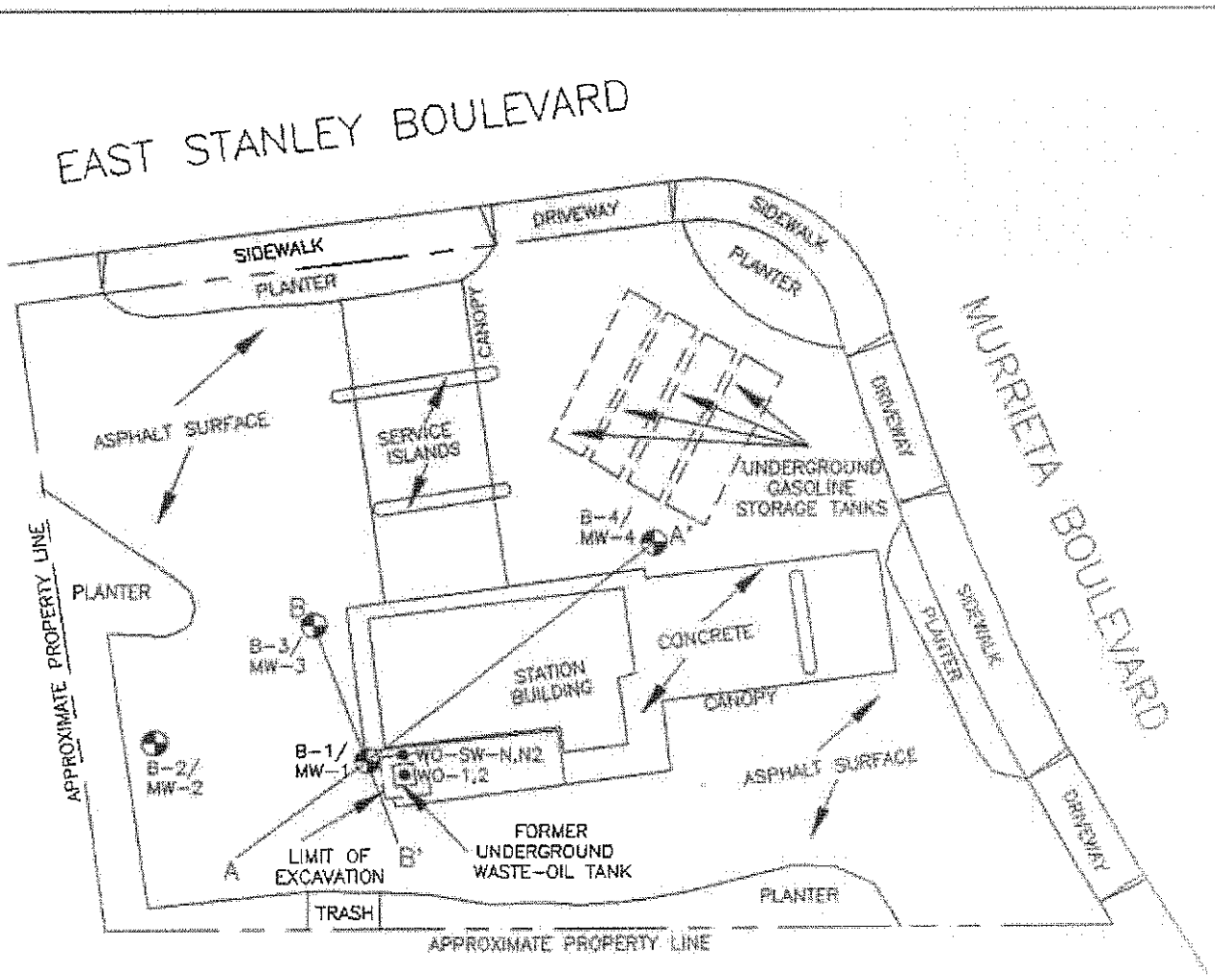
Applied GeoSystems

PROJECT NO. 69028-2

GEOLOGIC CROSS SECTION B-B'
ARCO Service Station No. 6113
785 East Stanley Boulevard
Livermore, California

PLATE

P - 11



N

Approximate Scale

40 20 0 40 80

feet

EXPLANATION

WO-SW-N,N2 = Soil sample collected by Pacific (1989)

B-4/MW-4 = Boring/monitoring well (Applied GeoSystems, September 1989 and February 1991)

B — B' = Geologic cross sections

Source: Modified from plan supplied by Ron Archer, Civil Engineer Inc., October 1988.

