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By Alameda County Environmental Health 1:07 pm, Dec 16, 2016



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December 15, 2016

Kit Soo
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Subject: Remedial Action Plan
1619 1st Street, Livermore, California
Tesoro No. 67076 (Former Beacon 3604); ACEH Case No. RO0434

Dear Ms. Soo:

Enclosed please find a copy of the *Remedial Action Plan* for the subject site, dated 4 December 2016. This report is submitted by Arctos Environmental at the request of Tesoro Environmental Resources Company.

Based on my inquiry of the person or persons directly responsible for gathering the information contained in this report, I believe the information was prepared by qualified personnel who properly gathered and evaluated the information, and that the information submitted is, to the best of my knowledge and belief, true, correct, and complete.

Please feel free to call me at 253/896-8731 or Scott Stromberg of Arctos Environmental at 510/525-2180 with questions.

Sincerely,

A handwritten signature in blue ink, appearing to read "Kyle Waldron".

Kyle Waldron
Environmental Remediation Administrator

Attachments

CC: Scott Stromberg, Arctos



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Remedial Action Plan

Tesoro Site No. 67076 (Former Beacon 3604)
1619 1st Street
Livermore, California

prepared for:

Tesoro Environmental Resources Company
3450 South 344th Way, Suite 201
Auburn, Washington 98001

December 2016



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4 December 2016
Project No. 01LV

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Alameda, California 94502-6577

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Dear Ms. Soo:


Arctos Environmental, on behalf of Tesoro Environmental Resources Company, has prepared this remedial action plan summarizing historical and current site conditions, identifying potential data gaps, establishing remedial goals, and evaluating the path forward for the subject site.


If you have questions or comments regarding this report, please call Scott Stromberg or Mike Purchase at 510/525-2180.

Very truly yours,

ARCTOS ENVIRONMENTAL


Scott Stromberg, P.G.
Project Geologist


Michael P. Purchase, P.E.
Vice President



Copy: Kyle Waldron – Tesoro Companies, Inc.
Colleen Winey – Zone 7 Water Agency

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1.0 INTRODUCTION

Arctos Environmental (Arctos), at the request of Tesoro Environmental Resources Company (Tesoro), has prepared this remedial action plan (RAP) for the active service station at 1619 1st Street in Livermore, California (the site; Figure 1). The RAP was prepared in response to Alameda County Environmental Health (ACEH) recommendations during a meeting between ACEH, Tesoro, and Arctos on 25 August 2016. The RAP summarizes historical and current site conditions, identifies potential data gaps, establishes remedial goals, and evaluates the path forward for the site.

1.1 Site Location and Setting

The site is an active service station located on the southeast corner of the intersection of 1st Street and South P Street. The station contains two underground storage tanks (USTs; 20,000 and 12,000 gallon capacity), four dispenser islands, associated product piping, and a building. Adjacent properties include an office building to the east; South P Street and Fosters Freeze restaurant to the west; 1st Street, Safeway supermarket and Walgreens drugstore to the north; and residential housing to the south.

1.2 Investigation and Remediation History

In November 1992, three USTs and associated product piping were removed from the site and replaced. Soil samples were collected from the tank pit and beneath the product piping. A total of 1,200 cubic yards of soil were excavated and disposed of offsite (Arctos, 2005).

Several technologies have been tested to evaluate remedial effectiveness including soil vapor extraction (SVE; 1996 to 1997 and 2010 to present), air sparging (1996 to 1997), oxygen injection (2010 to 2013, and 2015 to present), and in situ chemical oxidation (ISCO; 2011 to 2013).

A soil and groundwater remediation system, including 27 dual-completion groundwater air-sparging and vapor extraction wells (7 onsite wells and 20 offsite wells at the Livermore Arcade Shopping Center [LASC] site), was installed in September and October 1995. The system operated from May 1996 through February 1997. Groundwater concentrations of total petroleum hydrocarbons as gasoline (TPHg) and

benzene decreased by 73 and 78 percent, respectively, at onsite well MW-2, and concentrations of TPHg and benzene decreased by 77 and 60 percent, respectively, at offsite well MW-6 (Arctos, 2005).

Grab groundwater samples were collected from six offsite SVE wells and LASC groundwater well MW-23 in March 1997. Only one well (VE-10) had detectable TPHg and benzene concentrations of 440 and 5.1 micrograms per liter ($\mu\text{g/l}$), respectively (Arctos, 2005). At the time, groundwater elevations were at historical highs, which contributed to a decrease in contaminant concentrations. The system was shut down in 1997 and removed in 1999.

Arctos installed deep groundwater monitoring wells on and off site between 2008 and 2012 to assess the vertical and lateral extent of dissolved-phase petroleum hydrocarbon impacts. Arctos installed and started up an SVE system and an oxygen injection system in 2010 in accordance with an approved interim remedial action plan (IRAP; Arctos, 2008). Operation and effectiveness of these remedial systems are discussed in greater detail in Sections 3.1 and 3.2.

Arctos performed a membrane interface probe (MIP) investigation in January 2011 to assess the lateral and vertical extent of free product after it was detected at the site on 25 October 2010 in oxygen injection well IP-8. The highest impacts were generally encountered between 55 and 70 feet below ground surface (bgs) in the southwest portion of the site near the USTs (Arctos, 2011a). These impacts are approximately 15 to 30 feet below the top of the water table in May 2016. Based on the results of the MIP borings, Arctos installed deep monitoring well DW-8 in April 2011 downgradient of the USTs. The highest TPHg and benzene concentrations in groundwater at the site are currently reported at well DW-8.

ISCO pilot testing was conducted on site in 2011 and on and off site in 2013 in accordance with work plans approved by ACEH (Arctos, 2011b; Arctos, 2013). Results and effectiveness of ISCO pilot testing were submitted in reports to ACEH (Arctos, 2012a; Arctos 2014), and are discussed in greater detail in Section 3.3.

Arctos conducted an offsite investigation in June 2012 to assess the lateral and vertical extent of offsite impacts. The investigation included the advancement of three soil borings

and collection of grab groundwater samples (borings DB-8 through DB-10). Results confirmed that the highest offsite dissolved-phase impacts were located from approximately 50 to 65 feet bgs, consistent with the former secondary source areas on site (Arctos, 2012b).

Recent remedial operation at the site, since 2015, has focused on reducing residual groundwater contaminant mass in the vicinity of former source areas using (1) oxygen injection and (2) SVE during periods of low groundwater levels. Dissolved-phase petroleum hydrocarbon concentrations at source area injection and groundwater monitoring wells have decreased by over 99 percent since startup of the oxygen injection and SVE systems in 2010.

1.3 Sensitive Receptors

California Water Service Company (CWS) water supply well CWS08 is located approximately 1,300 feet northwest, downgradient, of the site at 1493 Olivina Avenue in Livermore, California. Well CWS08 is screened from 122 to 141, 150 to 158, 163 to 167, 177 to 194, 195 to 203, 218 to 231, and 262 to 263 feet bgs. Well CWS08 is operational and is pumped at a rate of approximately 260 gallons per minute. According to CWS, this well is expected to remain in operation for the foreseeable future (CWS, 2016). Figure 2 shows the site and supply well CWS08 and the boring and well construction log is included in Appendix A.

1.4 Background on Surrounding Environmental Case Properties

The plume is located between the Tesoro site and water supply well CWS08. The following table summarizes surrounding properties with environmental cases:

Surrounding Property	GeoTracker ID	Case Status	Location Relative to Site	Contaminants of Concern
LASC	SL18227625	Open	Northwest (downgradient)	Solvents
Depaoli Property	T0600100441	Closed	East (crossgradient)	Waste/Motor/Hydraulic/Lubricating Oil
McPeak, Gerald E	T0600101515	Closed	West (crossgradient)	Waste/Motor/Hydraulic/Lubricating Oil

2.0 SITE CONCEPTUAL MODEL

2.1 Geology and Hydrogeology

The site is underlain by approximately 100 feet of Quaternary alluvial fan deposits overlaying the Livermore gravels. The Tertiary-aged Livermore gravels extend to approximately 600 feet deep and consist of massive beds of rounded gravel cemented by a sandy clay and sandy silt matrix. The alluvial fan deposits consist of semi-consolidated deposits of clay, silt, sand, and gravel (California Department of Water Resources [DWR], 1974). The north-south trending Livermore fault is mapped 0.5 mile west of the site.

The site lies in the Mocho II Subbasin of the Livermore Valley groundwater basin. This area is drained by Arroyo Mocho, which runs from the southeast toward the northwest approximately 0.5 mile southwest of the site. The Arroyo Mocho also provides groundwater recharge in the area (DWR, 1974).

In the site vicinity, subsurface investigations have found a shallow, upper unconfined water-bearing zone consisting primarily of gravels with sand and clay. Underlying the gravels, an approximately 45-foot-thick, low-permeability clay unit (aquitar) is found at depths of approximately 60 to 110 feet bgs at the LASC site, 800 feet northwest of the site. Fine-grained units of clay containing sand and gravel are present across the site at varying depths. The deposits vary laterally and may include channel deposits. Below the clayey unit is the top of the underlying semiconfined aquifer. Groundwater extraction for municipal water supply occurs in the semiconfined aquifer and in a deeper confined aquifer.

No evidence of communication between the shallow water-bearing zone and the underlying aquifers in the site vicinity has been documented. Groundwater elevations in the shallow water-bearing zone and the semiconfined aquifer are similar and indicate that hydraulic connection at some point between these two water-bearing zones is likely. Over the last 17 years, depths to water at the site have ranged from 17 feet bgs in March 1996 to 48 feet bgs in November 2007. Seasonal fluctuations observed at the site over the past 10 years indicate that depths to water during the first and second quarters (average of 37 feet bgs) were on average approximately 4 feet lower than during the third

and fourth quarters (average of 41 feet bgs). The groundwater flow direction generally is to the northwest with a hydraulic gradient ranging from 0.01 to 0.03 since 1993.

2.2 Sources and Contaminants of Concern

Groundwater beneath the site is impacted by petroleum hydrocarbons and the contaminants of concern (COCs) include TPHg; benzene, toluene, ethylbenzene, and total xylenes (BTEX); methyl tert-butyl ether (MTBE); and tert-butyl alcohol (TBA). There are two historical sources of contamination at the site. One historical source is the former leaking USTs, which were located in the southwest corner of the site and replaced in 1992; this release is deeper and characterized by higher TPHg concentrations. The second historical source is the former dispensers, which were located in the northern portion of the site and replaced in 1992 and 2013; this release is shallower and characterized by higher oxygenates.

2.3 Distribution of COCs

2.3.1 Extent of Impacts to Soil

Soil investigations were conducted during the excavation of USTs and associated product piping in November 1992, as well as during well installation activities conducted at the site between 1993 and 2012.

Vadose Zone Soil Impacts

Vadose zone, hydrocarbon-impacted soil was observed during the removal of USTs and product lines in November 1992. Soil samples collected below the USTs at a depth of 14 feet below grade contained TPHg concentrations of 600 and 1,800 milligrams per kilogram (mg/kg) at the west end of the unleaded plus and unleaded tanks, respectively. The UST excavation was then overexcavated to a depth of 19 feet below grade for installation of the new USTs. TPHg was detected in soil at a concentration of 4,700 mg/kg at a depth of 19 feet below grade at the southwest corner of the tank pit. The excavation was advanced to a depth of 27 feet in this area to remove impacted soil. The confirmation sample collected at 27 feet below grade in the southwest corner of the tank pit contained TPHg and benzene at concentrations of 490 and 1.4 mg/kg, respectively; this was the only detection of benzene in soil. TPHg was also detected in two locations under the product piping at the eastern pump island at concentrations of 2.7 and 4.4 mg/kg. Soil samples

were not analyzed for MTBE (Arctos, 2005). A figure showing historical soil sampling locations and a table summarizing historical soil analytical results are included in Appendix B.

Source area excavation of hydrocarbon-impacted soil and subsequent confirmation sampling results indicate that shallow, vadose zone soil impacts do not pose a risk to human or environmental health. Additionally, remediation in the vicinity of former source areas using SVE has further decreased risk associated with shallow soil impacts. Section 2.3.3 provide additional detail regarding soil vapor sampling results.

Saturated Zone Soil Impacts

Between 1993 and 1994, monitoring wells MW-1 through MW-10, vapor wells VW-1 through VW-3, and boring B-4 were installed by Delta Environmental Consultants, Inc., of Rancho Cordova, California. From 2005 to 2012, Arctos collected soil samples during the installation of wells TP-1, TP-2, MW-12, and DW-5 through DW-9, as well as during the advancement of deep borings DB-1 through DB-5. The highest concentrations of COCs in soil detected during historical well installation activities were observed in the northwest corner of the site at onsite well TP-1 at a depth of 40 feet below grade. The table below summarizes the maximum concentrations of petroleum hydrocarbons detected in soil:

Compound	Location	Date	Sample Depth (feet below grade)	Concentration (mg/kg)
TPHg	TP-1	6/23/05	40	5,800
Benzene	TP-1	6/23/05	40	35
Ethylbenzene	TP-1	6/23/05	40	210
Toluene	TP-1	6/23/05	40	110
Total Xylenes	TP-1	6/23/05	40	480
MTBE	TP-2	6/23/05	35	4.2
TBA	DB-3	1/26/06	40	1.7

In general, the highest soil impacts were observed onsite between 30 and 45 feet (with the exception of DB-2 and DB-3, where the highest impacts were observed from 43 to 48 feet and 63 to 66 feet, respectively). The highest offsite impacts detected during installation of deep monitoring wells DW-8, located immediately offsite, and DW-9, located downgradient, were observed to be deeper, between 50 and 65 feet below grade.

A figure showing historical soil sampling locations and a table summarizing historical soil analytical results are included in Appendix B.

The magnitude and extent of remaining saturated soil impacts can be monitored based on concentrations of petroleum hydrocarbons in groundwater. Shallow monitoring wells (screened from approximately 30 to 50 feet bgs) have shown significant decreases in dissolved-phase concentrations, indicating that soil impacts at these depths have been significantly reduced. Graphs of hydrocarbon concentrations at shallow and deep wells are shown on Figures 3A through 3I. The highest remaining dissolved-phase concentrations are detected at deep wells (screened from approximately 50 to 65 feet bgs), indicating that remaining soil impacts are located within this interval. Cross sections showing soil lithology and saturated zone impacts identified during the 2011 MIP investigation and 2012 offsite investigation are shown on Figures 4 through 6.

Due to the depth of remaining saturated soil impacts, risk associated with exposure by direct contact is low. The remaining risk is associated with diffusion to groundwater. As a result, remediation of groundwater to acceptable cleanup standards will be considered sufficient remediation of saturated soil. Additional detail regarding groundwater impacts are discussed in Section 2.3.2.

2.3.2 Extent of Impacts to Groundwater

Gradient and Flow Directions

Current and historical water level data indicate that the general direction of groundwater flow is toward the northwest. However, in some years, the offsite groundwater flow direction showed a more northerly trajectory. The cause of the fluctuation in groundwater flow direction may be natural or may be related to pumping from supply well CWS08. The most recent groundwater elevation data are included in the First and Second Quarters 2016 Status Report (Arctos, 2016). Figure 7 shows groundwater elevations and flow direction. Historical groundwater elevation data are included in Appendix C.

Current Magnitude and Extent of Groundwater Impacts

The 2011 MIP investigation confirmed that the highest remaining impacts in the vicinity of the former USTs were located in the saturated interval from approximately 55 to 70 feet bgs (Figures 4 and 5). Depth to groundwater at the site has ranged from approximately 15 to 60 feet bgs based on monitoring conducted since June 1993

(Appendix C). It is therefore likely that releases from the former USTs occurred during periods of low groundwater levels. Subsequent increases in water levels submerged impacts, and changes in water levels potentially smeared impacts. The additional 2012 offsite investigation confirmed that offsite impacts were located from approximately 50 to 65 feet bgs, consistent with the onsite areas (Figure 6).

During the first and second quarters 2016, the highest onsite dissolved-phase concentrations of TPHg, benzene, and MTBE were detected at wells MW-2 and DW-8, located in the western portion of the site adjacent to the dispenser islands and USTs, respectively. Wells MW-2 and DW-8 are the only onsite wells with benzene concentrations above 10 µg/l and well DW-8 is the only onsite well with a benzene concentration above 100 µg/l. The highest offsite dissolved-phase concentrations of TPHg, benzene, and MTBE were detected at wells DW-7, IP-13, and MW-6, respectively, located downgradient of the site in the offsite parking lot. The table below summarizes the maximum hydrocarbon concentrations detected on and off site:

Hydrocarbon Compound	Maximum Onsite Concentration^(a) (µg/l)	Maximum Offsite Concentration^(a) (µg/l)
TPHg	36,200 (DW-8)	19,800 (DW-7)
Benzene	3,000 (DW-8)	340 (IP-13)
MTBE	2.5 (MW-2)	36 (MW-6)

(a) Dissolved-phase petroleum hydrocarbons analyzed by Environmental Protection Agency (EPA) Method 8260B and reported in µg/l.

COCs in groundwater are delineated to the west by monitoring wells MW-7 and MW-10, and to the east by monitoring wells MW-5 and MW-8. Concentrations of COCs in groundwater are not delineated to maximum contaminant levels (MCLs) to the north (downgradient), which poses a data gap. This data gap is discussed in Section 2.5.

Groundwater analytical results for monitoring wells and injection wells are included in the First and Second Quarters 2016 Status Report (Arctos, 2016). Figures 8 through 10 show isoconcentration contours for TPHg, benzene, and MTBE, respectively, for first quarter 2010 (prior to onsite remediation) and second quarter 2016. Historical groundwater analytical results are in Appendix D.

Hydrocarbon Concentration Trends

Since startup of the oxygen injection and SVE systems in 2010, dissolved-phase petroleum hydrocarbons show decreasing trends at onsite shallow monitoring well MW-2 and deep monitoring well DW-1 (Figures 3A and 3E). Benzene concentrations at well DW-8 have remained stable (Figure 3H). Since the offsite ISCO pilot test in 2013, decreasing trends are observed at several offsite monitoring wells; Figures 3B, 3C, 3D, 3F, 3G and 3I show hydrocarbon concentrations over time at wells MW-6, MW-9, MW-12, DW-2, DW-7, and DW-9, respectively.

2.3.3 Extent of Impacts to Soil Vapor

An onsite soil vapor survey was conducted in 2006 in the vicinity of former source areas. Shallow soil vapor samples were collected from 9 soil vapor probes (SG-1 through SG-9) at 4.5 to 5 feet below grade. TPHg was only detected at one location (SG-4) in the western portion of the site between the USTs and dispensers. Benzene, MTBE, and TBA were not detected in any soil vapor samples (Arctos, 2006). Shallow soil vapor does not appear to be impacted by petroleum hydrocarbons. Therefore, the site meets residential limits for a site with a bioattenuation zone as defined by the State Water Resources Control Board's Low-Threat UST Case Closure Policy (LTCP).

In June 2010, prior to the startup of the SVE system, deep soil vapor samples were collected from the western and southern portions of the site. Soil vapor samples were collected from 5 onsite wells (MW-11, TP-1, TP-2, VW-2, and VW-3) screened from approximately 20 to 40 feet below grade. The highest concentrations were observed at wells TP-1 and MW-11. TPHg concentrations ranged from 120,000 to 3,600,000 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) and benzene concentrations ranged from 330 to 2,400 $\mu\text{g}/\text{m}^3$. MTBE was only detected at well TP-2 at a concentration of 18,000 $\mu\text{g}/\text{m}^3$. TBA was not detected at any of the locations. Full-scale SVE operation was conducted from June 2010 to December 2012. Following shutdown of the SVE system, deep soil vapor samples were collected from the same set of wells in February 2013. TPHg was the only COC detected; TPHg was detected at wells MW-11, TP-1, and TP-2 at concentrations ranging from 26,000 to 32,000 $\mu\text{g}/\text{m}^3$. TPHg was not detected at wells VW-2 or VW-3. Benzene and ethylbenzene soil vapor concentrations were below LTCP limits. Deep soil vapor appears to be minimally impacted by petroleum

hydrocarbons and additional SVE operation since 2012 has likely continued to decrease soil vapor concentrations.

A figure showing historical soil vapor sampling locations as well as tables summarizing historical soil vapor analytical results are included in Appendix E.

2.4 Potential for COC Migration to Subsurface Utilities

The depth of impacted soil and groundwater at the site is greater than 20 feet bgs. Subsurface utilities in the area are located above a depth of 20 feet; therefore, utilities are not considered a potential pathway. Additionally, results of the 2006 onsite soil vapor survey, conducted in the source area where soil and groundwater concentrations were highest, showed that benzene and ethylbenzene were not detected in any soil vapor samples. Based on the soil vapor survey results, subsurface utility trenches (on or off site) likely do not act as preferential pathways for impacted soil vapor due to low soil vapor concentrations measured in the source area.

2.5 Data Gaps

As discussed in Section 2.3, concentrations of benzene and MTBE are not delineated to MCLs in the downgradient extent of the groundwater plume. Arctos will submit a work plan under separate cover proposing additional investigation to delineate the plume. This investigation will propose advancing soil borings along the northern boundary of the Safeway parking lot and collecting grab groundwater samples. Based on groundwater analytical results, two of the borings will be converted to downgradient groundwater monitoring wells. Additional detail regarding this proposed investigation will be included in the work plan.

3.0 REMEDIAL EFFECTIVENESS

The following sections summarize remedial technologies utilized at the site, remedial effectiveness, and proposed future remediation.

3.1 Soil Vapor Extraction

Arctos conducted an SVE pilot test on 5 December 2007 and monitored mass removal, flow, vacuum, and radius of influence (ROI) to (1) assess the applicability of SVE technology to remediate hydrocarbon-impacted, vadose-zone soil and saturated soil exposed during periods of low groundwater levels and (2) collect site-specific data to establish design parameters for a full-scale SVE system. In June 2010, a full-scale SVE system was installed at the site. The SVE system operates using a blower to maintain a partial vacuum on the extraction wells. Because pressure differentials exist between the extraction wells and the surrounding soil, air flows through the impacted soil toward the extraction wells. Compounds with adequate vapor pressure are stripped from the soil by the moving air. This air is collected at the extraction wells, piped through a manifold to a vapor treatment unit, and discharged to the atmosphere in accordance with a Bay Area Air Quality Management District permit.

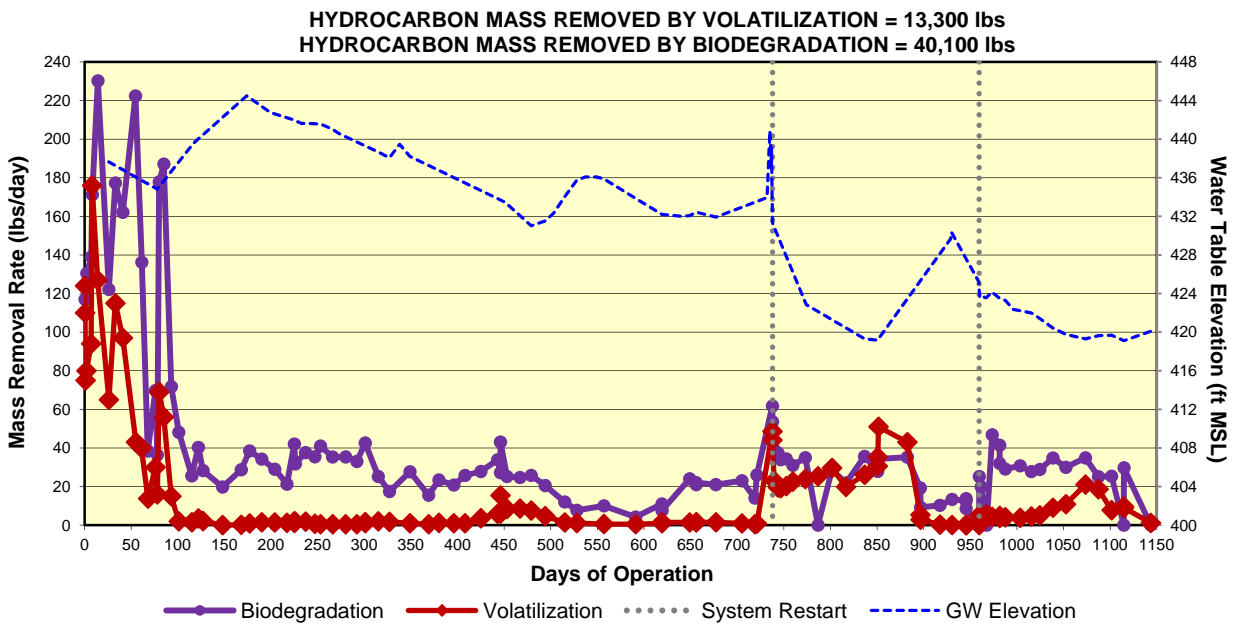
Full-time operation of the SVE system was initiated on 29 June 2010. The SVE system operated using existing source-area wells MW-1, MW-11, TP-1, TP-2, and VW-2. The SVE system was monitored to document and optimize hydrocarbon mass removal from the subsurface. The SVE system was shut down from December 2012 to July 2014 and from February to June 2015 due to high water levels and/or low mass removal rates. The system operated from June to December 2015 until it was shut down due to increasing water levels and low mass removal rates. The system has remained off since December 2015.