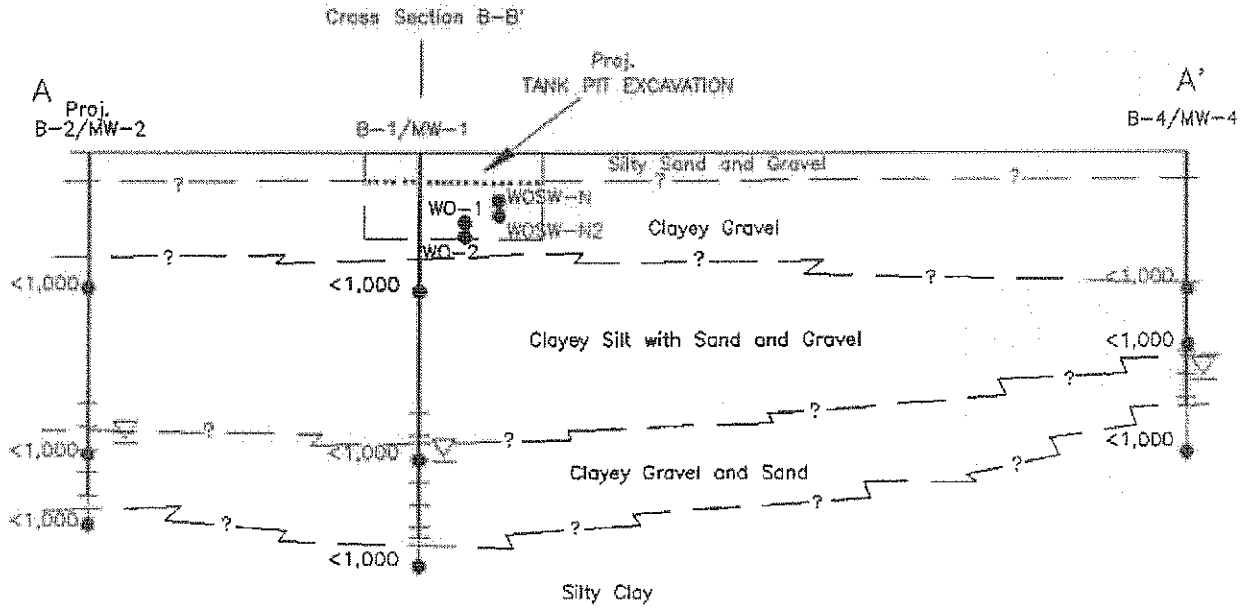
Applied GeoSystems

PROJECT: 69028-4

GENERALIZED SITE PLAN
ARCO Service Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE

2



EXPLANATION

<1,000 = Laboratory analyzed soil samples showing concentration of TPHg in parts per million

= Well casing

= Well screen

= Boring

= Initial water level in boring

= Static water level in well (March 20, 1991)

Approximate Horizontal and Vertical Scale

20 10 0 20 40

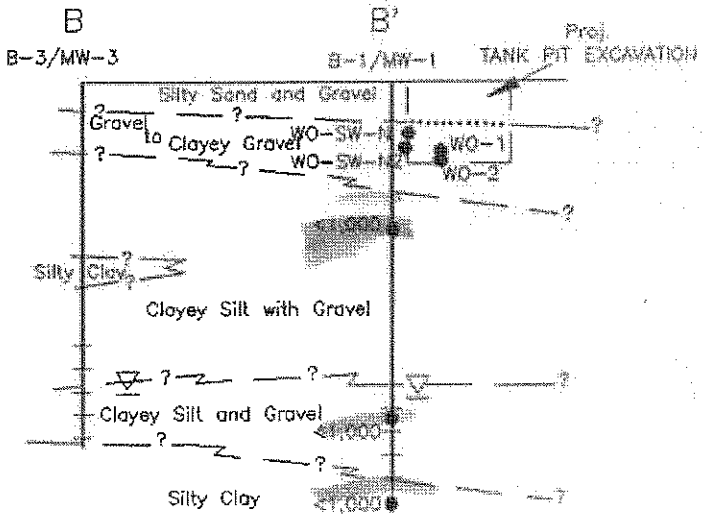
feet

Applied GeoSystems

PROJECT 69028-4

GEOLOGIC CROSS SECTION A-A'
ARCO Service Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 6



EXPLANATION

<1,000 = Laboratory analyzed soil sample showing concentration of TPHg in parts per million

= Well casing

= Well screen

= Boring

= Initial water level in boring

= Static water level in well (March 20,1991)

Approximate Horizontal and Vertical Scale

20 10 0 20 40

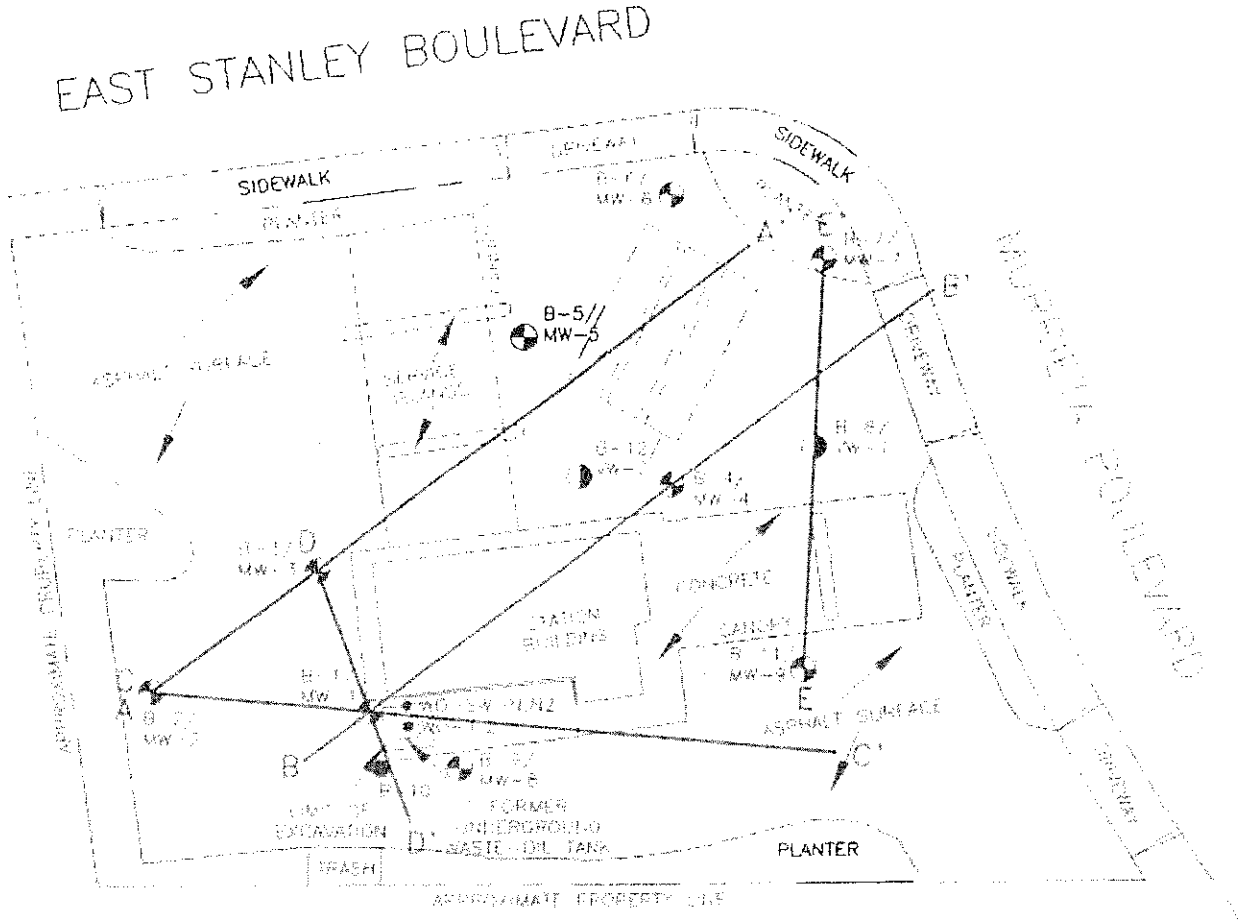
feet

Applied GeoSystems

PROJECT 69028-4

GEOLOGIC CROSS SECTION B-B'
ARCO Service Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 7