SVE Effectiveness

Between June 2010 and November 2012, the total hydrocarbon mass removed by the SVE system was estimated to be 38,300 pounds or approximately 5,900 gallons (at a density of 6.5 pounds per gallon). During the third quarter 2014, water levels on site decreased to the lowest levels observed since 2009. Arctos restarted the SVE system in July 2014 to remediate impacted, vadose-zone soil that was not exposed during previous SVE system operation. The SVE system was shut down in February 2015 due to increased water levels

and low mass removal. In June 2015, Arctos observed decreasing water levels at the site and restarted the SVE system to evaluate whether soil vapor concentrations had rebounded after being shut off for over 4 months. Influent hydrocarbon concentrations increased from non-detect to 520 parts per million by volume (ppmv) from the time of system shutdown in February 2015 to system restart in June 2015. Within 2 weeks of operation, SVE influent concentrations decreased by nearly 70 percent despite optimizing the system by increasing vacuum and decreasing dilution air. Between July 2014 and system shutdown in December 2015, 15,100 additional pounds of hydrocarbons were removed by the SVE system. The total hydrocarbon mass removed by the system to date is estimated to be 53,400 pounds or approximately 8,200 gallons (at a density of 6.5 pounds per gallon).

As stated in the 2008 IRAP, the SVE system is considered a groundwater remediation system by operating on saturated soil exposed during periods of low groundwater levels. As stated in previous sections, the highest on- and near-site soil impacts have been identified between approximately 40 and 65 feet below grade, depending on location. Depth to groundwater has ranged from approximately 15 to 60 feet bgs. Historical operation of the SVE system has shown that influent concentrations decrease relatively quickly until groundwater levels decrease, exposing soil that has not previously been exposed to SVE.



3.2 Oxygen Injection

The original oxygen generation system installed at the site in June 2008 was designed to purify ambient air to produce greater than 90 percent oxygen with variable air delivery up to 15 standard cubic feet per hour (scfh). In June 2015, Arctos replaced the existing oxygen generation system with a more powerful system capable of delivering up to 45 scfh at over 90 percent oxygen. The primary mechanisms of oxygen transport are advection and dispersion, the same mechanisms that facilitate contaminant migration. The system delivers oxygen at high concentrations and low flow rates and pressures to maximize oxygen transfer to groundwater without volatilizing dissolved-phase hydrocarbons. The primary objective of oxygen injection is to create geochemical conditions in groundwater that support aerobic biodegradation of COCs in groundwater.

In May and June 2008 five injection wells were installed on approximately 20-foot centers extending northeast to southwest in the driveway along the northwestern portion of the site to target the source area (IP-1 through IP-5). Two additional injection wells (IP-6 and IP-7) were installed in the northwest corner of the site and angled at approximately 25 degrees from vertical, which places the screen roughly 28 feet downgradient of the site. The injection wells were designed to target saturated sands and sandy silts between approximately 45 to 60 feet bgs. Additional injection wells IP-8 and IP-9 were installed along the southwest side of the site in November 2008. IP-10 was installed in the southwest corner of the site adjacent to MW-1 in January 2009. Full-time operation of the original oxygen injection system started on 18 October 2010 and operated on injection wells IP-1 through IP-10. The oxygen injection system was shut down on 28 March 2013 in preparation for the expanded ISCO pilot test. On 8 June 2015, Arctos restarted oxygen injection using the upgraded system. This system continues to operate on injection wells located along the western portion of the site where remaining impacts exist.

Oxygen Injection Effectiveness

From May 2010 (pre-oxygen injection) to April 2013 (post-oxygen injection and pre-ISCO), dissolved-phase hydrocarbon concentrations at source area wells MW-2 and DW-1 decreased by over 98 percent, indicating the original oxygen injection system was effective at degrading hydrocarbons in groundwater. The following table summarizes changes in hydrocarbon concentrations observed at these wells:

Well	Before O2 Injection (May 2010)	After O2 Injection and Before ISCO (April 2013)	Percent Reduction
<i>TPH_g Concentration^(a) (µg/l)</i>			
MW-2	26,000	430	99
DW-1	1,800	ND<50 ^(b)	99
<i>Benzene Concentration^(a) (µg/l)</i>			
MW-2	3,100	10	99
DW-1	160	ND<0.5	99 ^(c)
<i>MTBE Concentration^(a) (µg/l)</i>			
MW-2	530	13	98
DW-1	21	ND<0.5	99 ^(c)

(a) Dissolved-phase petroleum hydrocarbons analyzed by EPA Method 8260B and reported in µg/l.

(b) ND – Not detected at reporting limit listed.

(c) Half of reporting limit used to calculate percent reduction.

Based on the observed decreases in the source area as a result of previous oxygen injection, Arctos upgraded the former system. Since restarting oxygen injection in June 2015, dissolved-phase TPH_g and benzene concentrations at all operating injection wells have decreased to non-detect, except for injection wells IP-1, IP-8, and IP-10. The highest concentrations of TPH_g (1,430 µg/l) and benzene (8.3 µg/l) during the second quarter 2016 were detected at injection wells IP-8 and IP-1, respectively. However, TPH_g and benzene concentrations at these wells have decreased 97 to 99 percent compared to concentrations in May 2015 prior to restarting the oxygen injection system. MTBE concentrations have also decreased to non-detect at all operating injection wells since restarting the oxygen injection system, except injection wells IP-2, IP-4, IP-6, and IP-7. Detected MTBE concentrations during the second quarter 2016 ranged from 0.79 to 0.97 µg/l, and have decreased up to 91 percent compared to concentrations in May 2015.

COC concentrations at source area monitoring wells MW-2 and DW-1 continue to show decreases as a result of continued oxygen injection. Well DW-8 is located farther from oxygen injection wells in an area of greater oxygen demand due to higher COC concentrations and has not shown significant decreases. However, the recent decreases observed at injection wells IP-1, IP-8, and IP-9 indicate that the upgraded oxygen injection system shows greater effectiveness at meeting oxygen demand in the area of highest impacts and the ROI of the system may expand in this area over time.

3.3 In Situ Chemical Oxidation

Arctos conducted an ISCO pilot test southwest of the USTs during the fourth quarter 2011 and an expanded onsite and offsite ISCO pilot test in 2015 to evaluate the effectiveness of remediating hydrocarbon-impacted soil and groundwater in the source area and downgradient using the RegenOx™ ISCO technology. RegenOx™ is an ISCO technology developed by Regenesi Bioremediation Products, Inc., that includes a two-phase injection process involving a solid oxidant complex (sodium carbonate and sodium percarbonate) and an activator complex (ferrous iron sulfate and sodium silicate).

During the initial pilot test, Arctos injected RegenOx™ over three injection events into well IP-9. The activator complex was injected first to desorb hydrocarbon mass from soil and distribute the ferrous sulfate activator to enhance the oxidation reaction. The oxidant was injected immediately following the activator to oxidize hydrocarbons. To increase mass removal after each injection event, Arctos extracted groundwater from injection well IP-9 and two surrounding wells (IP-8 and DW-8) to remove contaminant mass that had been desorbed by the RegenOx™ activator complex. During the three groundwater extraction events, groundwater was pumped from the wells, treated by granular activated carbon, and discharged to the sanitary sewer under a permit from the City of Livermore.

From May to August 2013, Arctos conducted an expanded ISCO pilot test. Similar procedures to the initial pilot test were used for the expanded pilot test. RegenOx™ was injected into onsite wells IP-1 through IP-3, IP-8, IP-9, and offsite wells IP-11 through IP-17. Three rounds of injections were conducted on site and two rounds of injection were conducted off site. During each of the injection events, the activator complex was injected separately from the oxidant. Unlike the first pilot test, no groundwater extraction was performed after the injection events based on limited mass removal calculated during the initial pilot test.

ISCO Effectiveness

The results of the initial pilot test indicated that RegenOx™ was effective at desorbing petroleum hydrocarbon mass from soil with an ROI of approximately 20 feet and oxidizing dissolved-phase hydrocarbon mass with an ROI of approximately 10 feet. An estimated 130 pounds of TPHg were destroyed by chemical oxidation during the initial pilot test (Arctos, 2012a). The results of the expanded pilot test indicated that RegenOx™ activator was effective at desorbing petroleum hydrocarbon mass within the entire

injection area. The area of influence of the oxidation reaction was smaller than the area of influence of the activator likely because of high oxidant demand surrounding the injection wells. The area of influence of the activator and oxidation reaction extended to some upgradient, crossgradient, and downgradient performance monitoring wells indicating the monitoring well network was not sufficient to delineate the ISCO area to the point of no injection influence. However, the most significant changes in field and water quality parameters were observed immediately adjacent to the injection points and smaller changes were observed in wells located farther away from the injection points. Therefore, the well network delineated approximately the edge of the area of influence and it is unlikely the ISCO injections caused plume deflection. Figure 11 shows the area of influence observed during the expanded pilot test injections. Up to 960 pounds of hydrocarbon mass was destroyed through chemical oxidation on and off site during the expanded pilot test (Arctos, 2014).

3.4 Source Area Reduction

The expanded ISCO pilot test was completed in 2013 and the onsite oxygen injection system and SVE systems were restarted in June 2015. Analytical results from June 2014, following the expanded ISCO event and prior to the restart of the oxygen injection system, will be compared to second quarter 2016 results because water levels were at similar elevations. Historical groundwater monitoring indicate that dissolved-phase concentrations at the site vary with water table elevations.

From June 2014 to May 2016, oxygen injection and SVE remediation have decreased dissolved-phase hydrocarbon concentrations by up to 99 percent in source area wells and up to 91 percent in offsite, downgradient wells. The table below summarizes reductions in hydrocarbon concentrations for source area and downgradient wells.

Well ID	Date	Groundwater Elevation (ft. MSL)	Petroleum Hydrocarbon Concentration ^(a) (µg/l)			Percent Reduction ^(b)
			TPHg	Benzene	MTBE	
Onsite						
MW-2	6/11/14	431.33	6,900	520	120	68 to 98
	5/4/16	434.24	2,200	12	2.5	
DW-8	6/11/14	431.17	52,000	2,400	ND<7 ^(d)	30 decrease to 25 increase
	5/4/16	434.57	36,200	3,000	ND<21	
IP-1	6/10/14	432.16	50,000	1,600	ND<9	41 to 99
	5/4/16	434.54	516	8.3	ND<5.3	
IP-10	6/10/14	431.73	2,600	10	ND<0.5	79
	5/4/16	435.44	556	2.1	ND<0.5	
Offsite						
MW-6	6/10/14	429.57	11,000	860	120	70 to 88
	5/2/16	432.05	1,340	120	36	
DW-7	6/11/14	425.40	12,000	380	79	77 decrease to 65 increase
	5/4/16	429.05	19,800	110	18	
DW-9	6/11/14	425.75	13,000	380	41	61 to 91
	5/4/16	429.42	5,050	35	9.7	

(a) Dissolved-phase petroleum hydrocarbons as analyzed by EPA Method 8260B and reported in µg/l.

(b) Half the detection limit was used for non-detect concentrations in calculating percent reduction.

(c) NA – Not applicable.

(d) ND – Not detected at the reporting limit listed.

Additionally, oxygen injection and SVE remediation have effectively reduced the lateral extent of onsite source area TPHg and benzene by approximately 62 and 70 percent, respectively. Figures 12 through 14 show onsite hydrocarbon concentrations in June 2014 and May 2016. Figures 3A, 3G, 3H, and 3I show graphs of hydrocarbon concentrations over time at wells MW-2, DW-7, DW-8, and DW-9.

4.0 PATH TO CLOSURE

4.1 Cleanup Objectives

The site qualifies for case closure under the LTCP because it is a UST site located within the Central Valley Regional Water Quality Control Board district. The existence of supply well CWS08 disqualifies the site from meeting the groundwater-specific criteria outlined in categories 1 through 4 of the LTCP. However, based on a discussion with ACEH, Tesoro, and Arctos on 25 August 2016, ACEH will consider managing the site to closure under category 5 of the LTCP if conditions of one of categories 1 through 4 are met, despite proximity to well CWS08.

Soil Cleanup Levels

Soil cleanup levels are established in Table 1 of the LTCP. Additional discussion is included in Section 4.3.2.

Groundwater Cleanup Levels

Category 4 sets a cleanup level of reducing dissolved-phase benzene and MTBE concentrations below 1,000 µg/l and demonstrating that rebound above this limit does not occur for plumes with an overall length less than 1,000 feet. Based on hydrocarbon concentrations reported in second quarter 2016, the length of the groundwater benzene plume is estimated to be less than 1,000 feet but has not been delineated. The table below summarizes the proposed cleanup levels and maximum concentrations detected during the second quarter 2016:

Constituent of Concern	Proposed Cleanup Level (µg/l)	2Q16 Maximum Concentration (µg/l)
Benzene	1,000	3,000 (DW-8)
MTBE	1,000	36 (MW-6)

Currently, only concentrations of benzene at onsite well DW-8 exceed cleanup goals. Arctos understands that the ultimate groundwater cleanup goal for the site is to achieve COC concentrations that will not pose an unacceptable risk to receptors and which meet the requirements of the LTCP, with natural attenuation processes continuing to degrade the remaining COCs until background levels and/or MCLs are reached.

4.2 Rebound Testing

Continuous remediation including oxygen injection, SVE, and ISCO has been conducted since 2010; currently, there is no post-remediation rebound testing data. Following completion of remediation, Arctos will perform rebound testing for at least 4 quarters to evaluate post-remediation groundwater concentrations and trends.

4.3 Low-Threat Closure Policy

Criteria	Criteria Met?	Additional Comments
General Criteria		
<i>The unauthorized release is located within the service area of a public water system.</i>	Yes	The unauthorized release is located within the service area of the Livermore Municipal Water utility.
<i>The unauthorized release consists only of petroleum.</i>	Yes	Based on historical file review and lab analytical results, the unauthorized release consists only of petroleum.
<i>The unauthorized (“primary”) release for the UST system has been stopped.</i>	Yes	There are two historical sources of contamination at this site. One historical source is the former leaking USTs, located in the southwest corner, and the other historical source is former leaking dispensers, located in the northwest corner of the site. In 1992, three USTs and associated product piping were removed from the site. Dispensers were replaced in 2013. Based on decreasing groundwater concentrations, there does not appear to be an ongoing source of contamination.
<i>Free product has been removed to the maximum extent practicable.</i>	Yes	Free product was detected at the site in October 2010 in injection well IP-8. A sheen was observed at offsite well DW-5 in November 2013 and January 2014; the sheen is believed to be a result of mass desorption due to the offsite ISCO event. Free product has not been observed in any on- or offsite wells since.
<i>A conceptual site model that assesses the nature, extent, and mobility of the release has been developed.</i>	Yes	The components of a conceptual site model are included in this report and historical reports submitted by Arctos to ACEH.
<i>The secondary source has been removed to the extent practicable.</i>	Yes	Petroleum-impacted soil and groundwater located in the vicinity of the points of release from the primary sources have been removed by soil excavation, oxygen injection, soil vapor extraction, and ISCO activities.
<i>Soil or groundwater has been tested for MTBE and results reported in accordance with the Health and Safety Code section 25296.15.</i>	Yes	Soil and groundwater have been tested for MTBE and results have been included in reports submitted to ACEH. Dissolved-phase MTBE concentrations are currently below 36 µg/l at all monitoring wells.

Criteria	Criteria Met?	Additional Comments
<i>Nuisance, as defined by Water Code section 10350, does not exist at the site.</i>	Yes	Nuisance does not exist on site. Water Code section 13050 defines “nuisance” as anything which meets all of the following requirements: (1) Is injurious to health, or is indecent or offense to the senses, or an obstruction to the free use of property so as to interfere with the comfortable enjoyment of life or property. (2) Affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal. (3) Occurs during, or as a result of, the treatment or disposal of the petroleum release
Groundwater-Specific Criteria (Scenario 4)		
<i>The contaminant plume that exceeds water quality objectives is less than 1,000 feet in length.</i>	No	The downgradient extent of the plume has not been delineated but is estimated to be less than 1,000 feet in length. As discussed in Section 2.5, Arctos will submit a work plan to investigate the downgradient extent of the plume.
<i>There is no free product.</i>	Yes	Free product was detected at the site in October 2010 in injection well IP-8. A sheen was observed at offsite well DW-5 in November 2013 and January 2014; the sheen is believed to be a result of mass desorption due to the offsite ISCO event. Free product has not been observed in any on- or offsite wells since.
<i>The nearest existing water supply well or surface water body is greater than 1,000 feet from the defined plume boundary.</i>	No	There are no surface water bodies within 1,000 feet of the plume. However, operating supply well CWS08 is located approximately 1,300 feet northwest (downgradient) of the site at 1493 Olivina Avenue in Livermore, California. The current downgradient extent of the plume is not defined to the MCL of 1 µg/l for benzene. As stated in Section 2.5, Arctos will submit a work plan to delineate the downgradient plume to the practicable extent and based on results, the distance of well CWS08 to the toe of the plume can be defined.
<i>The dissolved concentration of benzene is less than 1,000 µg/l, and the dissolved concentration of MTBE is less than 1,000 µg/l.</i>	No	Benzene exceeds the cleanup criteria of 1,000 µg/l at monitoring well DW-8. Benzene was detected at a concentration of 3,000 µg/l during the second quarter 2016. Dissolved-phase MTBE concentrations are currently below 36 µg/l at all monitoring wells.

Criteria	Criteria Met?	Additional Comments
Petroleum Vapor Intrusion to Indoor Air Criteria (Scenario 4)		
<i>There is a bioattenuation zone.</i>	Yes	Depth to water is greater than 30 feet and TPHg concentrations in soil from 0 to 30 feet below grade were below 100 mg/kg for most historical soil samples except for samples collected from the source area in 1992 and 1993. However, onsite SVE remediation conducted from 1996 to 1997 and 2010 to 2015 has decreased sorbed-phase hydrocarbon mass. Additionally, oxygen in the subsurface ranged from 16 to 22 percent prior to startup of the SVE system in 2010. Low soil COC concentrations and oxygen greater than 5 percent indicates there is likely a bioattenuation zone. However, Arctos used the soil vapor criteria for no bioattenuation zone because those criteria are more stringent.
<i>Soil gas sample was obtained beneath or adjacent to an existing building, and was collected at least five feet below the bottom of the building foundation.</i>	Yes	In 2006, soil vapor samples were collected from 9 onsite soil vapor probes at 4.5 and 5 feet below grade. In 2013, soil vapor samples were collected from 5 groundwater monitoring wells located along the western boundary of the site, as well as in the southern portion of the site near the residence; wells are screened from 28 to 43, 22 to 37, and 21 to 36 feet bgs.
<i>Soil gas concentrations must meet the criteria listed in the scenario 4 table.</i>	Yes	The site is located adjacent to a residence, therefore Arctos compared results of the 2006 and 2013 soil vapor surveys to the concentration limits for residential land use. Benzene and ethylbenzene were not detected in any soil vapor samples. However, detection limits for benzene exceed the residential soil gas criteria for sites with no bioattenuation zone. However, because benzene and ethylbenzene were not detected and there is a bioattenuation zone, soil vapor does not pose an unacceptable risk to residential receptors.
Direct Contact and Outdoor Air Criteria (Scenario 4)		
<i>Maximum concentrations of petroleum constituents in soil are less than or equal to those listed in Table 1 of the LTCP for the specified depth below grade.</i>	Yes	Based on data from soil samples collected from 1992 during tank and product piping removal as well as data from soil samples collected during boring and well installation from 1993 to 2012, the upper 10 feet of soil at the site is free of petroleum contamination. Benzene was not detected in any soil samples collected from 0 to 10 feet below grade. Ethylbenzene was detected in one soil sample collected from 2.5 feet below grade at a concentration of 0.041 mg/kg, which is below residential, commercial/industrial, and utility worker concentration limits presented in Table 1 of the LTCP.

The primary impediments to closure are that the downgradient extent of the plume has not been delineated to MCLs and dissolved-phase benzene concentrations downgradient of the former source area exceed 1,000 µg/l. The plume is estimated to be less than 1,000 feet in length, but to determine the extent, Arctos will submit a work plan to investigate the downgradient area of the plume. Additionally, benzene concentrations exceed the cleanup criteria of 1,000 µg/l at monitoring well DW-8. However, because the primary and secondary sources have been removed to the extent practicable and because onsite remediation is ongoing, benzene concentrations at well DW-8 are expected to continue to decrease.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Based on the information presented in this report, Arctos has concluded the following:

1. SVE, oxygen injection, and ISCO technologies have been demonstrated to be effective at remediating petroleum hydrocarbon impacts at the site.
2. Benzene concentrations exceed LTCP cleanup goals at one onsite well for plumes with an overall length less than 1,000 feet. Based on hydrocarbon concentrations reported in second quarter 2016, the length of the groundwater benzene plume is estimated to be less than 1,000 feet but is not currently delineated.
3. The former vadose zone impacts to soil have been largely removed from the site through soil remediation and excavation activities. It is unlikely that former soil impacts act as a continuing source to groundwater, and there is low risk for dermal exposure.
4. The release occurred during low water levels. Remaining soil impacts are located in low permeability soils in the saturated zone. Remaining soil impacts continue to contribute to the dissolved-phase plume via back diffusion. However, the risk associated with contaminant back diffusion is likely minimal based on decreasing groundwater concentrations. Additionally, due to their depths, impacts are a low risk to human health through direct contact and vapor intrusion. Saturated soil impacts will be monitored based on groundwater concentrations.
5. Results of soil and soil vapor sampling indicate the site likely has a bioattenuation zone and shallow soil vapor does not appear to be impacted by petroleum hydrocarbons. Therefore, the site meets residential soil gas criteria for a site with a bioattenuation zone as defined by the LTCP.

5.2 Recommendations

Proposed Remedial Approach

Based on the effectiveness of oxygen injection at reducing COC mass in the source area, Arctos proposes continuing this remedial approach. Reductions at injection wells and nearby groundwater monitoring wells have shown that oxygen injection is effective. The ROI of the system will expand as oxygen demand decreases in the vicinity of injection wells, as observed in well MW-2. The expanding ROI is anticipated to result in effective remediation of groundwater in the vicinity of well DW-8. Continued reduction in source area mass also decreases the potential for continued COC transport to offsite areas as observed in downgradient well MW-6.

High mass removal rates during initial startup of the SVE system indicate the system was effective at reducing hydrocarbon mass. However, low removal rates and minimal rebound during the last period of SVE operation indicate that the system (1) has removed hydrocarbon mass in the vadose zone and previously exposed saturated zones and (2) is most effective when operating on saturated soil that was not previously exposed to SVE. Arctos proposes keeping the SVE system off until water levels in the source area decrease below approximately 54 feet bgs and expose previously-submerged sorbed-phase mass.

Other Potential Remedial Considerations

In addition, based on the effectiveness of ISCO, this technology may be considered in the future to treat hotspots. Hotspots include areas with remaining impacts outside of the ROI of the onsite oxygen injection and SVE systems. Prior to implementing this type of technology, the monitoring well network around the proposed injection area(s) would be evaluated to assess whether the well network is sufficient to monitor plume deflection via injection by delineating to the point of no injection influence. The need for targeting hotspots is contingent upon further assessment of the effectiveness of oxygen injection at reducing groundwater concentrations and the need to further reduce groundwater plume toxicity to protect human health and the environment.

Remedial and Monitoring Schedule

Arctos proposes to perform remedial activities as follows:

1. Continue operation of the onsite oxygen injection system to reduce concentrations below LTCP criteria. Based on current trends, the system

will be operated into 2019, followed by assessment of overall COC reductions and rebound monitoring.