EXPLANATION

B-11/MW-9 = Boring/monitoring well (RESNA, 09/89, 02/91, and 06/92)

B-12/VW-2 = Boring/vapor extraction well (RESNA, 06/92)

B-10 = Boring (RESNA, 06/92)

WO-SW-N,N2 = Soil sample collected by Pacific (1989)

E — E' = Geologic cross section

= Existing gasoline-storage tanks

N

Approximate Scale

40 20 0 40 80

feet

Source: Modified from plan supplied by Ron Archer, Civil Engineer Inc., October 1988.

RESNA
Working to Restore Nature

PROJECT: 69028.07

GENERALIZED SITE PLAN
ARCO Service Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE
2

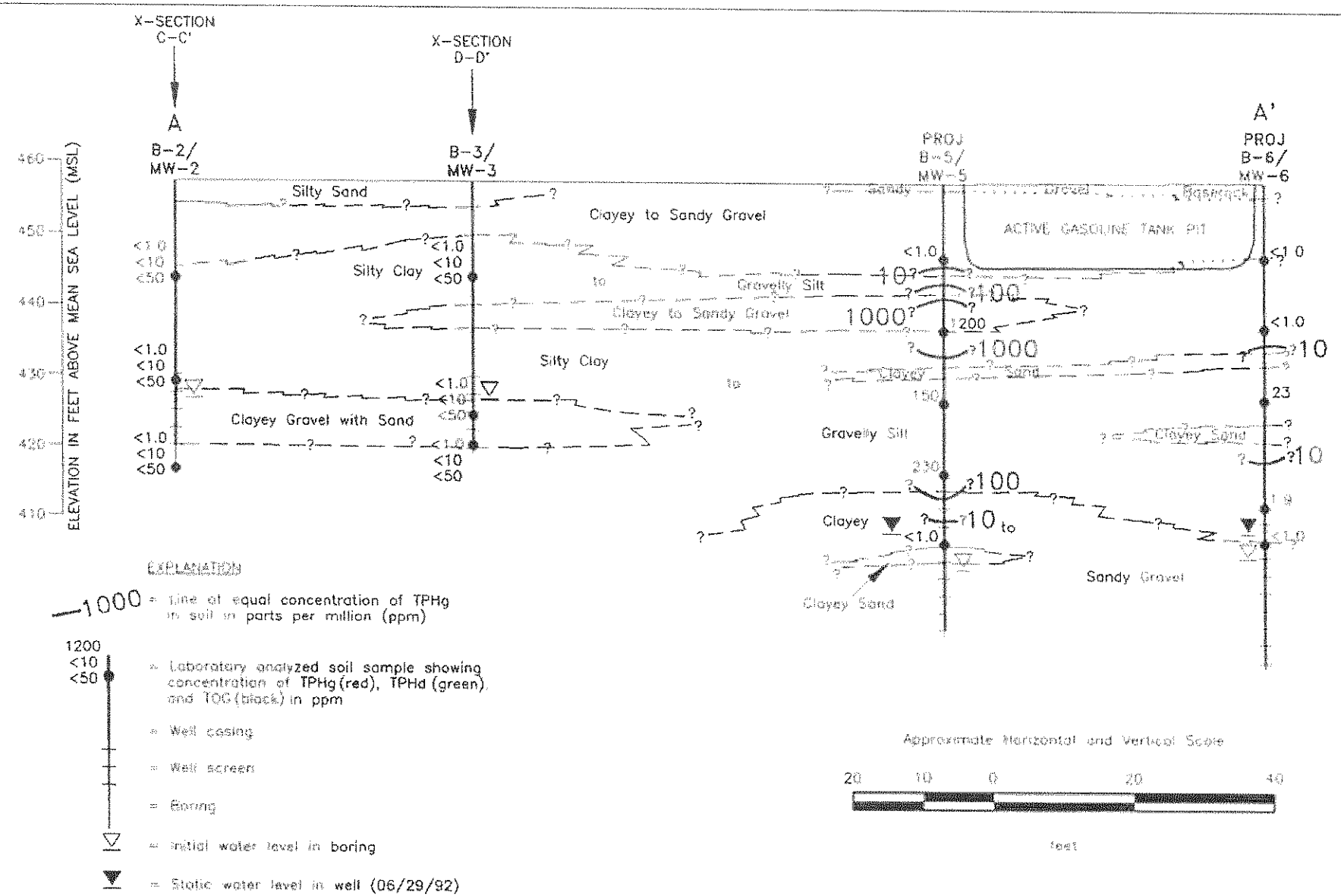


PLATE 26

GEOLOGIC CROSS SECTION A-A'
ARCO Service Station 6113
785 East Stanley Boulevard
Livermore, California