2. Intermittently operate the SVE system during the same three year period (through 2019) if water levels decrease and expose soil that has not been previously exposed to SVE, or if SVE influent concentrations indicate that significant COC mass remains and can be effectively remediated by SVE. As stated above in this section, the SVE system will not be operated unless water levels in the source area decrease below approximately 54 feet bgs.
3. Continue semiannual groundwater monitoring and reporting, with supplemental quarterly monitoring to evaluate remedial effectiveness. Wells will be sampled in accordance with the modified sampling plan proposed in Arctos's "First Quarter 2015 Status Report" and approved by ACEH in a 23 June 2015 e-mail (Arctos, 2015; ACEH, 2015; Appendix F).
4. Delineate the downgradient extent of the dissolved-phase plume to more definitively determine plume length. Arctos will submit a separate work plan for this data gap assessment

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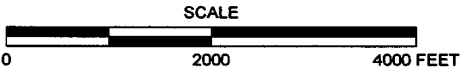
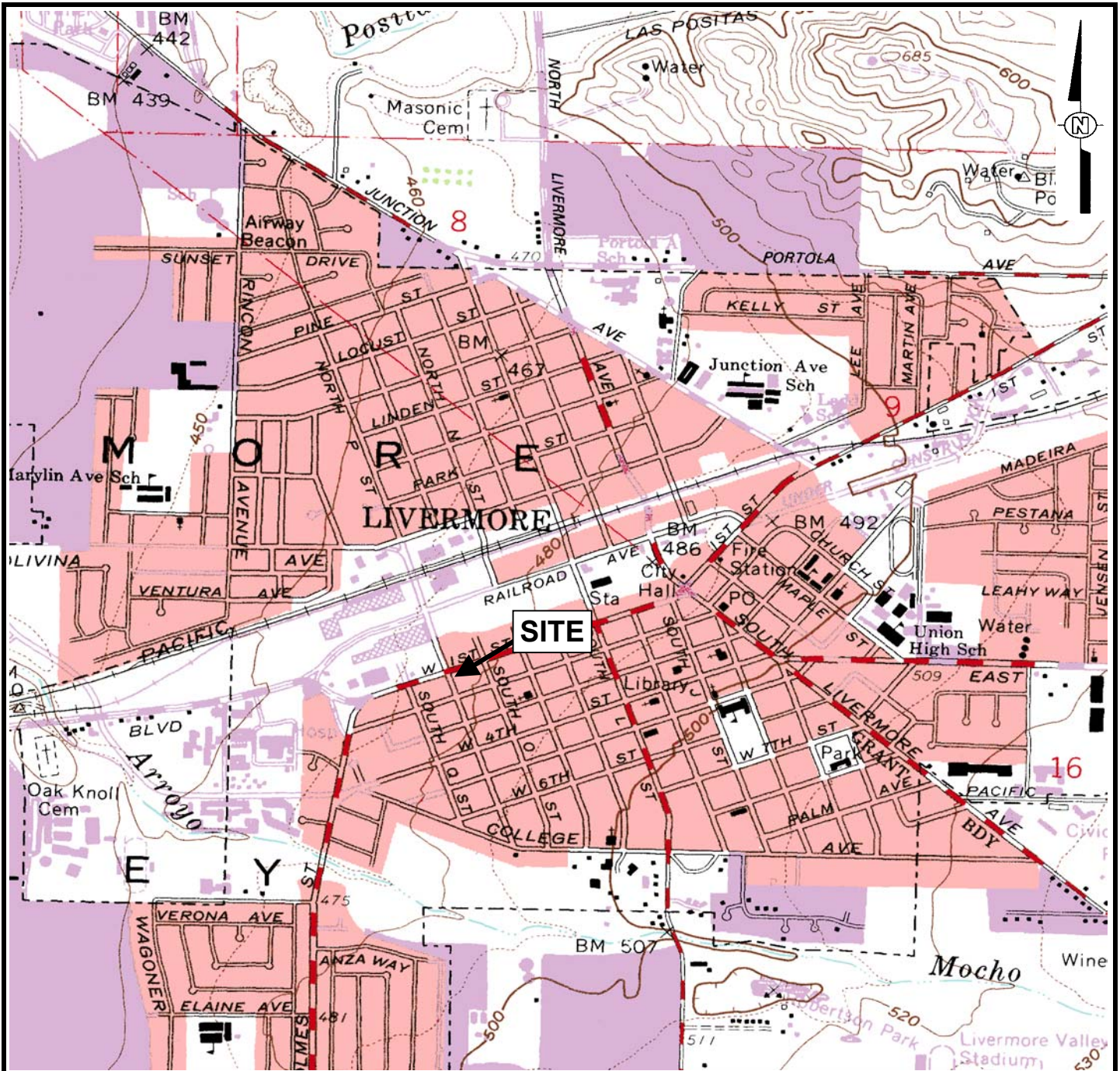
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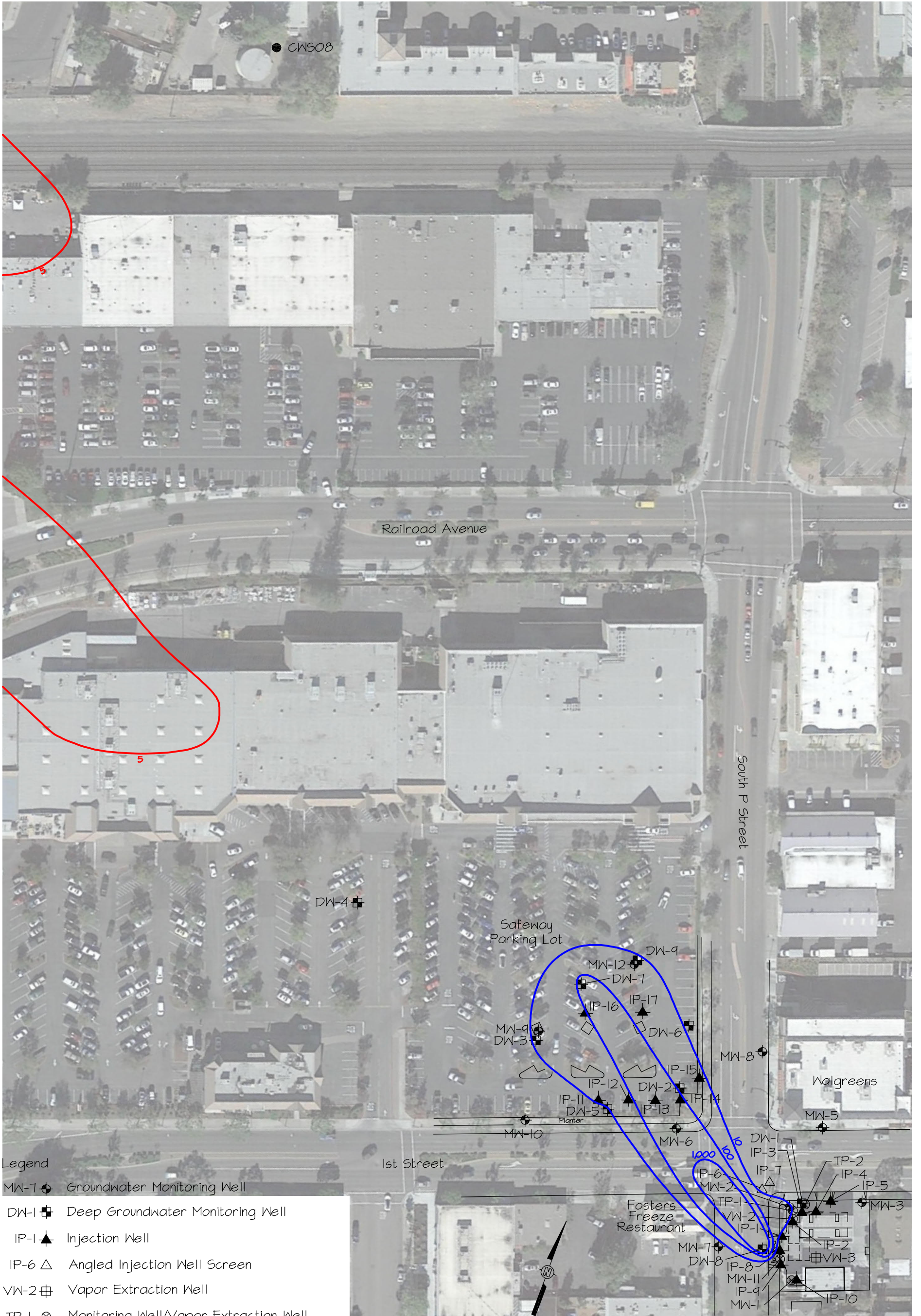
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REFERENCE
 7.5 MINUTE USGS TOPOGRAPHIC MAP OF
 LIVERMORE, CALIFORNIA QUADRANGLE
 DATE: 1961, PHOTOREVISED 1980
 SCALE = 1:24,000

ARCTOS ENVIRONMENTAL			
TESORO - LIVERMORE			
SITE LOCATION MAP			
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FILE NO. Site Map.xls		FIGURE 1	



Legend

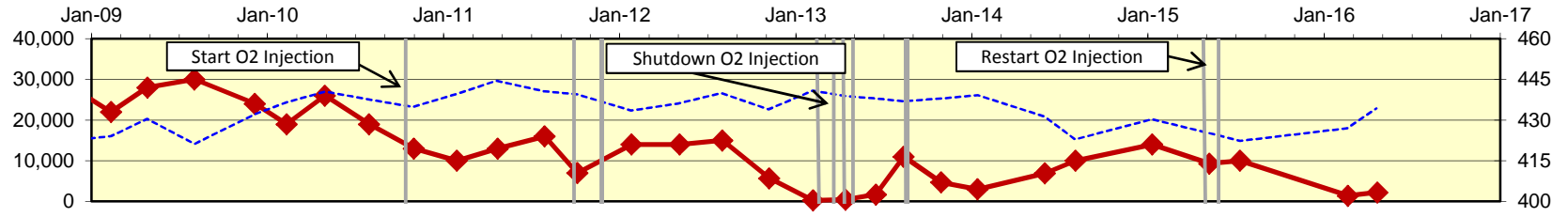
- MW-7 ◈ Groundwater Monitoring Well
- DW-1 ◈ Deep Groundwater Monitoring Well
- IP-1 ▲ Injection Well
- IP-6 △ Angled Injection Well Screen
- VW-2 ◈ Vapor Extraction Well
- TP-1 ⊗ Monitoring Well/Vapor Extraction Well
- CWS08 ● California Water Service Municipal Well

- 1000 — 2016 Benzene Concentration Contour (µg/L), Queried Where Uncertain
- 5 — Approximate 2016 PCE Concentration Contour (µg/l) Associated with LASC/MOSC Site (RNQCB Case OISO216)

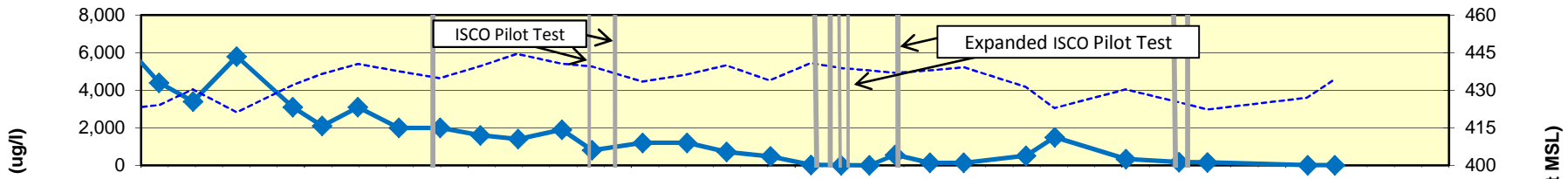
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	NO.	BY	DATE	
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	1	MY	12/3/16	XXX

ARCTOS ENVIRONMENTAL			
TESORO - LIVERMORE			
REGIONAL SITE PLAN			
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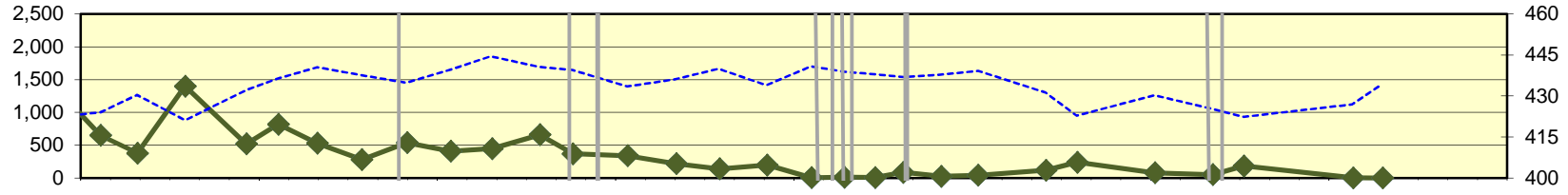
TPHg and Groundwater Elevation



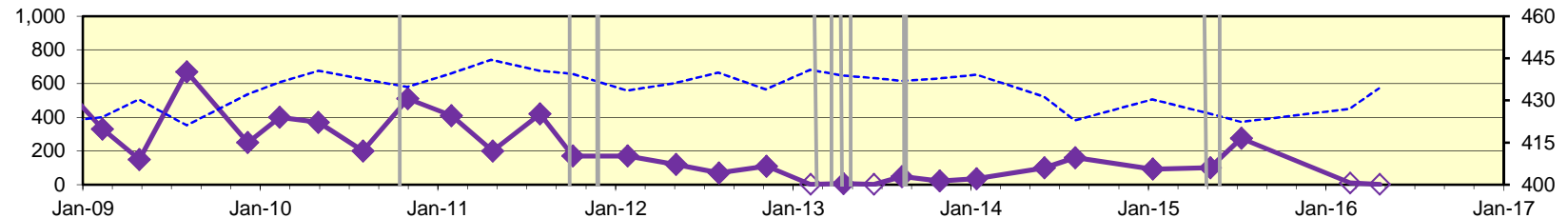
Benzene and Groundwater Elevation



MTBE and Groundwater Elevation

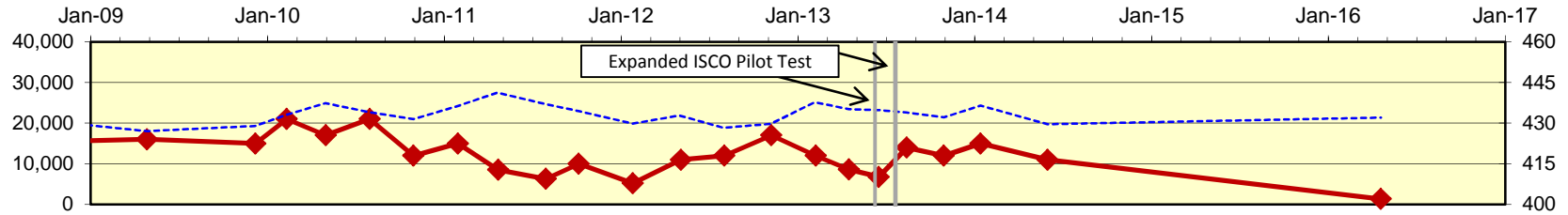


TBA and Groundwater Elevation

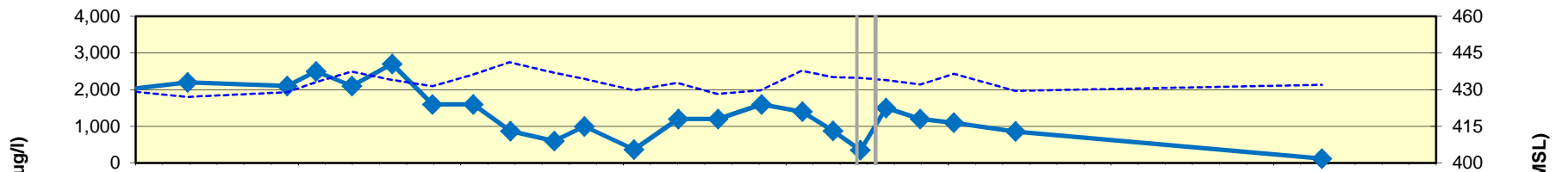


—◆— TPHg
 —◆— Benzene
 —◆— MTBE
 —◆— TBA
 ◆ Detections
 - - - - - GW Elevation

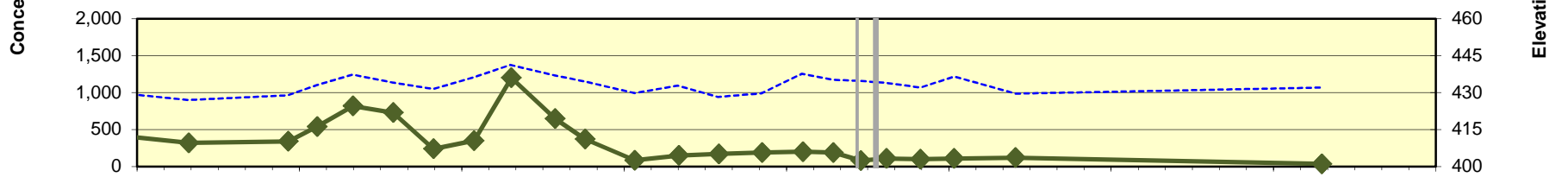
TPHg and Groundwater Elevation



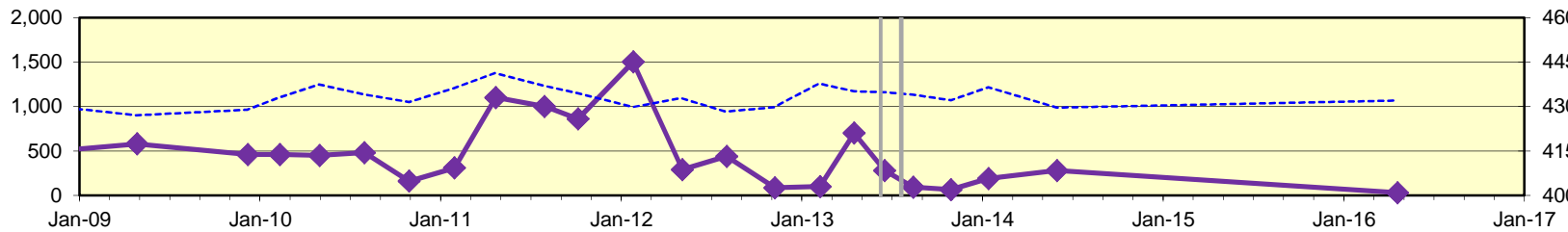
Benzene and Groundwater Elevation



MTBE and Groundwater Elevation

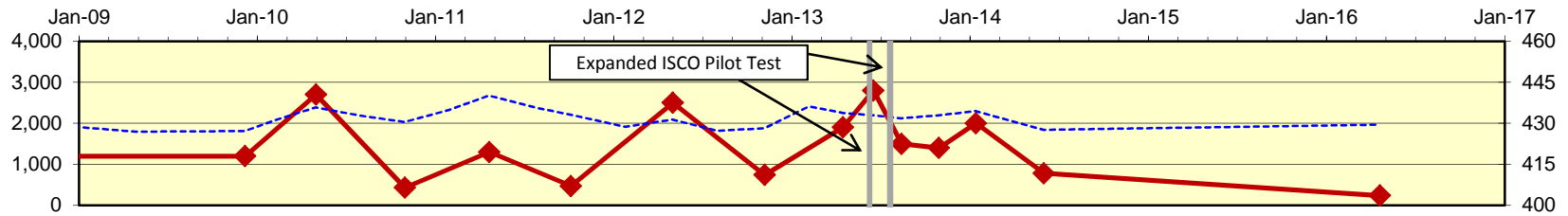


TBA and Groundwater Elevation

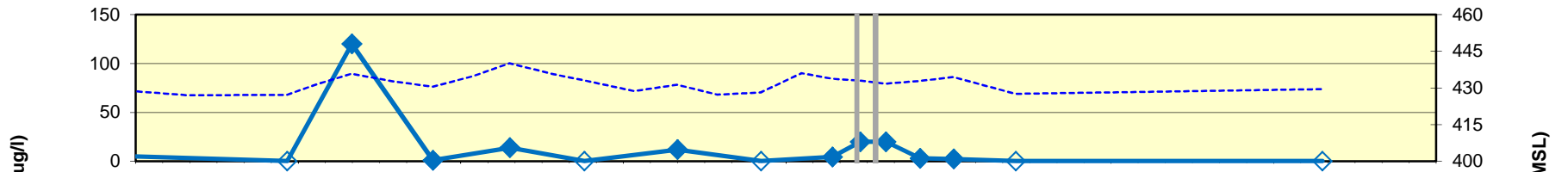


◆ TPHg
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 ◆ Detections
 - - - GW Elevation

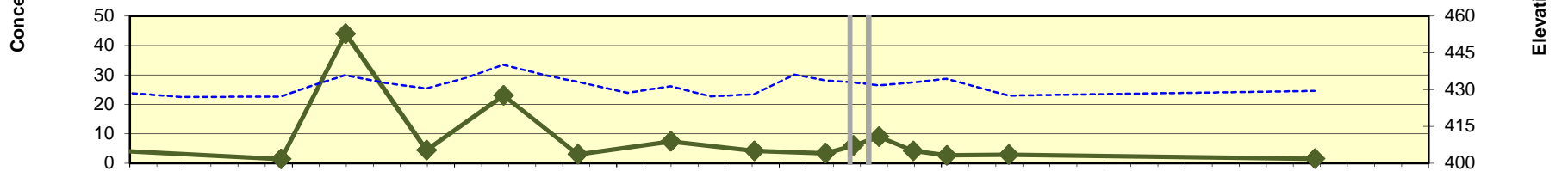
TPHg and Groundwater Elevation



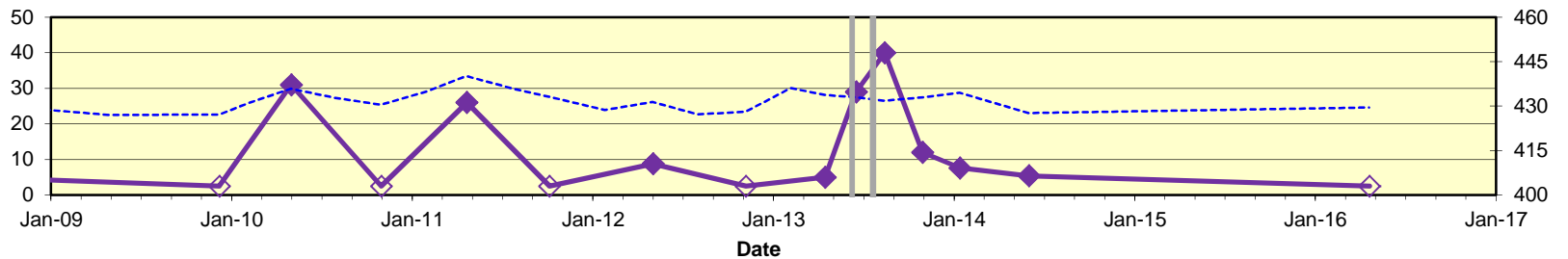
Benzene and Groundwater Elevation



MTBE and Groundwater Elevation

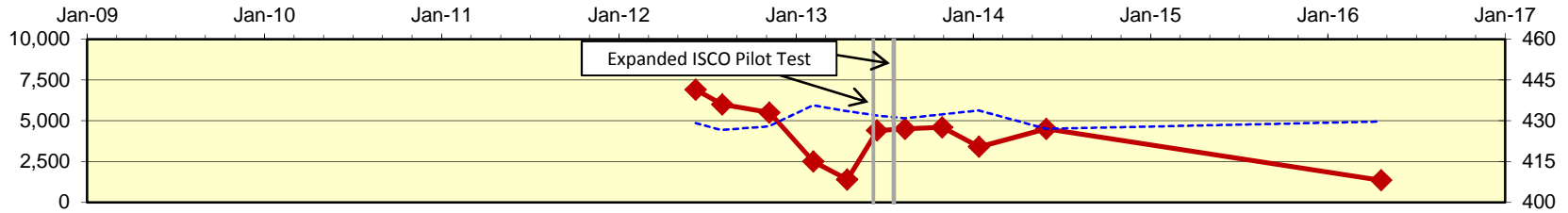


TBA and Groundwater Elevation

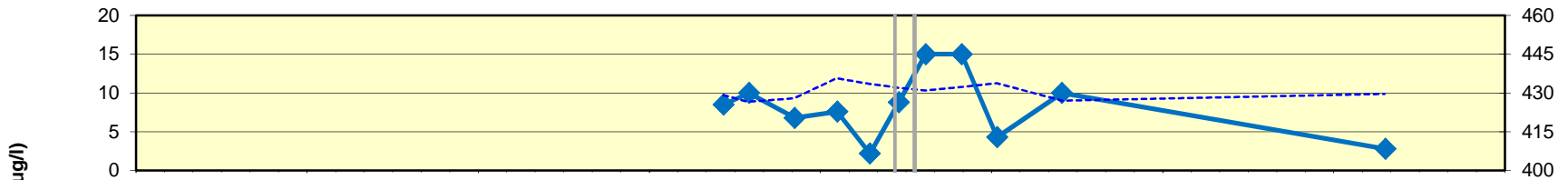


◆ TPHg
 ◆ Benzene
 ◆ MTBE
 ◆ TBA
 ◆ Detections
 - - - GW Elevation

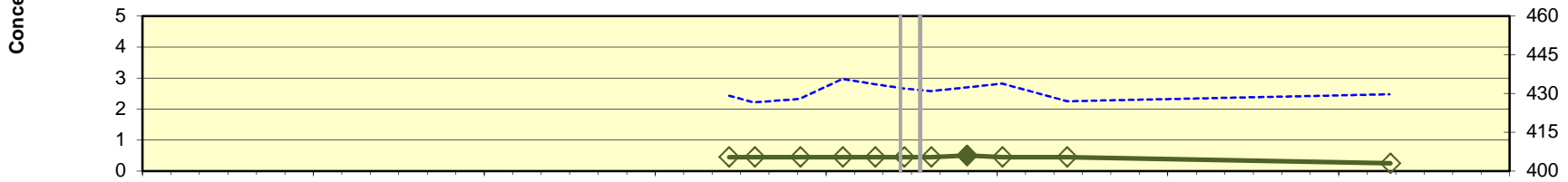
TPHg and Groundwater Elevation



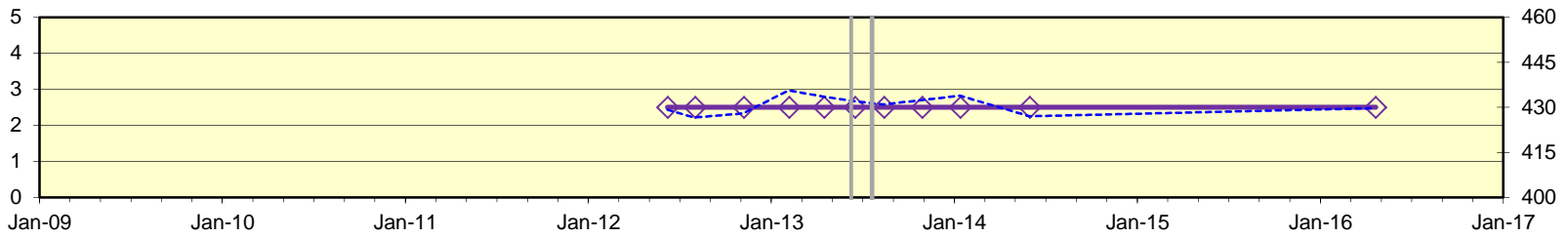
Benzene and Groundwater Elevation



MTBE and Groundwater Elevation

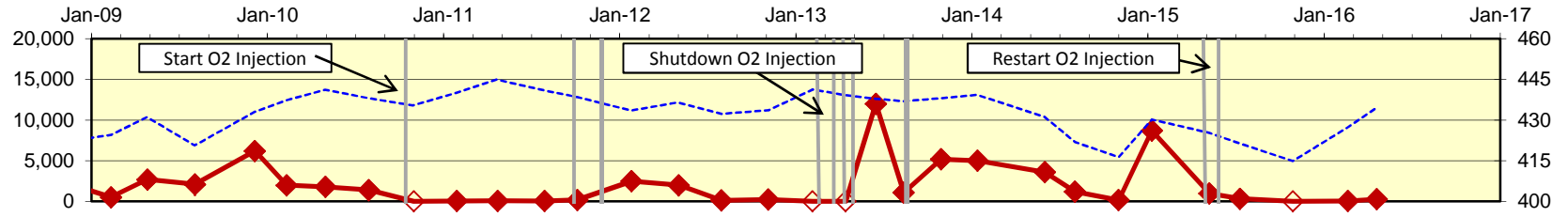


TBA and Groundwater Elevation

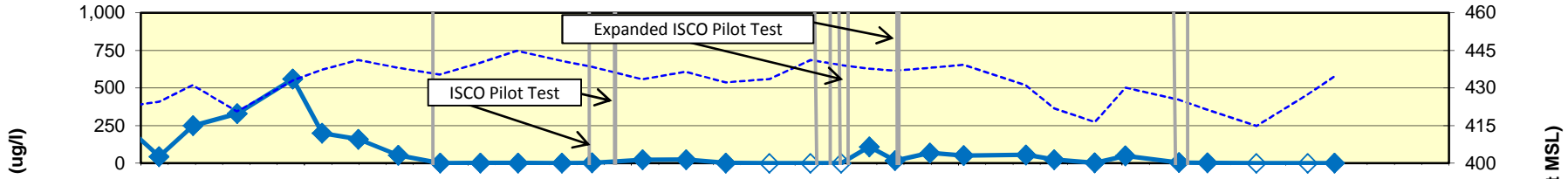


◆ TPHg
 ◆ Benzene
 ◆ MTBE
 ◆ TBA
 ◆ Detections
 - - - - - GW Elevation

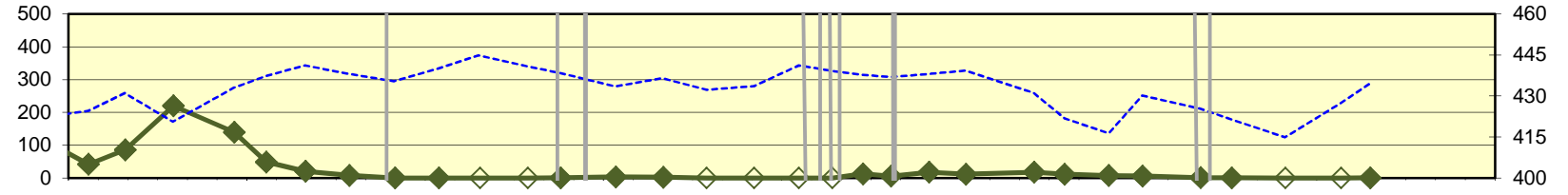
TPHg and Groundwater Elevation



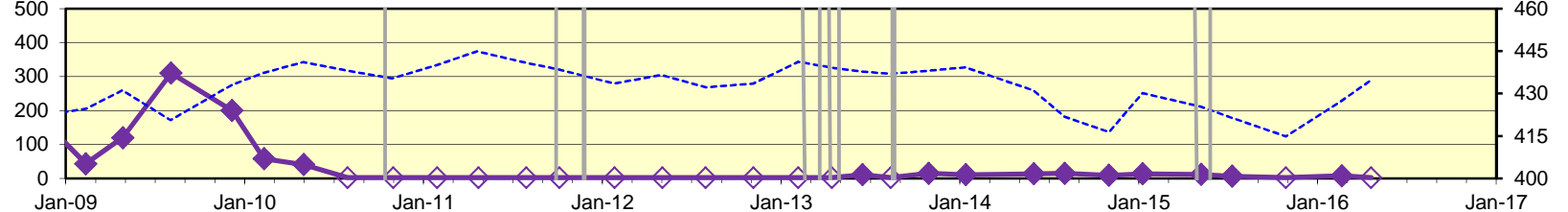
Benzene and Groundwater Elevation



MTBE and Groundwater Elevation

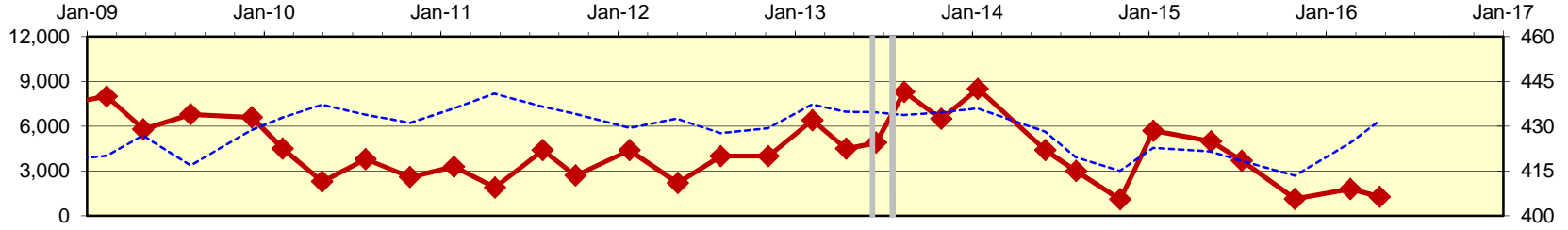


TBA and Groundwater Elevation

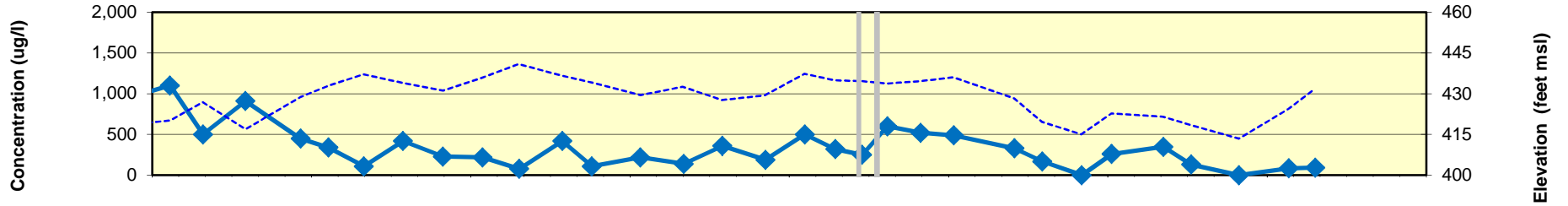


◆ TPHg
 ◆ Benzene
 ◆ MTBE
 ◆ TBA
 ◆ Detections
 - - - - - GW Elevation

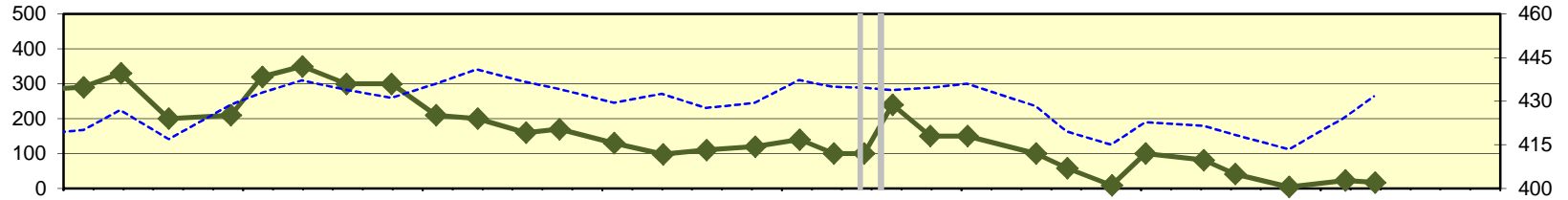
TPHg and Groundwater Elevation



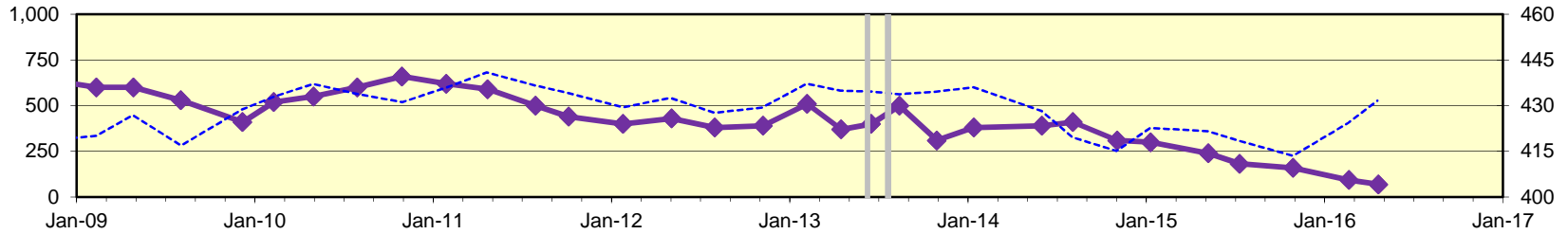
Benzene and Groundwater Elevation



MTBE and Groundwater Elevation

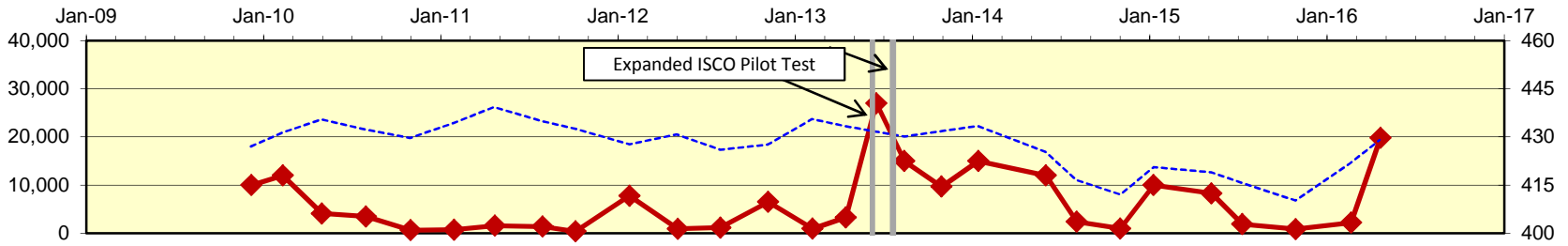


TBA and Groundwater Elevation

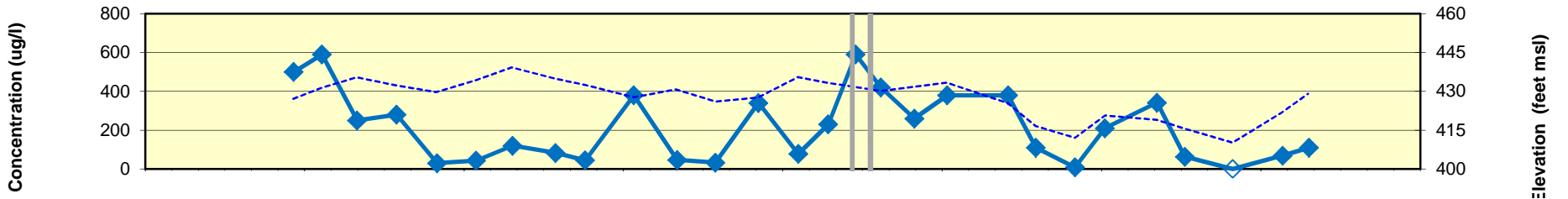


◆ TPHg
 ◆ Benzene
 ◆ MTBE
 ◆ TBA
 ◆ Detections
 - - - GW Elevation

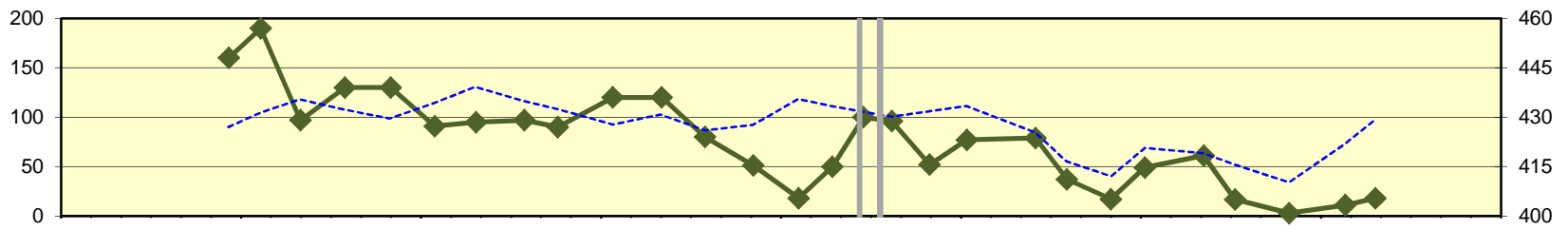
TPHg and Groundwater Elevation



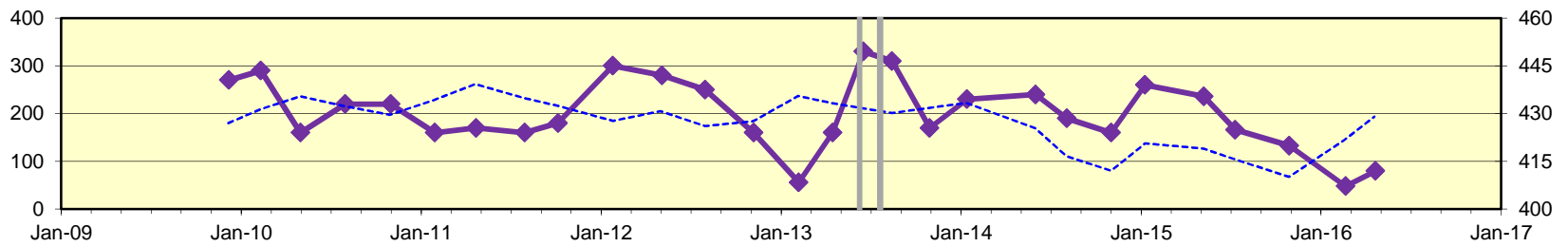
Benzene and Groundwater Elevation



MTBE and Groundwater Elevation

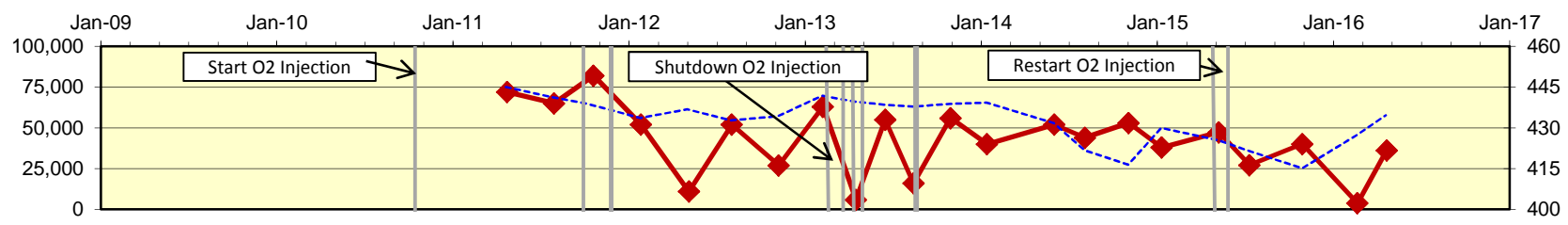


TBA and Groundwater Elevation

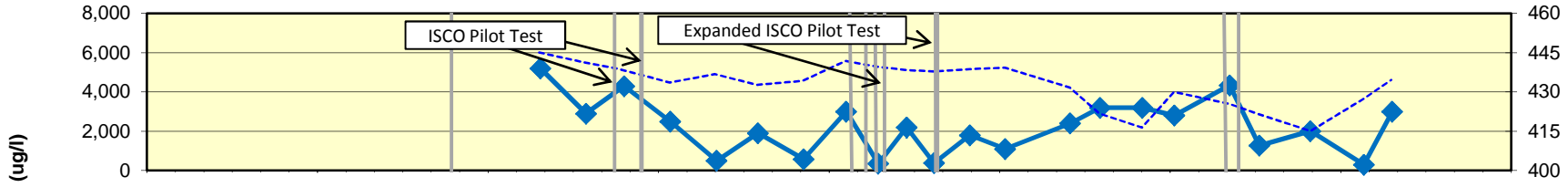


◆ TPHg
 ◆ Benzene
 ◆ MTBE
 ◆ TBA
 ◆ Detections
 - - - GW Elevation

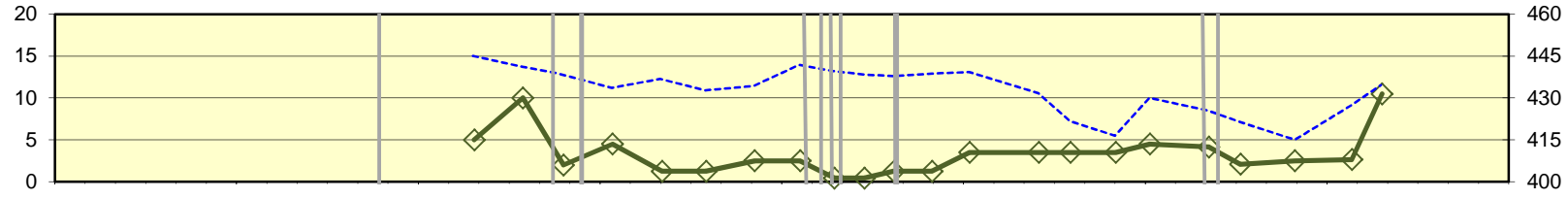
TPHg and Groundwater Elevation



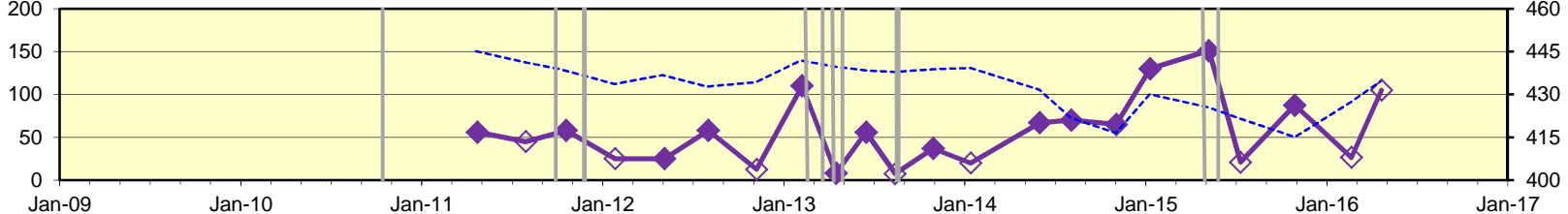
Benzene and Groundwater Elevation



MTBE and Groundwater Elevation



TBA and Groundwater Elevation

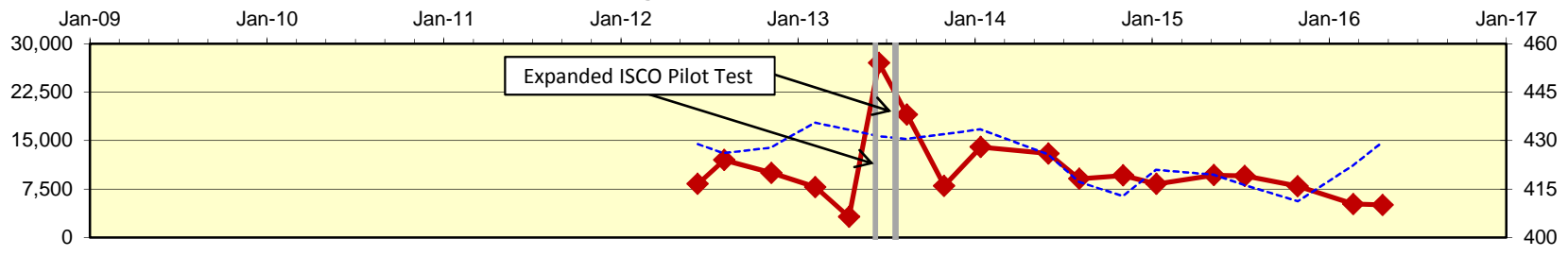


Concentration (ug/l)

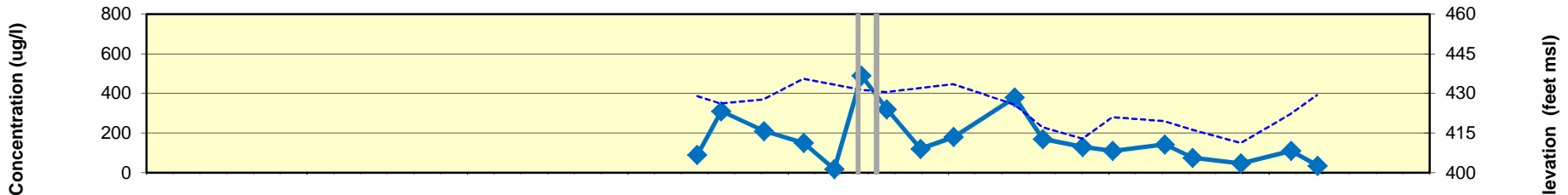
Elevation (feet MSL)