RESNA
Working to Restore Nature

PROJECT 69028.07

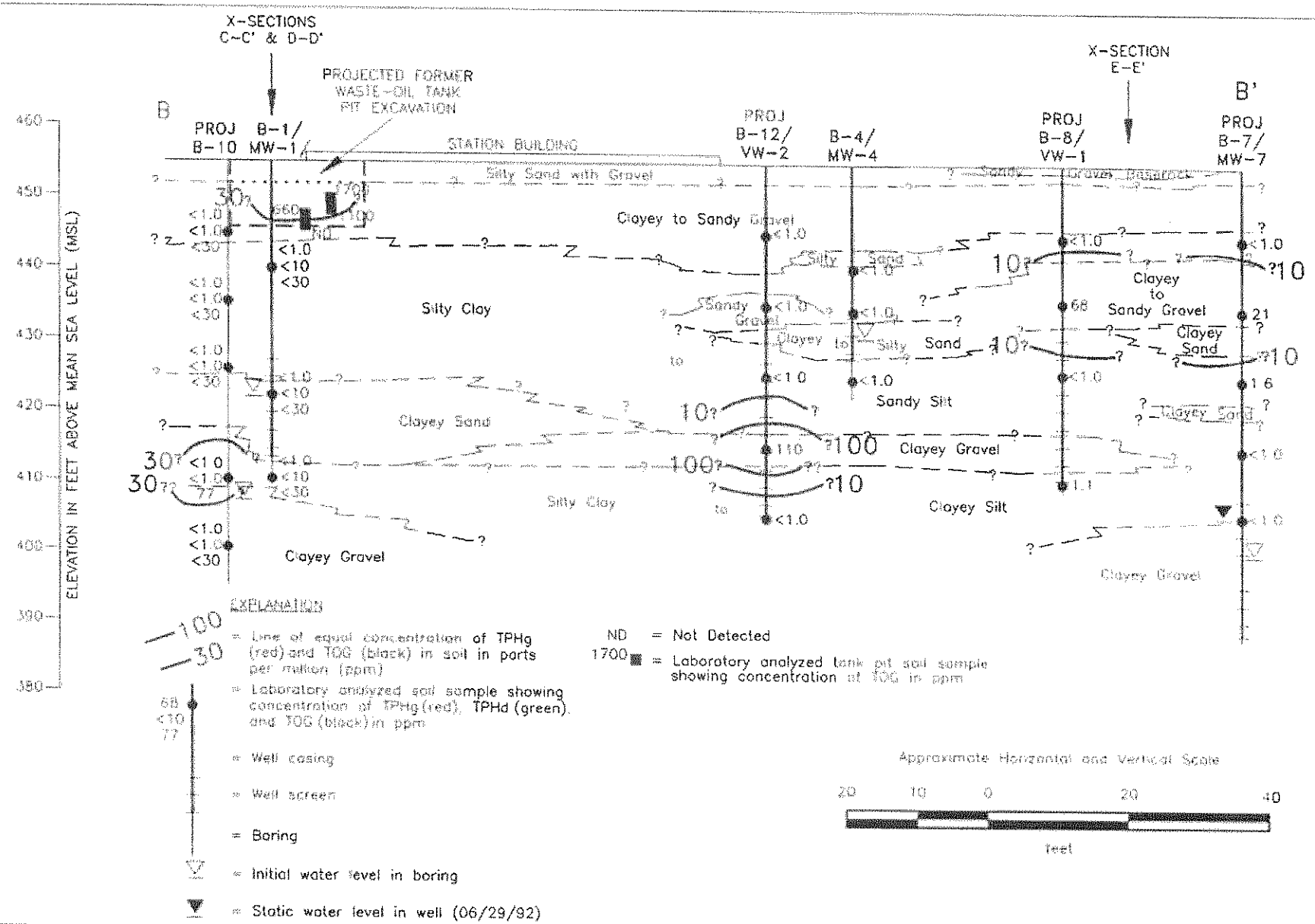
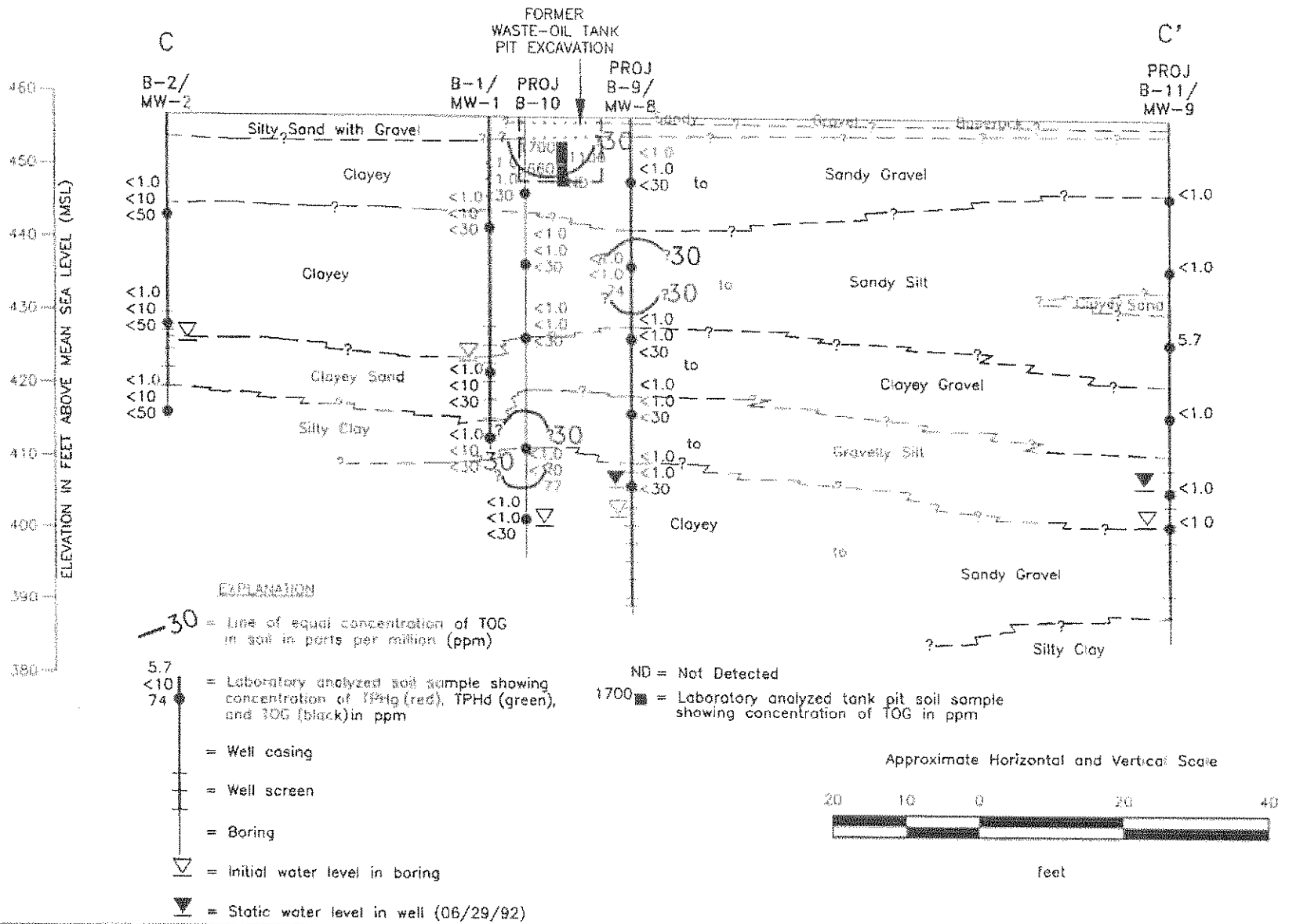