◆ TPHg
 ◆ Benzene
 ◆ MTBE
 ◆ TBA
 ◆ Detections
 - - - GW Elevation

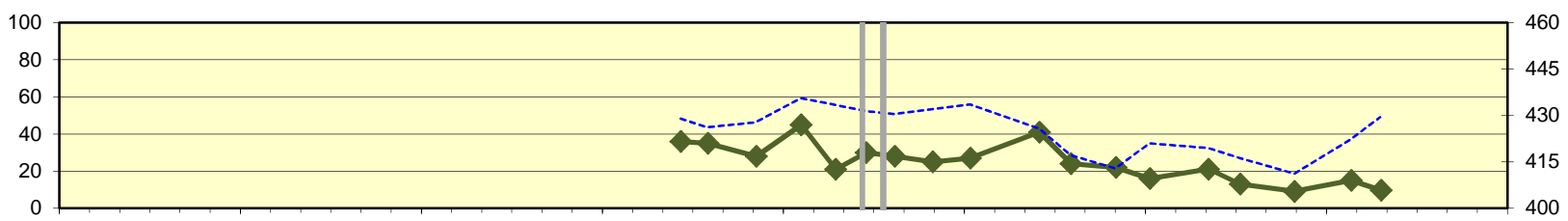
TPHg and Groundwater Elevation



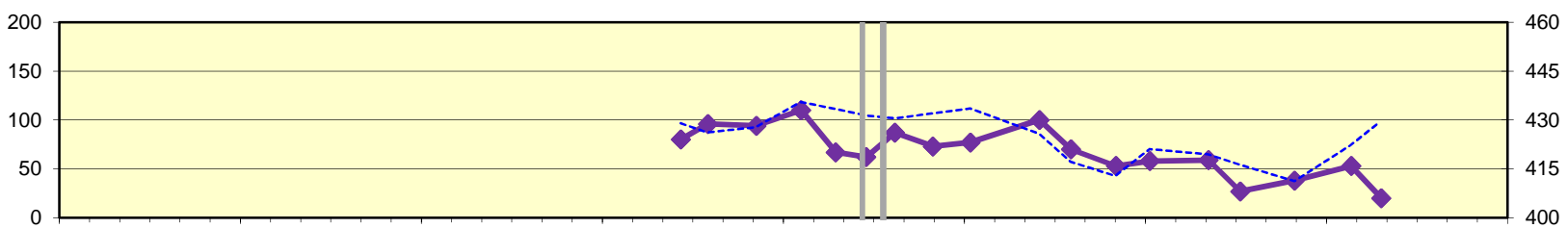
Benzene and Groundwater Elevation



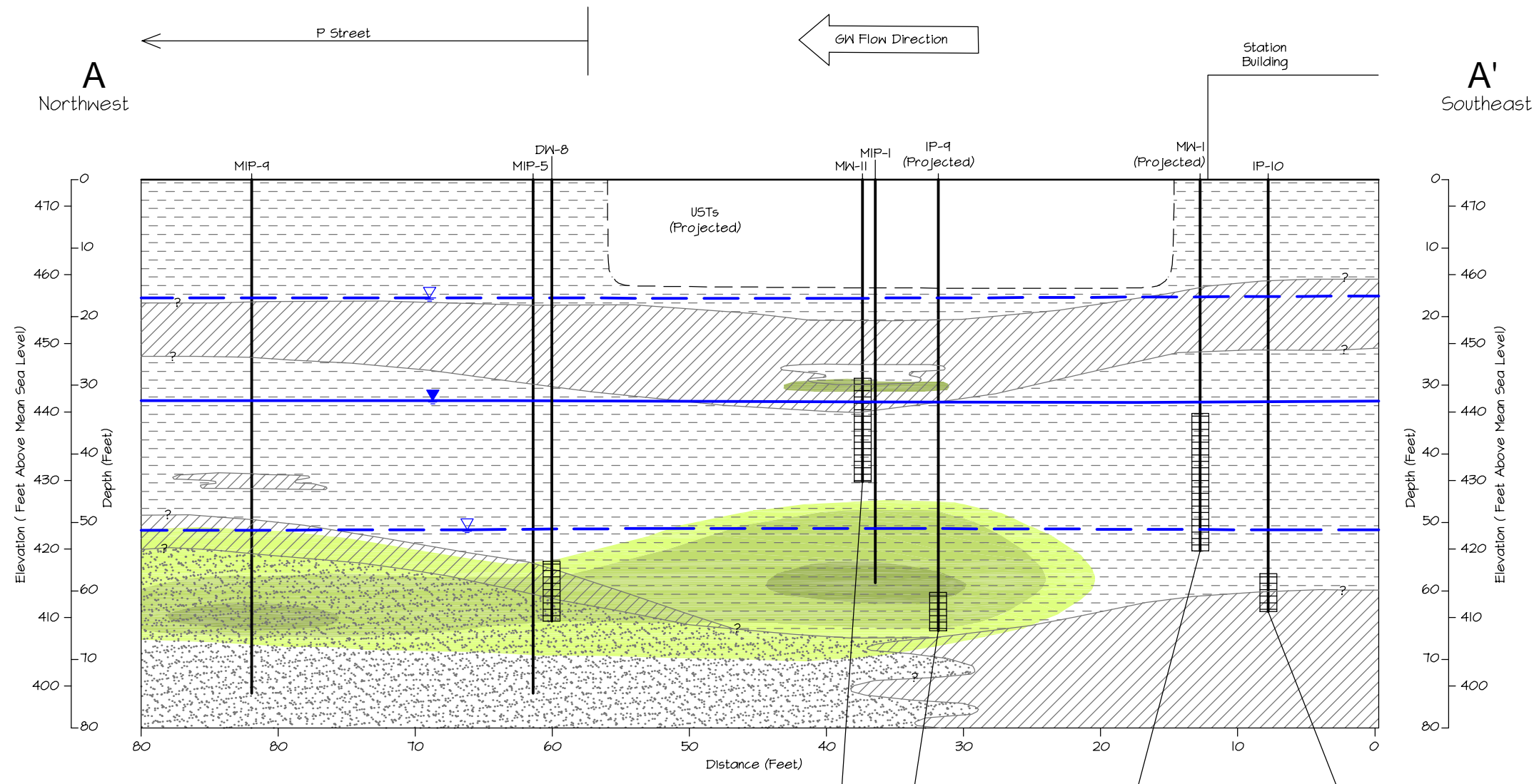
MTBE and Groundwater Elevation



TBA and Groundwater Elevation



—◆— TPHg
 —◆— Benzene
 —◆— MTBE
 —◆— TBA
 ◆ Detections
 - - - - - GW Elevation



TPHg	20,000	TPHg	92,000	TPHg	200	TPHg	3,600
Benzene	210	Benzene	6,000	Benzene	ND	Benzene	73
MTBE	ND	MTBE	ND	MTBE	ND	MTBE	ND

Legend

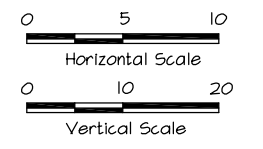
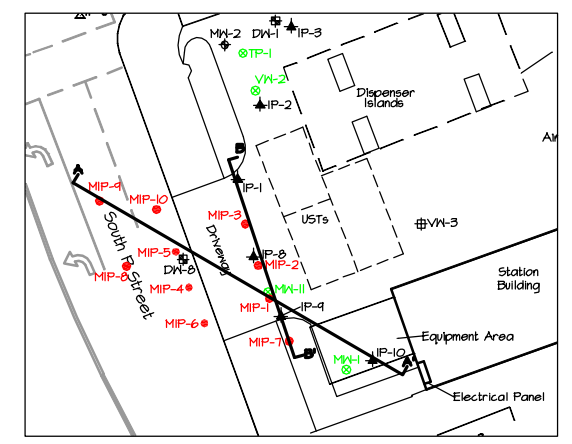
- Soil Classification**
- Silts and Clays
 - Sands and Silty Sands
 - Cemented Sands or Silts
 - Well or Boring Identification
 - Screened Interval
 - Groundwater Elevation at MW-1 on 1 February 2011
 - Historic High Groundwater Elevation at MW-1 (21 March 1996) and Historic Low Groundwater Elevation at MW-1 (4 August 2009)

Groundwater Results From May 2010 (IP-9, IP-10) or February 2011 (MW-1, MW-11)

TPHg	20,000	Total Petroleum Hydrocarbons as Gasoline ($\mu\text{g/l}$)
Benzene	210	Benzene ($\mu\text{g/l}$)
MTBE	ND	Methyl Tert-Butyl Ether ($\mu\text{g/l}$)
ND Not Detected at Reporting Limit		

Flame Ionization Detector (FID) Response Contours From January 2011 Membrane Interface Probe (MIP) Borings

	1.0E6 - 3.0E6
	3.0E6 - 5.0E6
	>5.0E6



REVISION	REVISIONS			
	NO.	BY	DATE	DESCRIPTION
	0	MY	2/10/11	Site Investigation Report
	1	MY	7/27/11	Work Plan for ISCO Pilot Test
	2	MY	12/3/16	Remedial Action Plan

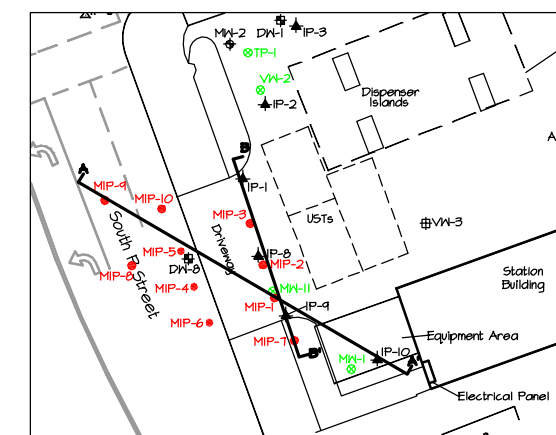
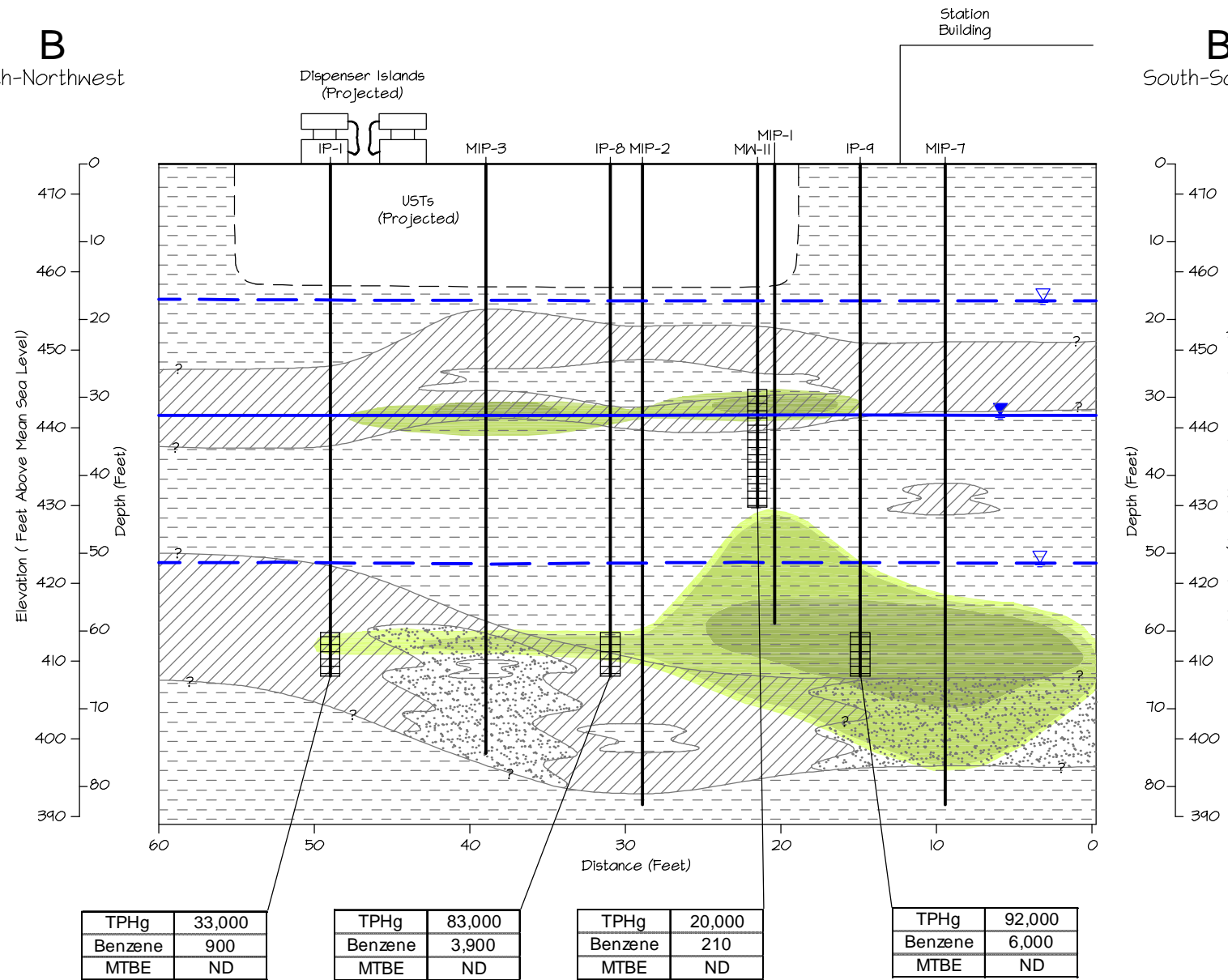
ARCTOS ENVIRONMENTAL			
TESORO - LIVERMORE			
GEOLOGIC CROSS SECTION A-A'			
WITH MIP RESULTS			
PROJECT NO. OILV	DRAWN BY MY	CHECKED BY MN	APPROVED BY JPG
FILE NO. OILVII80802.DWG		FIGURE 4	

12/3/2016 5:55AM 01LV11B0802.dwg

12/3/2016 6:09AM 01LV11B0901.dwg

B
North-Northwest

B'
South-Southeast



Legend
Soil Classification

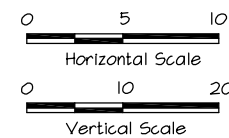
- Silts and Clays
- Sands and Silty Sands
- Cemented Sands or Silts
- IP-4 Well or Boring Identification
- Screened Interval
- Groundwater Elevation at MN-1 on 1 February 2011
- Historic High Groundwater Elevation at MN-1 (21 March 1946) and Historic Low Groundwater Elevation at MN-1 (4 August 2009)

Groundwater Results From May 2010 (IP-1, IP-8, IP-4) or February 2011 (, MN-11)

TPHg	33,000	Total Petroleum Hydrocarbons as Gasoline ($\mu\text{g/l}$)
Benzene	900	Benzene ($\mu\text{g/l}$)
MTBE	ND	Methyl Tert-Butyl Ether ($\mu\text{g/l}$)

ND Not Detected at Reporting Limit

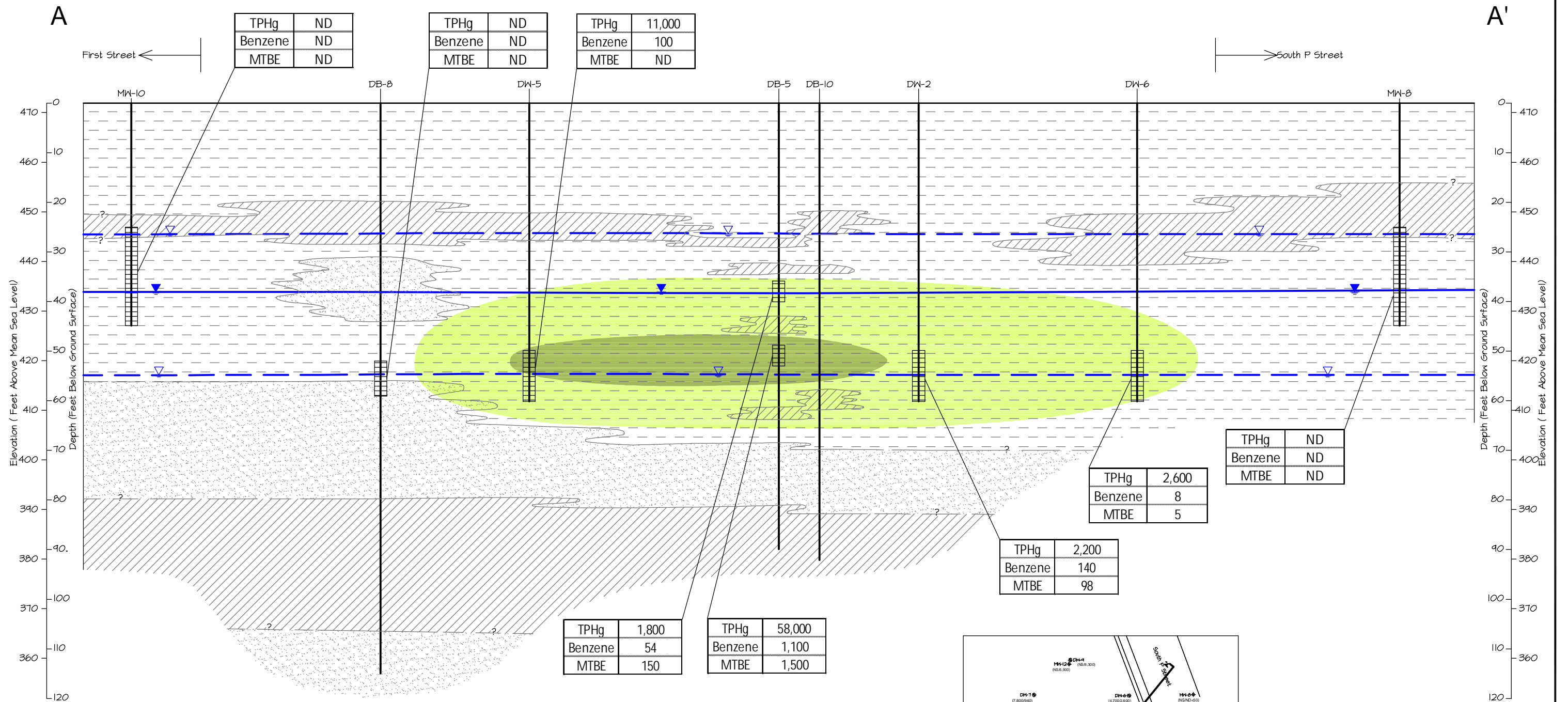
Flame Ionization Detector (FID) Response Contours From January 2011 Membrane Interface Probe (MIP) Borings



REVISION	REVISIONS			
	NO.	BY	DATE	DESCRIPTION
	0	MY	2/10/11	Site Investigation Report
	1	MY	12/3/16	Remedial Action Plan

ARCTOS ENVIRONMENTAL			
TESORO - LIVERMORE			
GEOLOGIC CROSS SECTION B-B'			
WITH MIP RESULTS			
PROJECT NO. OILV	DRAWN BY MY	CHECKED BY MN	APPROVED BY JPG
FILE NO. OILV11B0901.DWG		FIGURE 5	

12/3/2016 6:38AM 01LV11B1401.dwg



Legend

Soil Classification

- Silts and Clays
- Sands and Silty Sands
- Cemented Sands or Silts

Well or Boring Identification

- MW-10 Well or Boring Identification
- Screened Interval
- Groundwater Elevation on 7 May 2012
- Historic High Groundwater Elevation at MW-8 16 May 2006 and Historic Low Groundwater Elevation at DW-2 on 4 August 2009

Groundwater Results From May or June 2012 or February 2006 (DB-5)

TPHg	11,000	Total Petroleum Hydrocarbons as Gasoline ($\mu\text{g/l}$)
Benzene	100	Benzene ($\mu\text{g/l}$)
MTBE	ND	Methyl Tert-Butyl Ether ($\mu\text{g/l}$)

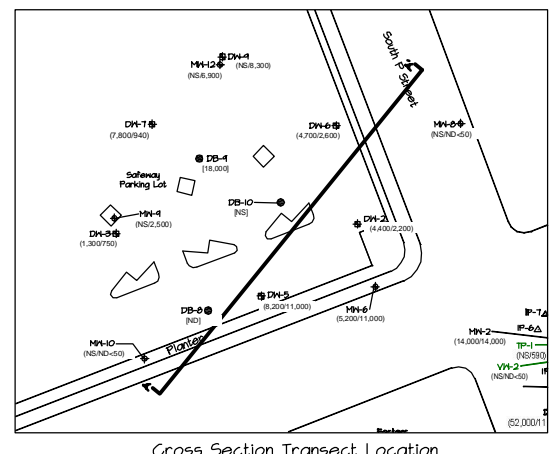
ND Not Detected at Reporting Limit

TPHg Concentration Contours

- 1,000 to 10,000 $\mu\text{g/l}$
- > 10,000 $\mu\text{g/l}$

0 10 20
Horizontal Scale

0 10 20
Vertical Scale



REVISION	REVISIONS			
	NO.	BY	DATE	DESCRIPTION
1	MY	8/15/12		Second Quarter 2012 Monitoring Report
1	MY	12/3/16		Remedial Action Plan

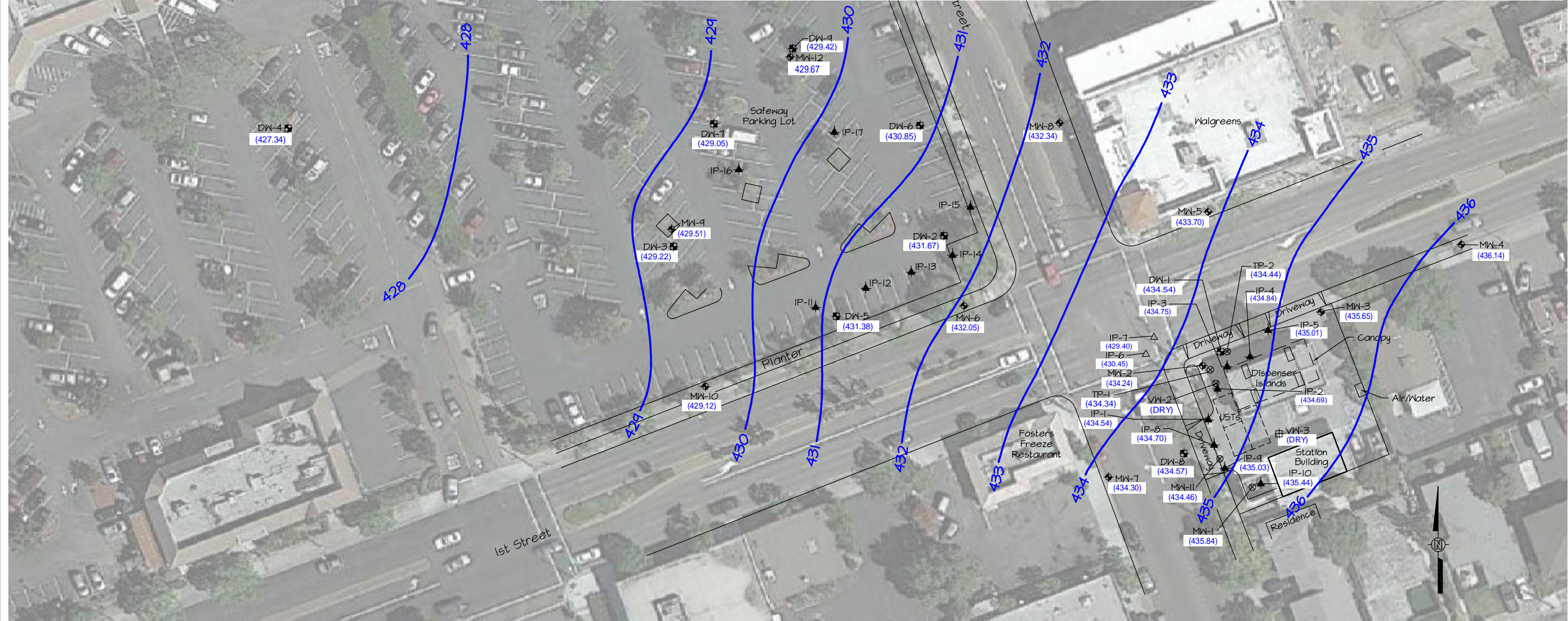
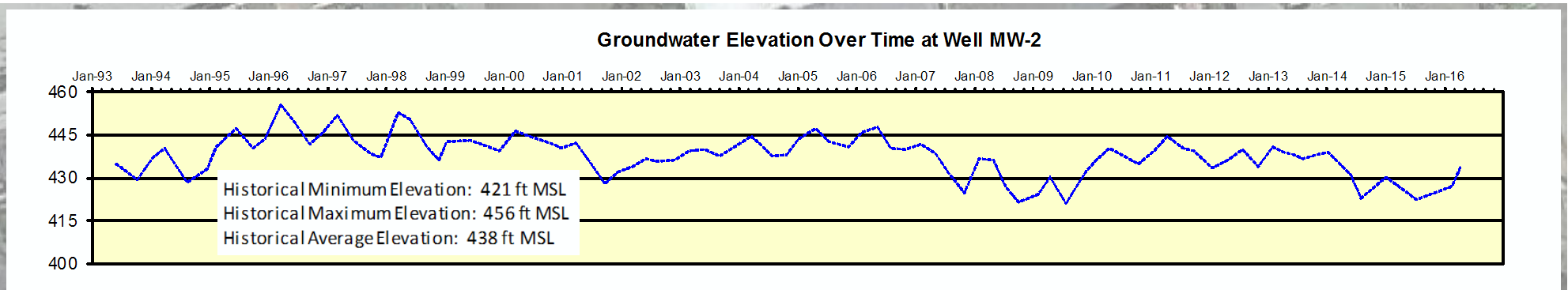
ARCTOS ENVIRONMENTAL