PLATE 27

GEOLOGIC CROSS SECTION B-B'
ARCO Service Station 6113
785 East Stanley Boulevard
Livermore, California

RESNA
Working to Restore Nature

PROJECT 69028.07



PLATE

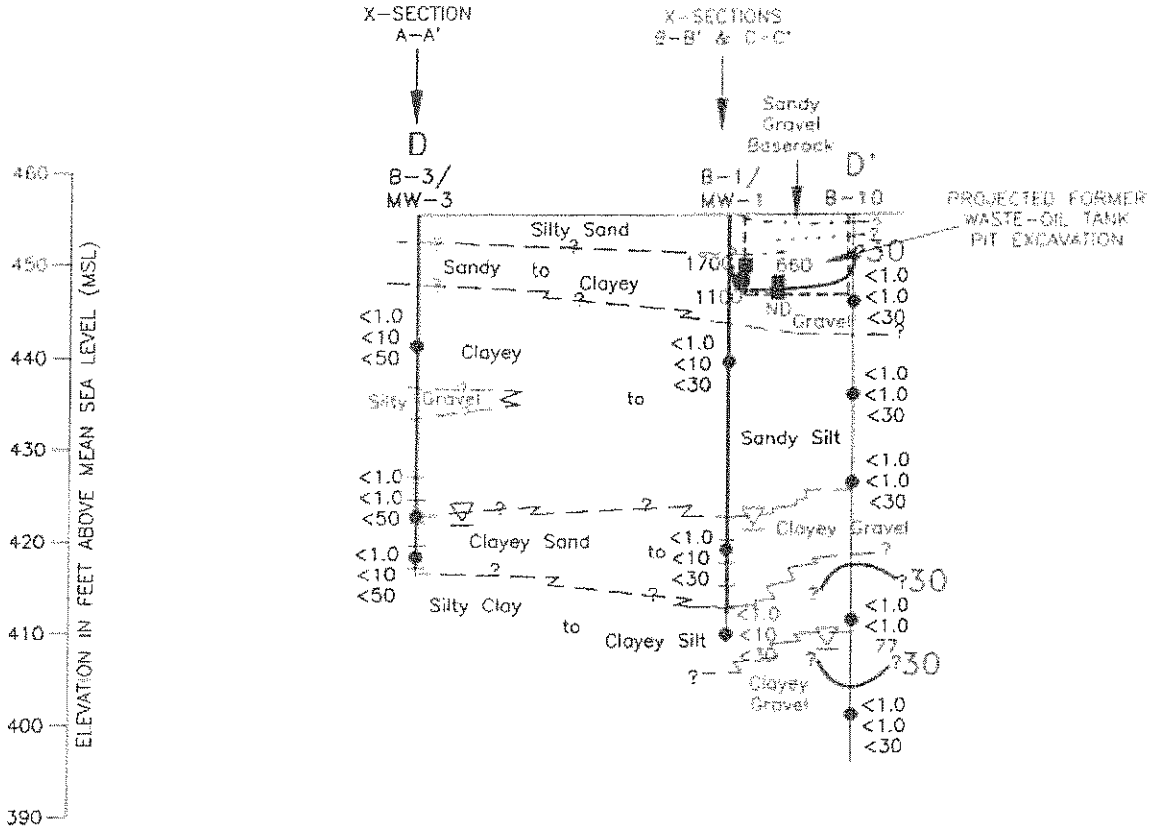
28

GEOLOGIC CROSS SECTION C-C'

ARCO Service Station 6113
785 East Stanley Boulevard
Livermore, California

RESNA
Working to Restore Nature

PROJECT 69028.07



EXPLANATION

30 = Line of equal concentration of TOG in soil in parts per million (ppm)

<1.0
<10
77 = Laboratory analyzed soil sample showing concentration of TPHg (red), TPHd (green), and TOG (black) in ppm