TESORO - LIVERMORE

GEOLOGIC CROSS SECTION A-A' WITH TPHg CONCENTRATION CONTOURS

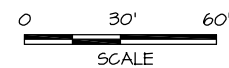
PROJECT NO. OILV	DRAWN BY MY	CHECKED BY SS	APPROVED BY MP
FILE NO. OILV11B1401.DWG		FIGURE 6	

01LV11B-20433.dwg
7/20/2016 4:37PM



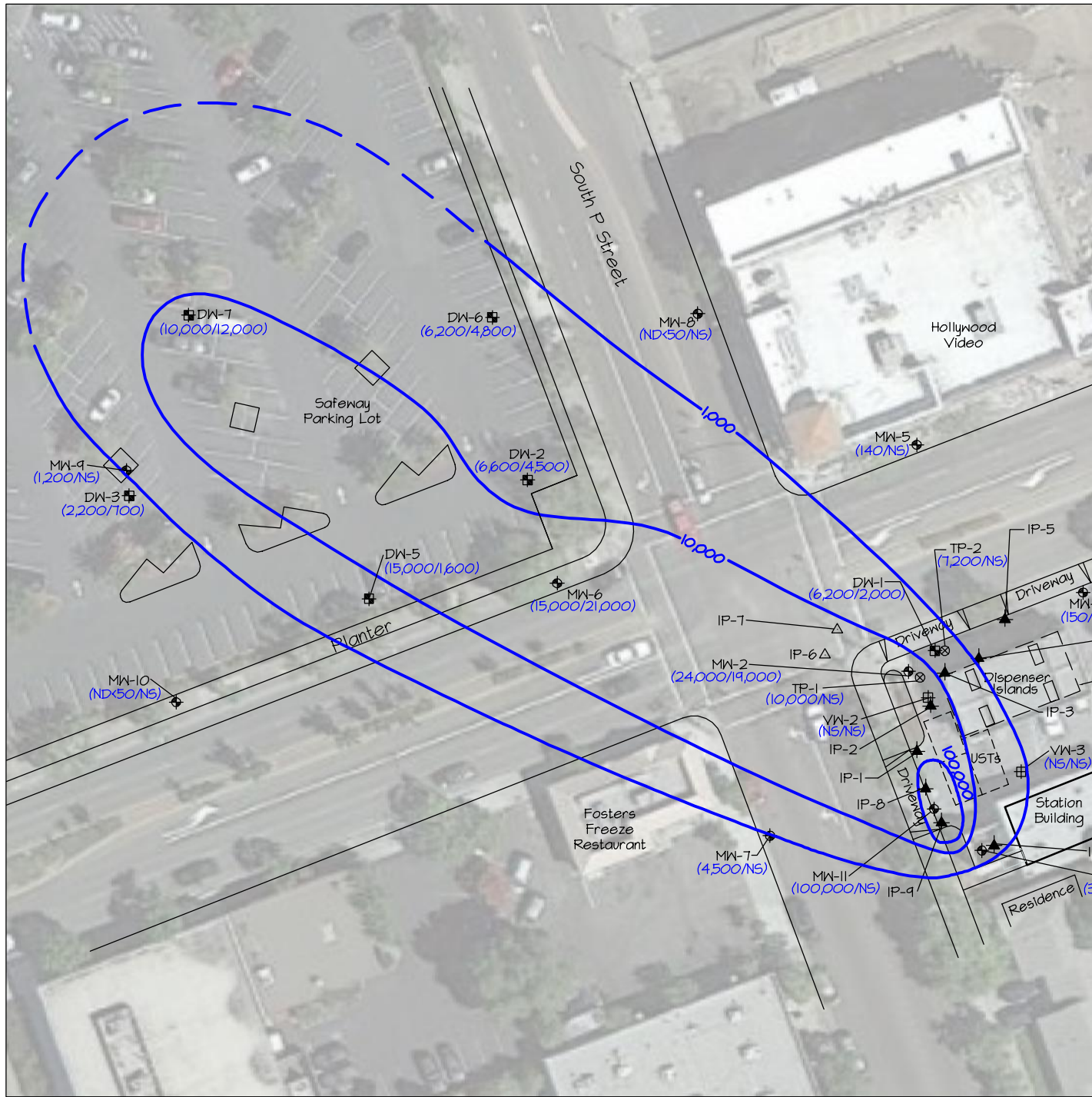
Legend

- MW-7 Groundwater Monitoring Well
- DW-1 Deep Groundwater Monitoring Well
- IP-1 Injection Well
- IP-6 Angled Injection Well Screen
- VN-2 Vapor Extraction Well
- TP-1 Monitoring Well/Vapor Extraction Well
- (427.34) Groundwater Elevation in Feet Above Mean Sea Level (MSL) Measured 2 May 2016
- 428 Groundwater Elevation Contour (Feet Above MSL)

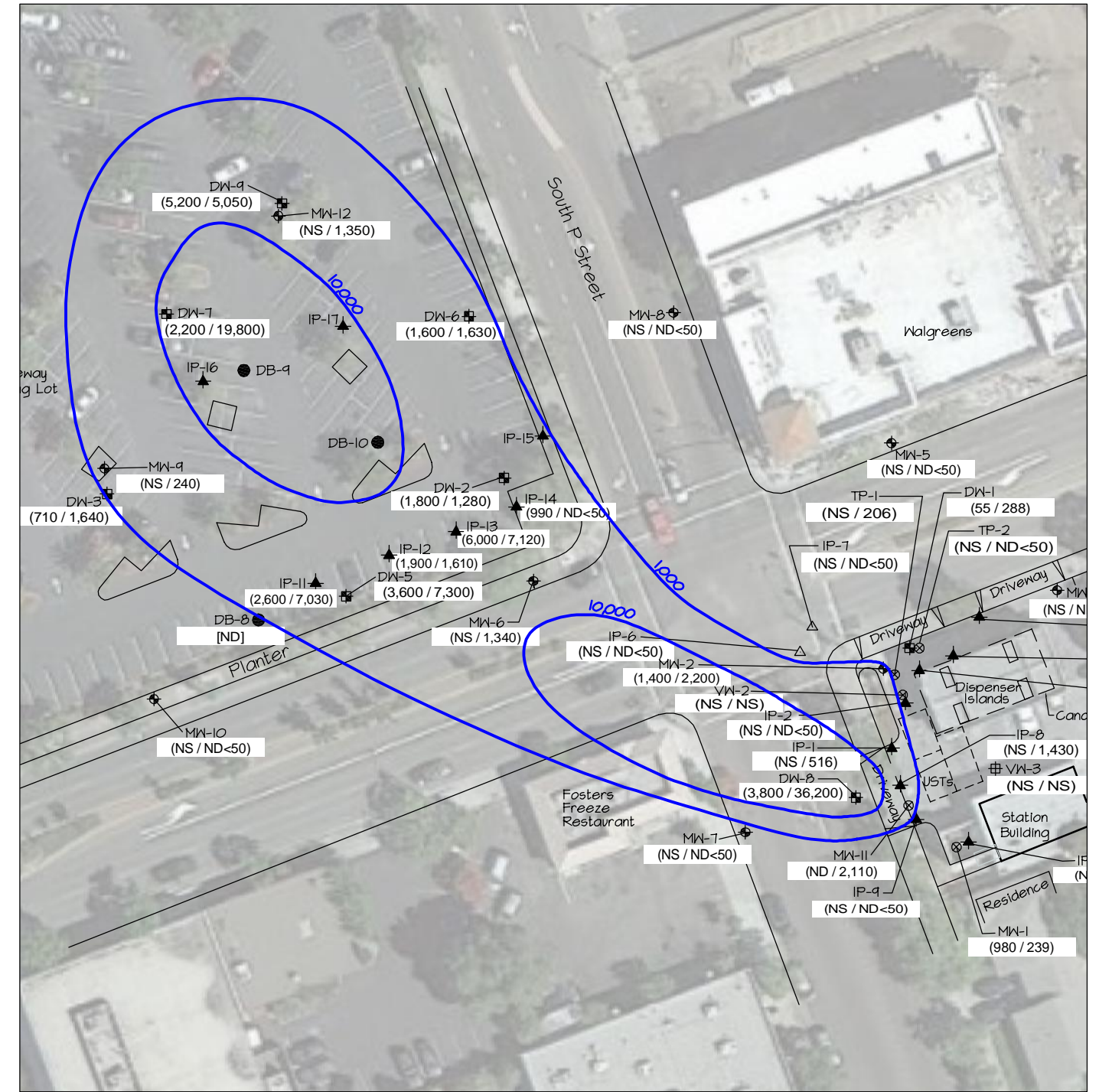


REVISION	REVISIONS			
	NO.	BY	DATE	DESCRIPTION
33	28	MY	3/15/15	First Quarter 2015 Monitoring Report
	29	MY	1/15/15	Second Quarter 2015 Monitoring Report
	30	MY	1/26/16	Second Half 2015 Monitoring Report
	31	MY	1/26/16	Second Half 2015 Monitoring Report
	32	MY	1/15/16	First Half 2016 Monitoring Report
33	MY	7/15/16	First Half 2016 Monitoring Report	

ARCTOS ENVIRONMENTAL			
TESORO - LIVERMORE			
GROUNDWATER ELEVATION CONTOURS - 2Q16			
PROJECT NO. OILV	DRAWN BY MY	CHECKED BY MP	APPROVED BY JPG
FILE NO. OILV11B-20433.DWG		FIGURE 7	



February 2010



May 2016

Legend

- MW-1 Groundwater Monitoring Well
- DW-1 Deep Groundwater Monitoring Well
- IP-1 Injection Well
- IP-6 Angled Injection Well Screen
- VN-3 Vapor Extraction Well (Not Connected to System)
- TP-1 Monitoring Well/Vapor Extraction Well
- MIP-1 January 2011 Membrane Interface Probe (MIP) Boring

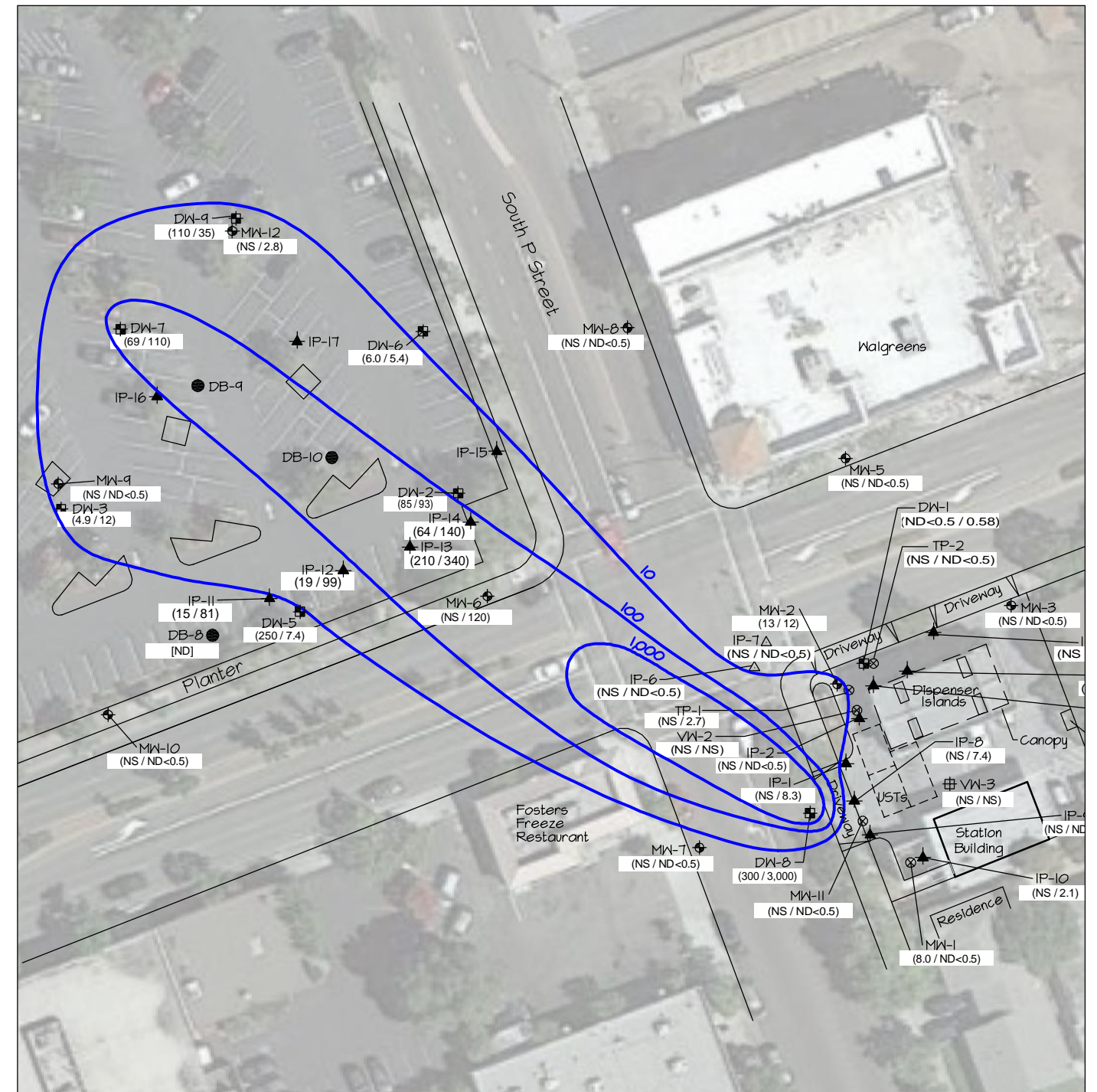
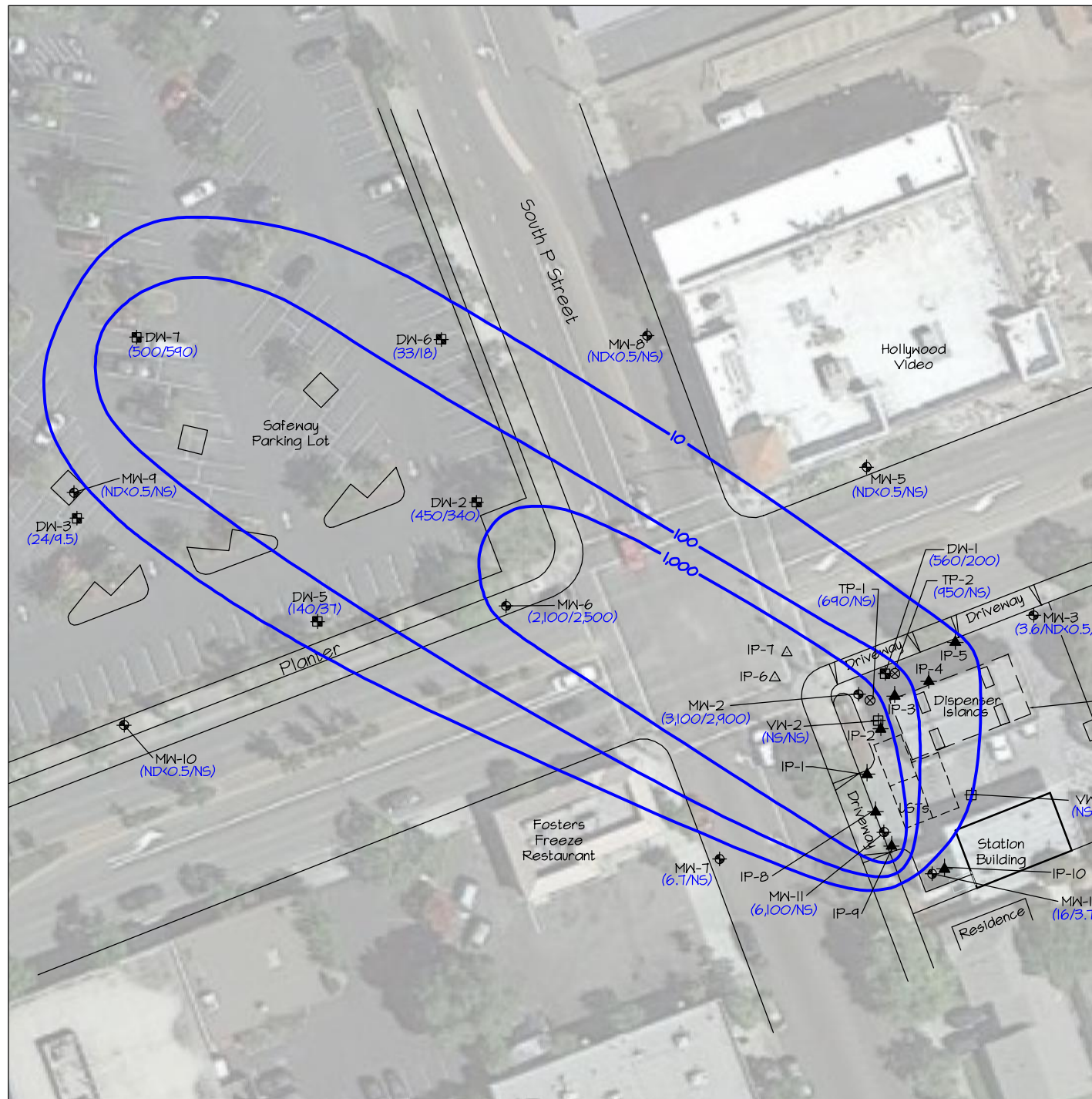
1,000 TPHg Concentration Contour (µg/L), Queried Where Uncertain



REVISION	REVISIONS		
	NO.	BY	DATE
0	MY	11/30/16	Remedial Action Plan

ARCTOS ENVIRONMENTAL			
TESORO - LIVERMORE			
TPHg CONCENTRATION CONTOURS OVER TIME - 1Q10 AND 2Q16			
PROJECT NO. OILV	DRAWN BY MY	CHECKED BY MN	APPROVED BY JPG
FILE NO. OILVIB3000.DWG		FIGURE 8	

01LV11B3100.dwg
11/30/2016 4:11PM

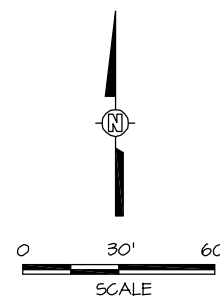


Legend

February 2010

- MW-1 Groundwater Monitoring Well
- DW-1 Deep Groundwater Monitoring Well
- IP-1 Injection Well
- IP-6 Angled Injection Well Screen
- VN-3 Vapor Extraction Well (Not Connected to System)
- TP-1 Monitoring Well/Vapor Extraction Well
- MIP-1 January 2011 Membrane Interface Probe (MIP) Boring
- Benzene Concentration Contour ($\mu\text{g/L}$), Queried Where Uncertain

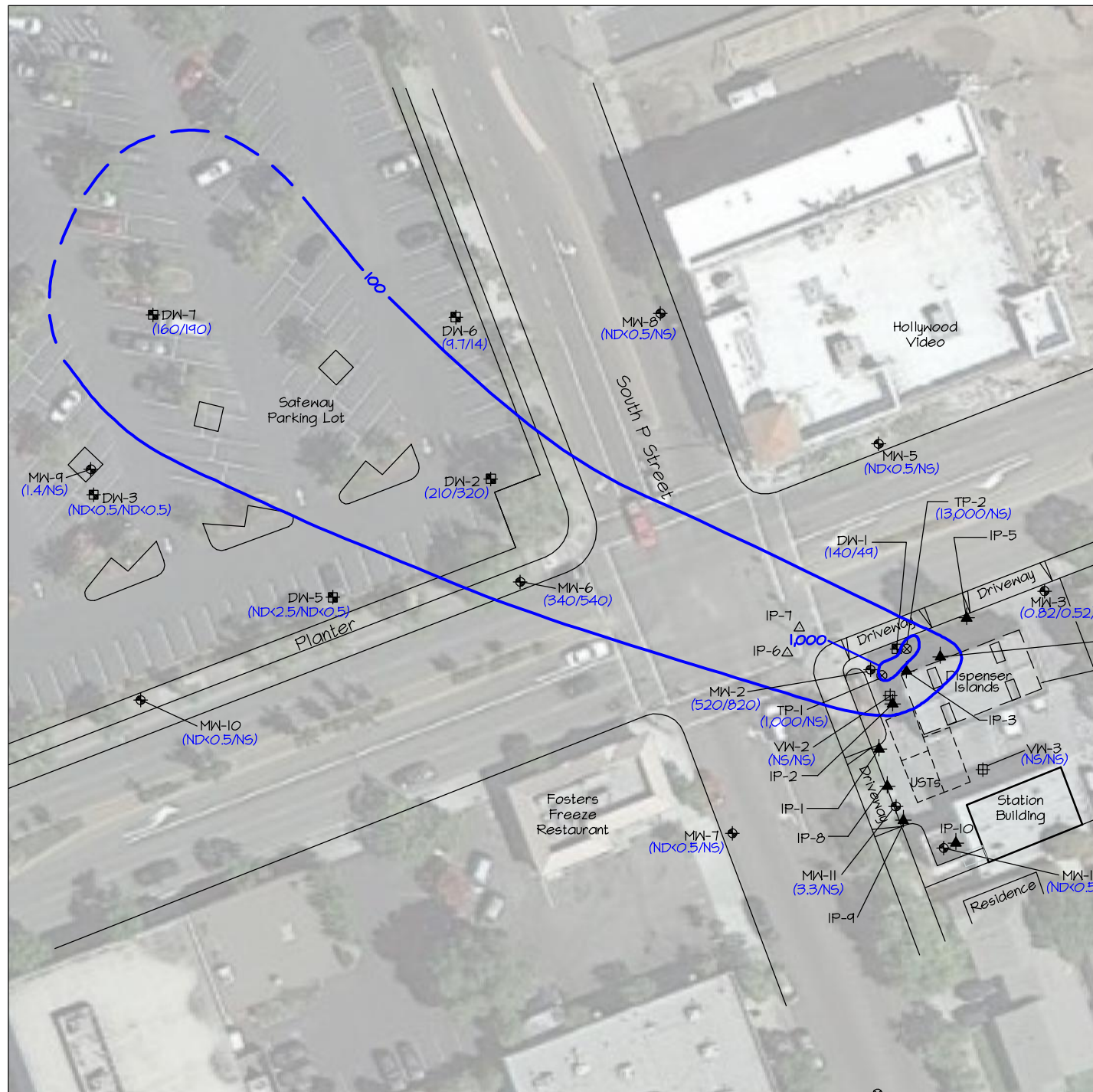
May 2016



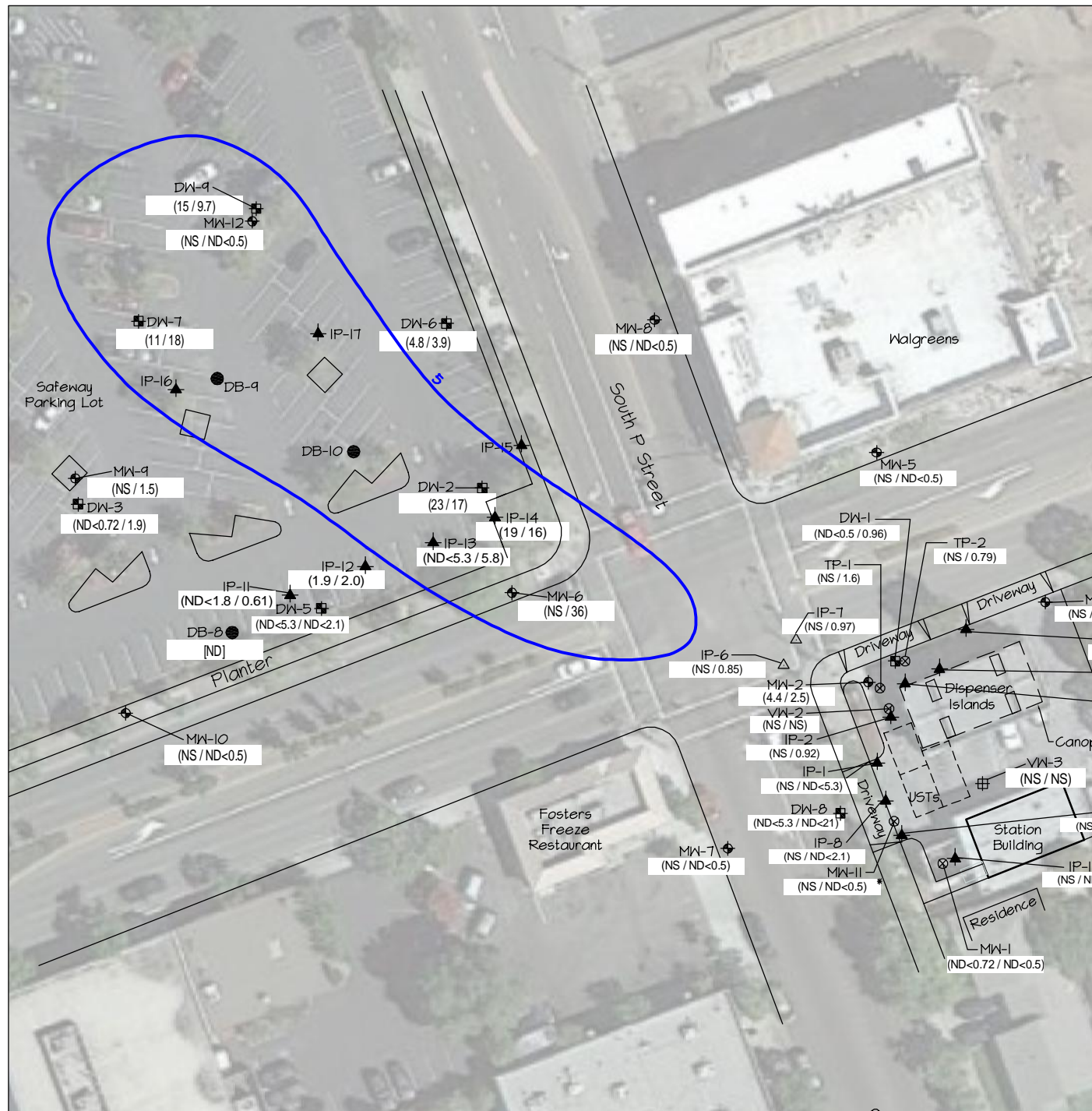
REVISION	REVISIONS		
	NO.	BY	DATE
0	MY	11/30/16	Remedial Action Plan

ARCTOS ENVIRONMENTAL			
TESORO - LIVERMORE			
BENZENE CONCENTRATION CONTOURS OVER TIME - 1Q10 AND 2Q16			
PROJECT NO. OILV	DRAWN BY MY	CHECKED BY MN	APPROVED BY JPG
FILE NO. OILV11B3100DWG	FIGURE 9		

11/30/2016 4:28PM 01LV11B3200.dwg

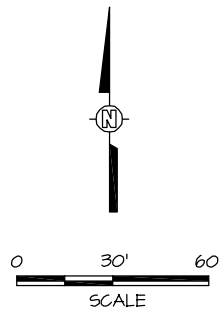


February 2010



May 2016

- Legend
- MW-1 Groundwater Monitoring Well
 - DW-1 Deep Groundwater Monitoring Well
 - IP-1 Injection Well
 - IP-6 Angled Injection Well Screen
 - VN-3 Vapor Extraction Well (Not Connected to System)
 - TP-1 Monitoring Well/Vapor Extraction Well
 - MIP-1 January 2011 Membrane Interface Probe (MIP) Boring
 - 100 MTBE Concentration Contour ($\mu\text{g/L}$), Queried Where Uncertain



REVISION	REVISIONS			
	NO.	BY	DATE	DESCRIPTION
0			11/30/16	Remedial Action Plan

ARCTOS ENVIRONMENTAL			
TESORO - LIVERMORE			
MTBE CONCENTRATION CONTOURS OVER TIME - 1Q10 AND 2Q16			
PROJECT NO. OILV	DRAWN BY MY	CHECKED BY MN	APPROVED BY JPG
FILE NO. OILV11B3200.DWG	FIGURE 10		

01LV11B2600.dwg
5/22/2014 4:24PM



Legend

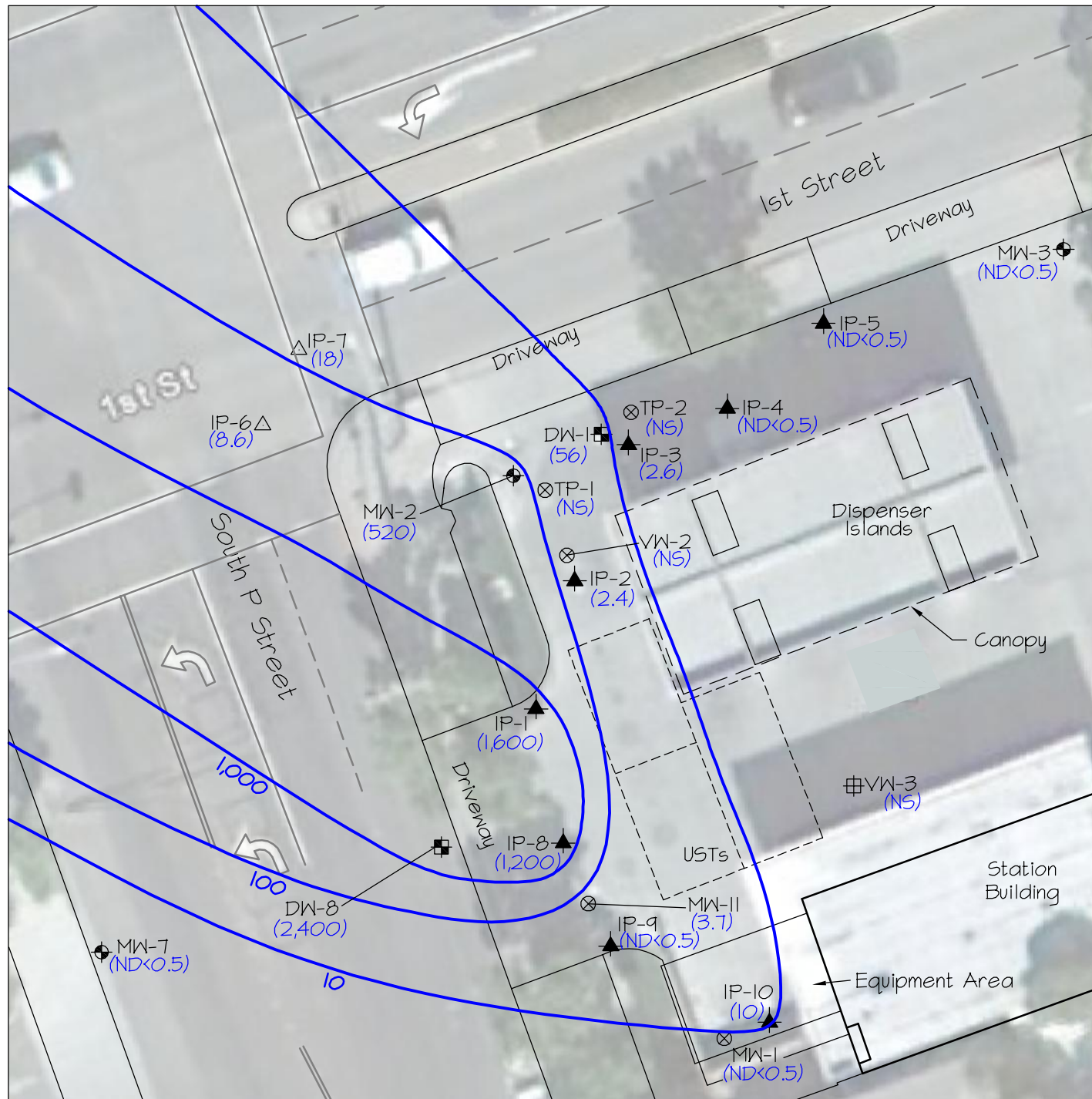
- MW-7 ◈ Groundwater Monitoring Well
- DW-1 ◈ Deep Groundwater Monitoring Well
- IP-1 ▲ Injection Well
- IP-6 △ Angled Injection Well Screen
- VW-2 ⊞ Vapor Extraction Well
- TP-2 ⊗ Monitoring Well/Vapor Extraction Well

- DB-8 ● Soil Boring
- IP-2 ▲ Expanded ISCO Pilot Test Onsite Injection Well
- IP-II ◈ Offsite Injection Well Installed April 2013

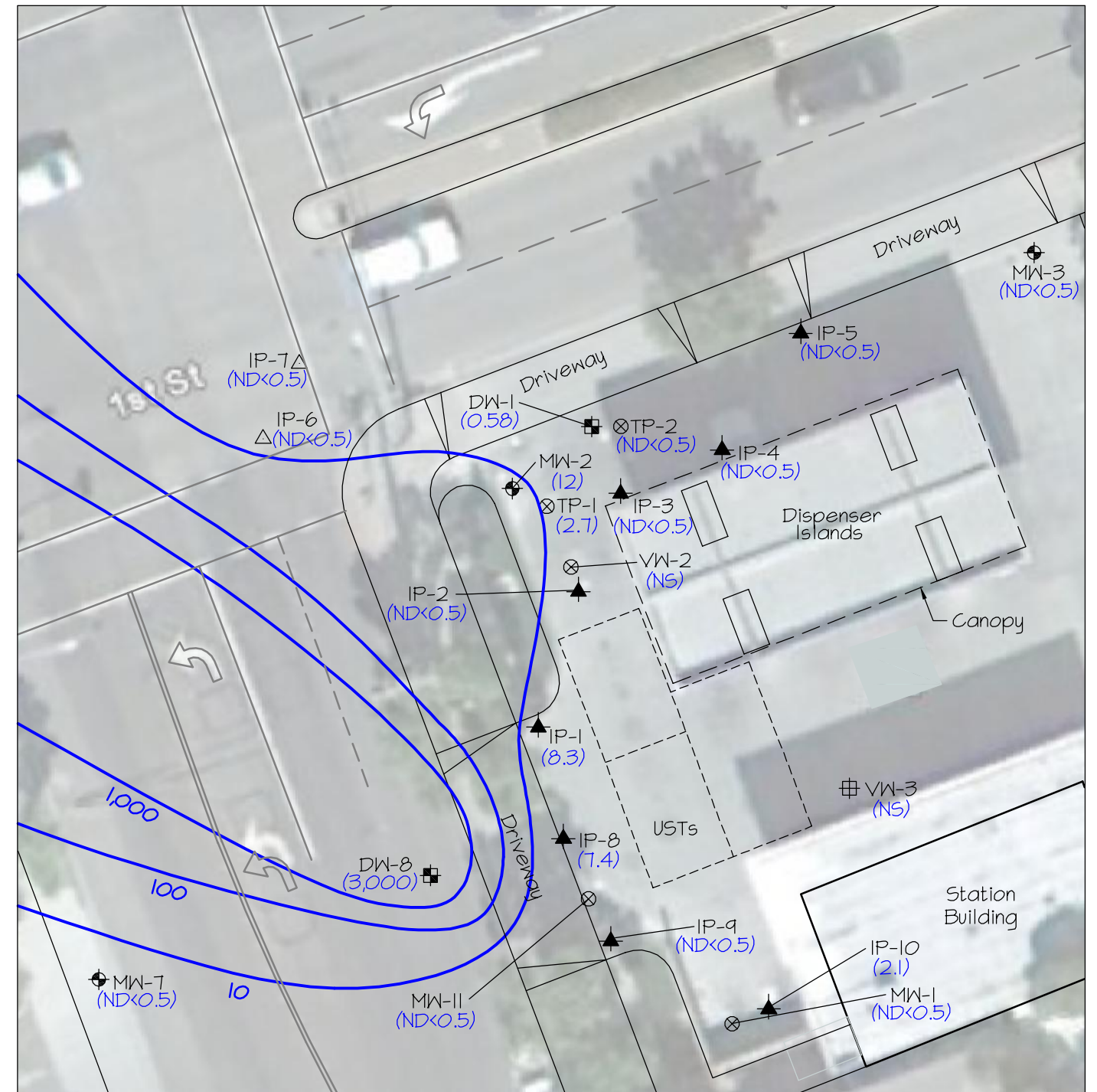
- Light Green Area: Activator Complex Area of Influence
- Dark Green Area: Oxidant Complex Area of Influence

REVISION	REVISIONS		
	NO.	BY	DATE
0	MY	5/15/14	Expanded ISCO Pilot Test Report

ARCTOS ENVIRONMENTAL			
TESORO - LIVERMORE			
EXPANDED ISCO PILOT TEST AREA OF INFLUENCE			
PROJECT NO. OILV	DRAWN BY MY	CHECKED BY MP	APPROVED BY JPG
FILE NO. OILVIB2600.DWG	FIGURE 11		



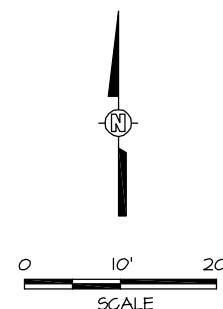
June 2014



May 2016

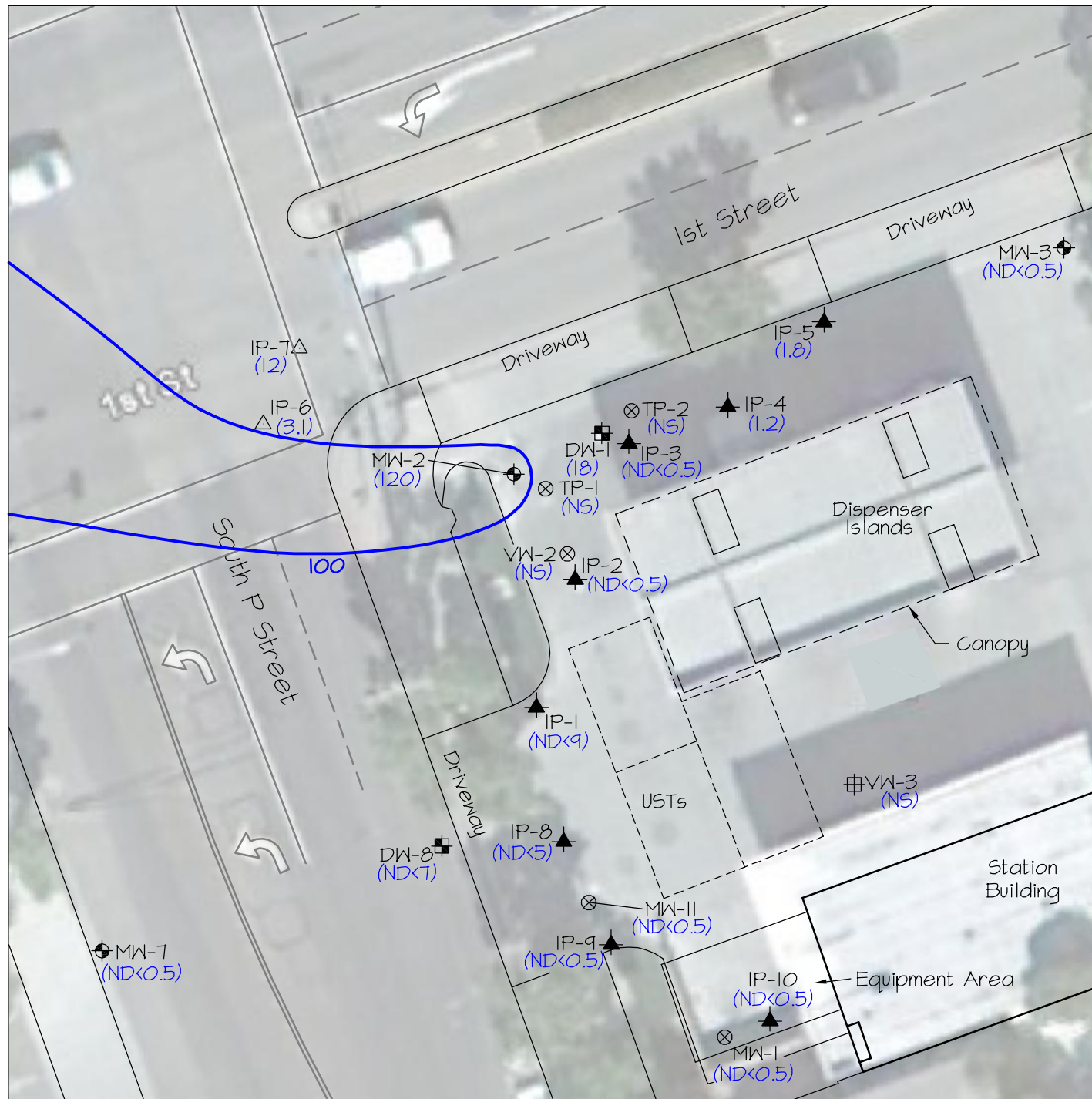
Legend

- MW-1 Groundwater Monitoring Well
- DW-1 Deep Groundwater Monitoring Well
- IP-1 Injection Well
- IP-6 Angled Injection Well Screen
- VW-3 Vapor Extraction Well (Not Connected to System)
- TP-1 Monitoring Well/Vapor Extraction Well
- MIP-1 January 2011 Membrane Interface Probe (MIP) Boring
- Benzene Concentration Contour (µg/L), Queried Where Uncertain

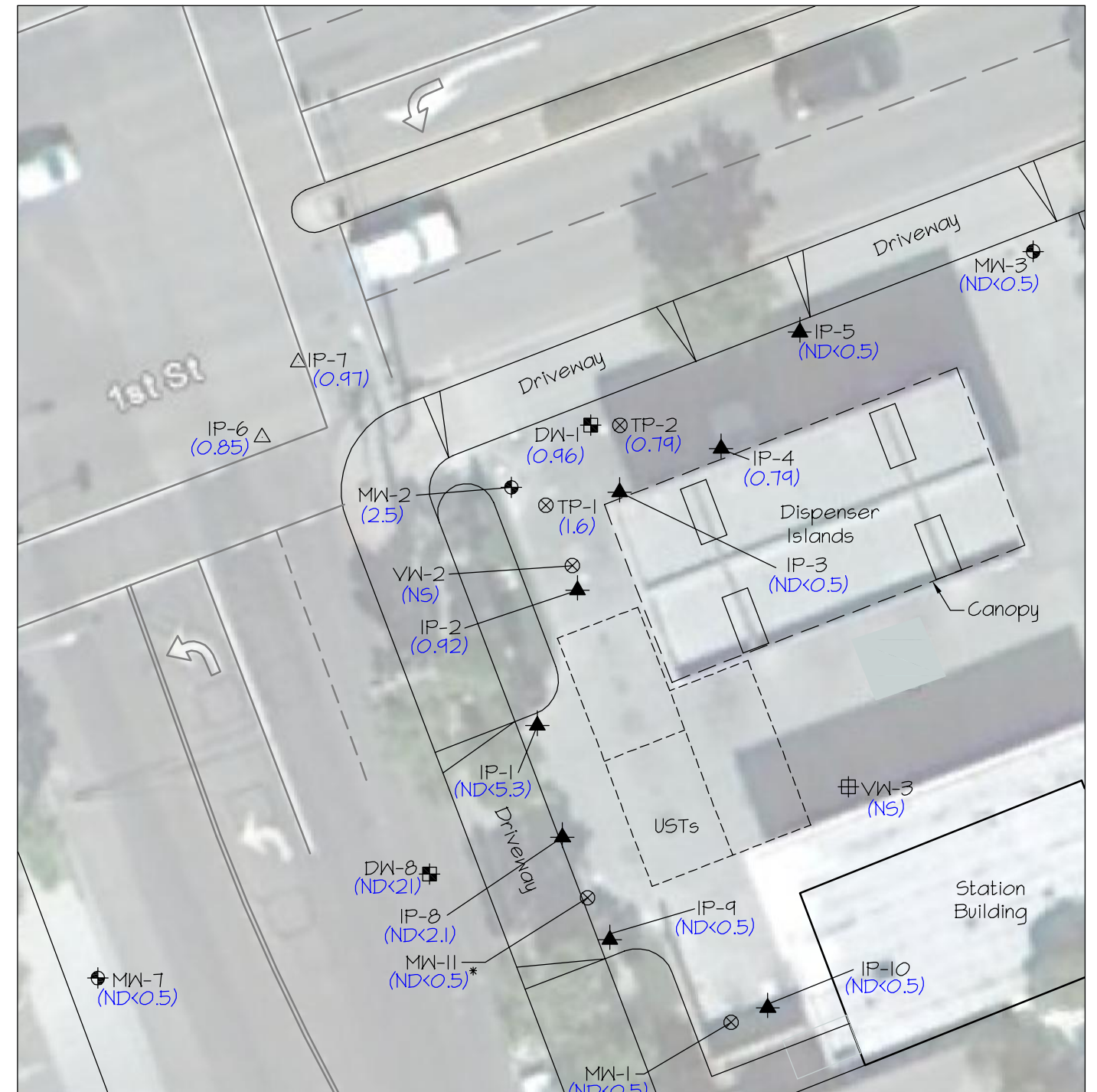


REVISION	REVISIONS			
	NO.	BY	DATE	DESCRIPTION
6	2	MY	12/28/13	Third Quarter 2013 Monitoring Report
	3	MY	3/15/14	Fourth Quarter 2013 Monitoring Report
	4	MY	5/15/14	First Quarter 2014 Monitoring Report
	5	MY	7/15/14	Second Quarter 2014 Monitoring Report
	6	MY	8/15/16	First Half 2016 Monitoring Report

ARCTOS ENVIRONMENTAL			
TESORO - LIVERMORE			
ONSITE BENZENE CONCENTRATION CONTOURS - 2Q14 AND 2Q16			
PROJECT NO. OILV	DRAWN BY MY	CHECKED BY MN	APPROVED BY JPG
FILE NO. OILVIIIB2406.DWG		FIGURE 13	



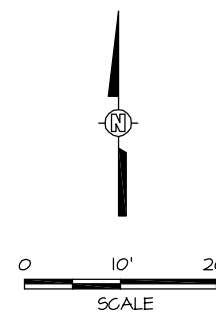
June 2014



May 2016

Legend

- MW-1 Groundwater Monitoring Well
- DW-1 Deep Groundwater Monitoring Well
- IP-1 Injection Well
- IP-6 Angled Injection Well Screen
- VW-3 Vapor Extraction Well (Not Connected to System)
- TP-1 Monitoring Well/Vapor Extraction Well
- MIP-1 January 2011 Membrane Interface Probe (MIP) Boring
- MTBE Concentration Contour ($\mu\text{g/L}$), Queried Where Uncertain



REVISION	REVISIONS			
	NO.	BY	DATE	DESCRIPTION
6	2	MY	12/28/13	Third Quarter 2013 Monitoring Report
	3	MY	3/15/14	Fourth Quarter 2013 Monitoring Report
	4	MY	5/15/14	First Quarter 2014 Monitoring Report
	5	MY	7/15/14	Second Quarter 2014 Monitoring Report
	6	MY	8/15/16	First Half 2016 Monitoring Report

ARCTOS ENVIRONMENTAL			
TESORO - LIVERMORE			
ONSITE MTBE CONCENTRATION CONTOURS - 2Q14 AND 2Q16			
PROJECT NO. OILV	DRAWN BY MY	CHECKED BY MN	APPROVED BY JPG
FILE NO. OILV11B2506.DWG		FIGURE 14	

APPENDIX A
BORING AND WELL CONSTRUCTION LOGS

Acton • Mickelson • van Dam, Inc.
 Consulting Scientists, Engineers, and Geologists

Log of Soil Boring MW-1

Casing Elevation: 100.00 feet

Completion Depth: 54 feet

Project No.
19024.01

Location: Beacon 604
1619 W. First Street
Livermore, CA.

Drilling Company: Turner Exploration
 Driller: Mike Barr
 Drilling and Sampling Methods:
 BK-81 HSA California Modified
 split-spoon sampler

OVM/OVA HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-27-93	13:10
Finish	05-27-93	15:15
Water Depth	Initial	Completion
		38.46 feet

Depth (feet)	Sample Int.	Logged by: H. Hansen	Graphic Log	BORING/ WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
		Checked by: <i>Dvd</i>								

0		12 inch bore concrete								
1		CLAYEY GRAVEL Olive brown, 1/2 to 2 inch gravel, fine to coarse-grained sand, common plastic fines, dry (GC)								
2										
3										
4										
5					17					
6					12	18	14		MW1-1	0
7					35					
8										
9										
10					40					
11					45	18	12		MW1-2	0
12					50/4					
13										
14										
15										
16					35	9	9		MW1-3	0
17					50/3					
18										
19										
20		moist at 20.5 feet			18	18	18		MW1-4	0
					27					
					28					

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Log of Soil Boring MW-1 (cont)

Casing Elevation: 100.00 feet

Completion Depth: 54 feet

Project No.
19024.01

Location: Beacon 604
1619 W. First Street
Livermore, CA.