= Well casing

= Well screen

= Boring

= Initial water level in boring

ND = Not Detected

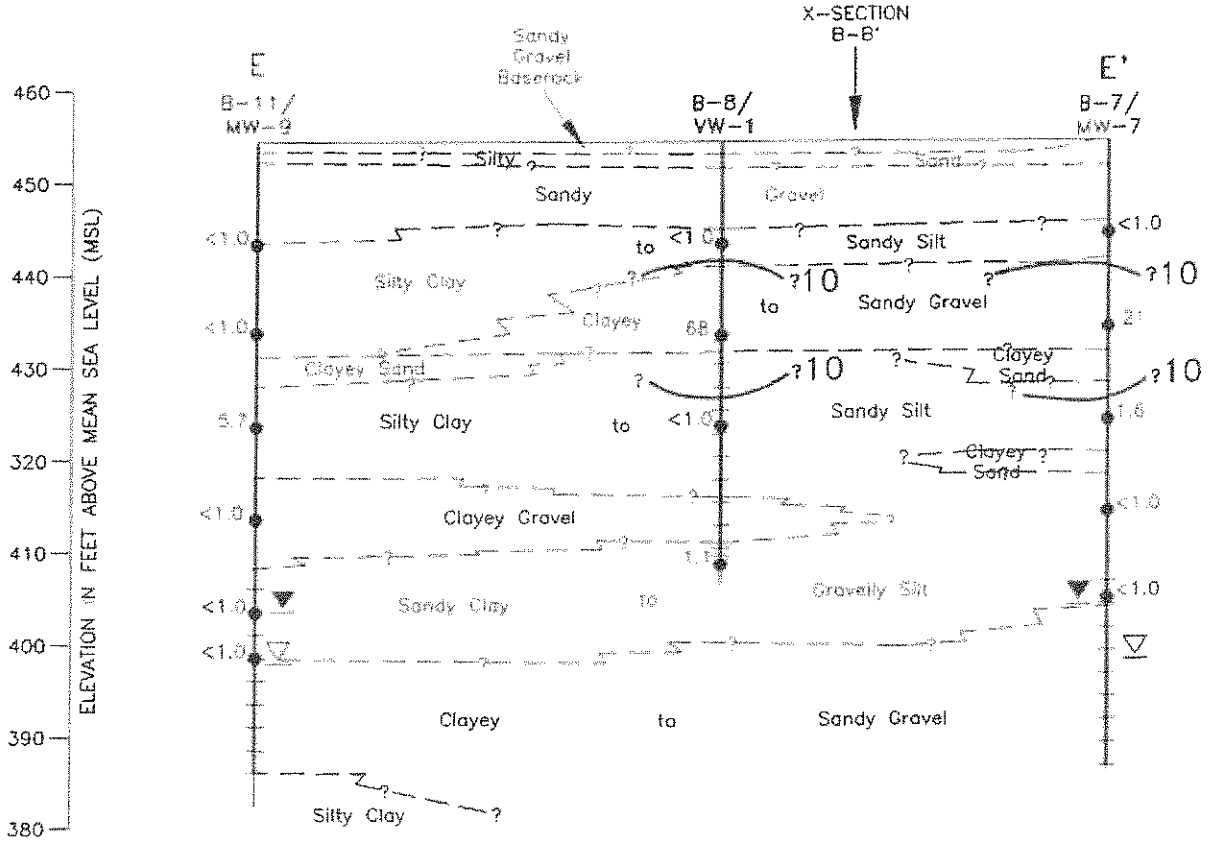
1100 = Laboratory analyzed tank pit soi sample showing concentration of TOG in ppm

Approximate Horizontal and Vertical Scale

20 10 0 20 40

feet

PROJECT 69028.07	GEOLOGIC CROSS SECTION D-D' ARCO Service Station 6113 785 East Stanley Boulevard Livermore, California	PLATE 29



EXPLANATION

10 = Line of equal concentration of TPHg in soil in parts per million (ppm)

68 = Laboratory analyzed soil sample showing concentration of TPHg in ppm

= Well casing

= Well screen

= Boring

▽ = Initial water level in boring

▼ = Static water level in well (06/29/92)

Approximate Horizontal and Vertical Scale

20 10 0 20 40

feet

RESNA
Working to Restore Nature

PROJECT 69028.07

GEOLOGIC CROSS SECTION E-E'
ARCO Service Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE
30