Drilling Company: Turner Exploration
Driller: Mike Barr
Drilling and Sampling Methods:
BK-B1 HSA California Modified
split-spoon sampler

OVM/OVA HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-27-93	
Finish	05-27-93	15:15

Water Depth	Initial	Completion
		38.46 feet

Depth (feet)	Sample Int.	Logged by: H. Hansen	Graphic Log	BORING/ WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
		Checked by: D.D.								
20										
21										
22										
23										
24										
25					6	18	18		MW1-5	0
26					27					
27					28					
28										
29										
30					14	18	18		MW1-6	4
31					17					
32					33					
33										
34										
35					18	18	18		MW1-7	110
36					27					
37					33					
38										
39										
40					19	18	16		MW1-8	40
41					27					
					37					

BQ001243

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 Log of Soil Boring MW-1
 (cont)

Casing Elevation: 100.00 feet

Completion Depth: 54 feet

Project No.
19024.01

Location: Beacon 604
1619 W. First Street
Livermore, CA.

Drilling Company: Turner Exploration
 Driller: Mike Barr
 Drilling and Sampling Methods:
 BK-81 HSA California Modified
 split-spoon sampler

OVM/OVA Hnu PID with 10.2 eV Probe

Drilling	Time	Date
Start	05-27-93	13:10
Finish	05-27-93	15:15

Water Depth	Initial	Completion
		38.46 feet

Logged by: H. Hansen
 Checked by: DvD
 Description

Graphic Log	BORING/ WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)

(continued from above)
 CLAYEY GRAVEL, olive brown,
 1/2 to 2 inch gravel, fine- to
 coarse-grained sand, common plastic
 fines, saturated (GC)

Depth (feet)	Graphic Log	BORING/ WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)		
40	[Patterned area representing clayey gravel and sand]	[Well detail]								
41										
42										
43										
44										
45					28					
46					29	18	18		MW1-9	15
47					42					
48										
49										
50					16					
51			14	18	15		MW1-10	150		
52			33							
53										
54			16							
55			17	18	9		MW1-11	60		
56			24							
57										
58										
59										
60										
61										

Boring terminated at 55 feet

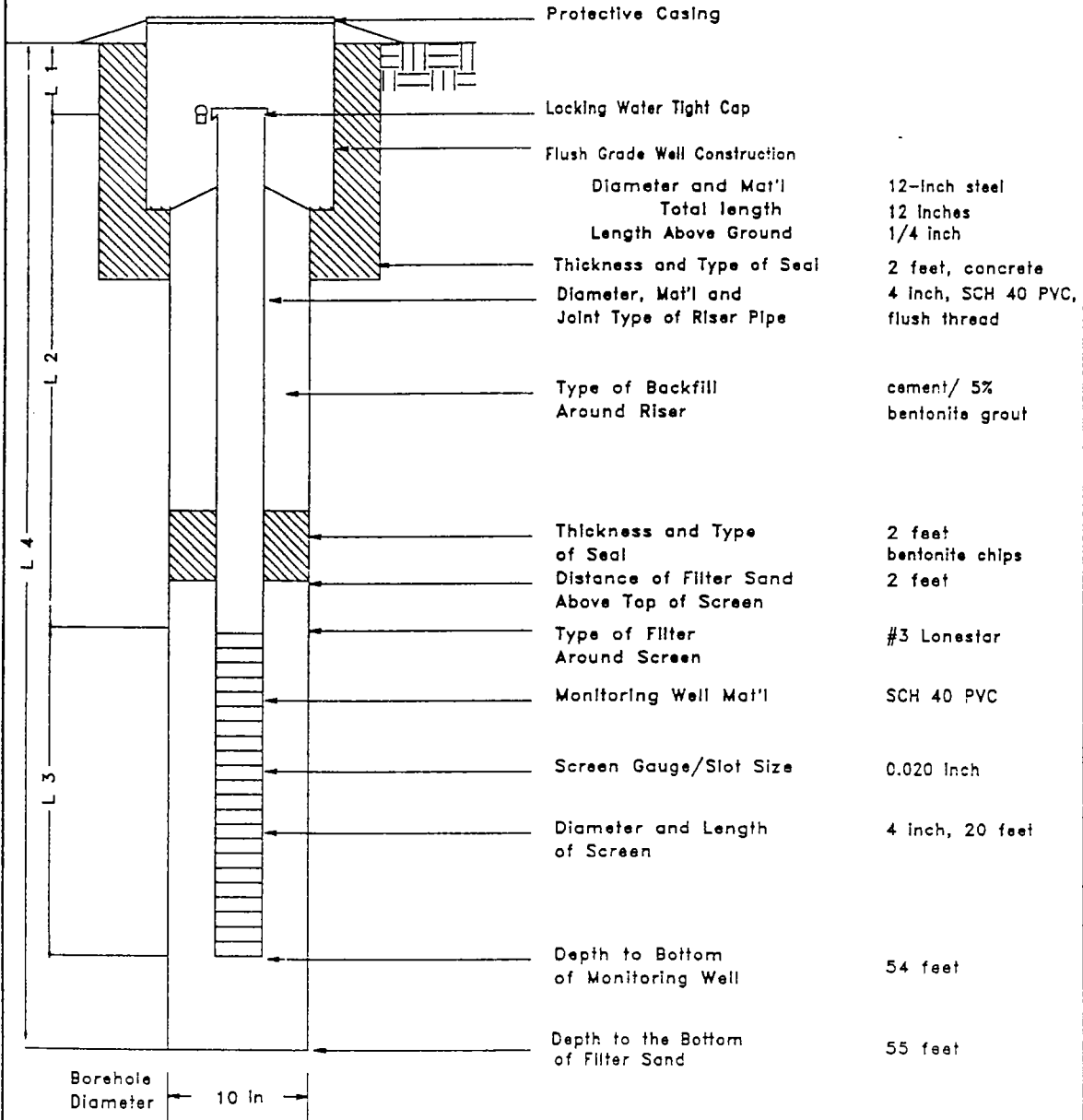
BQ001244

MONITORING WELL CONSTRUCTION DETAILS

PROJECT: Beacon #604
1619 W. First Street
Livermore, CA

MONITORING WELL NO. MW-1

ELEVATION: 100.00



- L1 = 0.25
- L2 = 33.75
- L3 = 20
- L4 = 54

MONITORING WELL WATER LEVEL MEASUREMENTS

DATE	TIME	WATER LEVEL*
06-22-93	13:26	38.46 ft

* MEASURING POINT TOP OF CASING

COMPLETION DATE AND TIME 15:30 05-27-93

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BQ001261

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Log of Soil Boring MW-2

Casing Elevation: 98.68 feet

Completion Depth: 54 feet

Project No.
19024.01

Location: Beacon 604
1619 W. First Street
Livermore, CA.

Drilling Company: Turner Exploration
 Driller: Mike Barr
 Drilling and Sampling Methods:
 BK-81 HSA California Modified
 split-spoon sampler

OVM/OVA HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-27-93	07:00
Finish	05-27-93	09:00

Water Depth	Initial	Completion
		39.07 feet

Depth (feet)	Sample Int.	Logged by: H. Hansen	Graphic Log	BORING/ WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
		Checked by: DJ								
0										
0			Concrete							
1			CLAYEY GRAVEL Olive brown, 1/2 to 2 inch gravel, fine to coarse-grained sand, common plastic fines, slightly moist, (GC)		2				MW2-1	0
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18			SILTY CLAY brown, moderately plastic, moist, (CL)		14				MW2-3	0
19										
20										
21										
22			SILTY CLAY brown, moderately plastic, moist, (CL)		18				MW2-4	12
23										
24										

BQ001245

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Log of Soil Boring MW-2 (cont)

Casing Elevation: 98.68 feet

Completion Depth: 54 feet

Project No.
19024.01

Location: Beacon 504
1619 W. First Street
Livermore, CA.

Drilling Company: Turner Exploration
Driller: Mike Barr
Drilling and Sampling Methods:
BK-81 HSA California Modified
split-spoon sampler

OVM/OVA HNu PID with 10.2 eV probe

Drilling	Time	Date
----------	------	------

Start	05-27-93	07:00
-------	----------	-------

Finish	05-27-93	09:00
--------	----------	-------

Water Depth	Initial	Completion
-------------	---------	------------

		39.07 feet
--	--	------------

Depth (feet)	Sample Int.	Logged by: H. Hansen	Graphic Log	BORING/ WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
		Checked by: DD								
20										
21										
22										
23										
24										
25					7	19	18	15		
26					24				MW2-5	30
27										
28										
29					28					
30					32	18	18		MW2-6	150
31					41					
32										
33										
34										
35					26	12	12		MW2-7	4
36					78					
37										
38										
39										
40					24	38	18	14		
41					32				MW2-8	400

(continued from above)
SILTY CLAY, brown, moderately plastic,
moist (CL)

CLAYEY GRAVEL
olive brown, 1/2 to 1 inch gravel
fine to coarse-grained sand
common plastic fines,
very moist, (GC)

saturated at 39.5 feet

BQ001246

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 Log of Soil Boring MW-2
 (cont)

Casing Elevation: 98.68 feet

Completion Depth: 54 feet

Project No.
19024.01

Location: Beacon 604
1619 W. First Street
Livermore, CA.

Drilling Company: Turner Exploration
 Driller: Mike Barr
 Drilling and Sampling Methods:
 BK-81 HSA California Modified
 split-spoon sampler

OVM/OVA HNu PID with 10.2 aV probe

Drilling	Time	Date
Start	05-27-93	07:00
Finish	05-27-93	09:00
Water Depth	Initial	Completion 39.07 feet

Depth (feet)	Sample Int.	Logged by: H. Hansen	Graphic Log	BORING/ WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
		Checked by: DHD								
40										
41										
42										
43										
44										
45					16					
46					17	18	18		MW2-9	300
47					22					
48										
49										
50					19					
51					24	18	17		MW2-10	250
52					22					
53										
54					8					
55					9	18	12		MW2-11	15
56					12					
57										
58										
59										
60										
61										

(continued from above)
 CLAYEY GRAVEL, olive brown, 1/2 to 1
 inch gravel, fine- to coarse-grained sand,
 common plastic fines, saturated (GC)

SILTY CLAY
 brown, moderately plastic
 saturated, (CL)

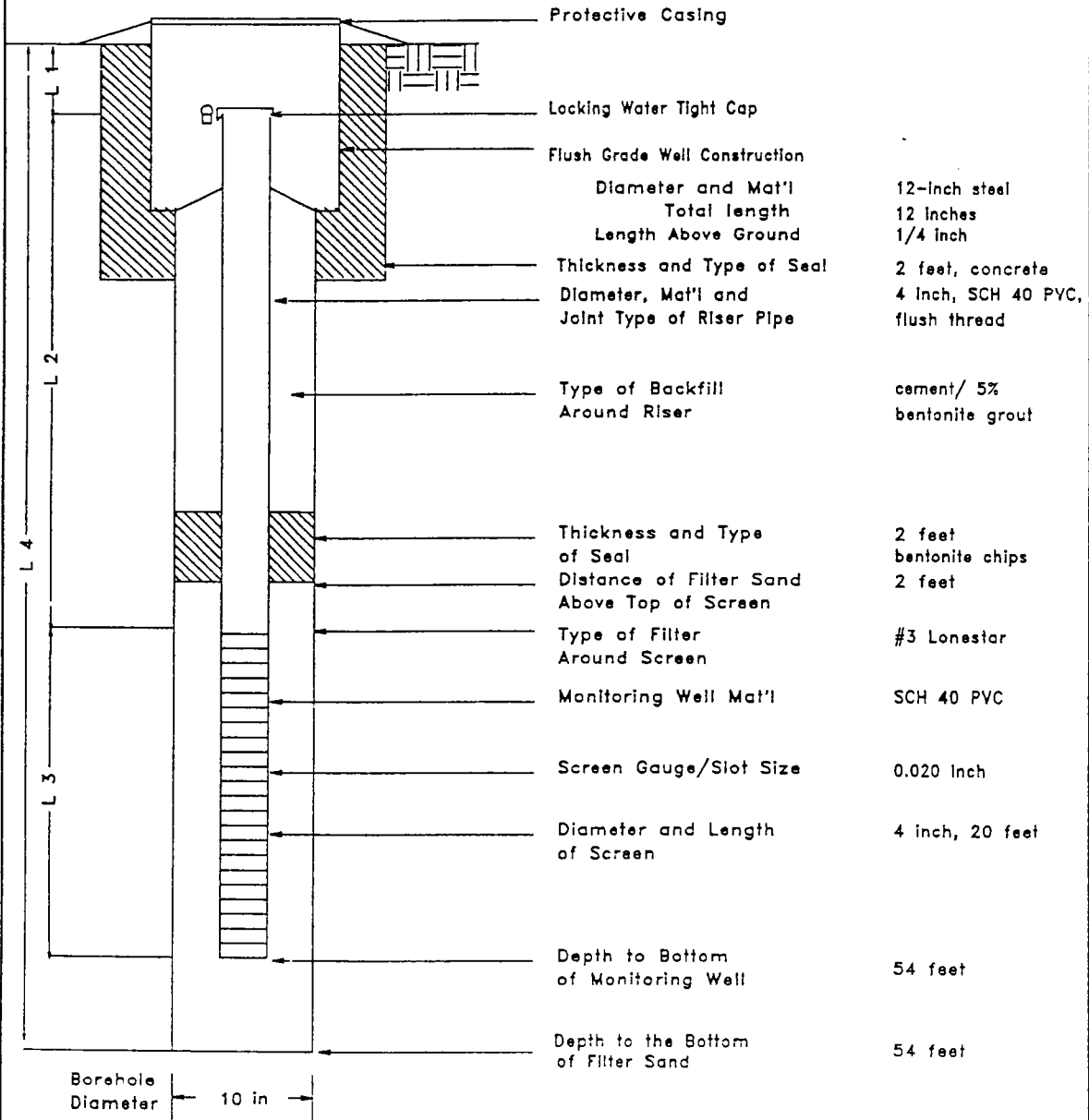
Total depth 55 feet.

MONITORING WELL CONSTRUCTION DETAILS

PROJECT: Beacon #604
1619 W. First Street
Livermore, CA

MONITORING WELL NO. MW-2

ELEVATION: 98.68



L1 = 0.25
L2 = 33.75
L3 = 20
L4 = 54

MONITORING WELL WATER LEVEL MEASUREMENTS

DATE	TIME	WATER LEVEL*
06-22-93	13:30	39.07 ft

* MEASURING POINT TOP OF CASING

COMPLETION DATE AND TIME 10:00 05-27-93

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 Log of Soil Boring MW-3

Casing Elevation: 99.08 feet

Completion Depth: 54 feet

Project No.
19024.01

Location: Beacon 604
1619 W. First Street
Livermore, CA.

Drilling Company: Turner Exploration
 Driller: Mike Barr
 Drilling and Sampling Methods:
 BK-81 HSA California Modified
 split-spoon sampler

OVM/OVA HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-28-93	12:30
Finish	05-28-93	15:30
Water Depth	Initial	Completion 37.11 feet

Depth (feet)	Sample Int.	Logged by: H. Hansen	Graphic Log	BORING/ WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
		Checked by: Dvd								
0										
1										
2										
3										
4										
5					6	18	17		MW3-1	0
6					17					
7					42					
8										
9										
10					9	18	18		MW3-2	0
11					24					
12					32					
13										
14										
15					10	18	0		MW3-3	NO RECOVERY
16					5					
17					12					
18										
19					18					
20					24	18	9		MW3-4	0
					22					

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Log of Soil Boring MW-3 (cont)

Casing Elevation: 99.08 feet

Completion Depth: 54 feet

Project No.
19024.01

Location: Beacon 604
1619 W. First Street
Livermore, CA.

Drilling Company: Turner Exploration
Driller: Mike Barr
Drilling and Sampling Methods:
BK-81 HSA California Modified
split-spoon sampler

OVM/OVA HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-28-93	12:30
Finish	05-28-93	15:30
Water Depth	Initial	Completion
		37.11 feet

Depth (feet)	Sample Int.	Logged by: H. Hansen	Graphic Log	BORING/ WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
		Checked by: D.D.								
		Description								

20		(continued from above)								
21		SILTY CLAY, brown, moderately plastic, moist (CL)								
22										
23										
24										
25					22					
26					28	18	11		MW3-5	0
27			CL		29					
28										
29										
30					17					
31					19	18	16		MW3-6	0
32					21					
33										
34										
35					9					
36		CLAYEY GRAVEL 1/2 to 2 inch gravel, fine to coarse-grained sand, common plastic fines, saturated (GC)			37	18	11		MW3-7	0
37					42					
38										
39			GC							
40					14	18	18		MW3-8	0
41					22					
					25					

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 Log of Soil Boring MW-3
 (cont)

Project No. 19024.01
 Location: Beacon 604
 1619 W. First Street
 Livermore, CA.

Drilling Company: Turner Exploration
 Driller: Mike Barr
 Drilling and Sampling Methods:
 BK-81 HSA California Modified
 split-spoon sampler

Casing Elevation: 99.08 feet

OVM/OVA HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-28-93	12:30
Finish	05-28-93	15:30

Completion Depth: 54 feet

Water Depth Initial Completion 37.11 feet

Depth (feet)	Sample Int.	Logged by: H. Hansen	Graphic Log	BORING/ WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
		Checked by: DJD								

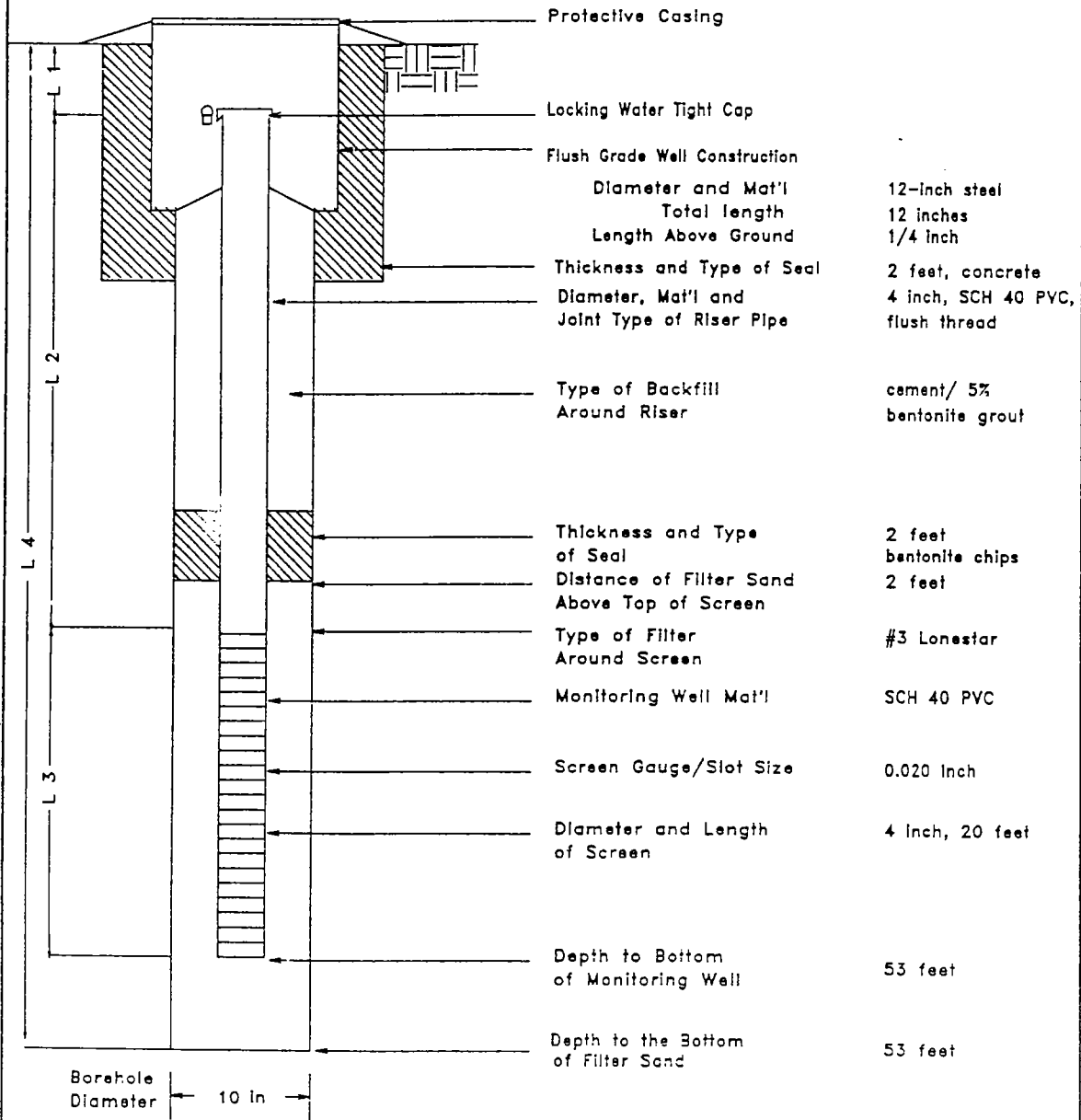
40		(continued from above)								
41		CLAYEY GRAVEL, 1/2 to 2 inch gravel, fine- to coarse-grained sand, common plastic fines, saturated (GC)								
42										
43										
44										
45					9					
46					37	18	18		MW3-9	0
47					42					
48										
49					7					
50					9	18	12		MW3-10	0
51					24					
52										
53		Boring terminated at 53 feet								
54										
55										
56										
57										
58										
59										
60										
61										

BQ001250

MONITORING WELL CONSTRUCTION DETAILS

PROJECT: Beacon #604
1619 W. First Street
Livermore, CA

MONITORING WELL NO. MW-3
ELEVATION: 99.08



- L1 = 0.25
- L2 = 32.75
- L3 = 20
- L4 = 53

MONITORING WELL WATER LEVEL MEASUREMENTS

DATE	TIME	WATER LEVEL*
06-22-93	13:22	37.11 ft

* MEASURING POINT TOP OF CASING

COMPLETION DATE AND TIME 15:45 05-28-93

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Log of Soil Boring: MW-4		OVM/OVA: hNu PID with 10.2 eV probe	
Project Number: 19024.03		Drilling	Time
Location: Beacon #604 1619 West First Street Livermore, California		Start	1115
		Finish	1300
Drilling Company: V & W Drilling Drilled By: Robert Vickery Drilling Method: 8" O.D. HSA, B-61 HDX Mobile Drill Rig Sampling Method: California Modified Split Spoon Sampler Fitted With 2"x6" Brass Sample Sleeves		Date	
		3/30/94	
		3/30/94	
		Water Depth (Date): 31.56 Feet (3/30/94)	
		Casing Elevation: 99.35 Feet	
		Completion Depth: 47 Feet	
		Logged By: S. Liaty	
		Checked By:	

DEPTH (feet)	DESCRIPTION	GRAPHIC LOG	USCS CLASS	WELL CONSTRUCTION	BLOWS/8 IN.	INCHES DRIVEN	INCHES RECOVERD	COMMENTS	SAMPLE NO.	FIELD OVM/OVA .READING (ppm)
0 - 1	CONCRETE AND ROAD BASE	[Dotted pattern]						Gravel up to 1.75 inches in diameter.		
1 - 5	SILTY GRAVEL, moderately dark yellowish brown, damp, dense,	[Dotted pattern]	GM							
5 - 10	SANDY GRAVEL, yellowish brown, damp, very dense, fine- to medium-grained sand	[Dotted pattern]	GW		13 15 15	18	18	Gravel up to 1.5 inches in diameter.	MW4-1	<1
10 - 15	Mottled reddish brown, partially cemented at 15 feet	[Dotted pattern]			26 50/ 6"	12	12		MW4-2	<1
15 - 20	Silty clay with trace sand, dark yellowish brown, moist, dense, fine- to medium-grained sand	[Dotted pattern]	CL		22 50/ 6"	12	12		MW4-3	<1
20 - 25	Silty clay with trace sand, dark yellowish brown, moist, dense, fine- to medium-grained sand	[Dotted pattern]	CL		12 13 16	18	18	Gravel up to 1.5 inches in diameter.	MW4-4	<1
25 - 30	SANDY GRAVEL, yellowish brown, moist, dense, fine- to medium-grained sand	[Dotted pattern]	GW		11 17 26	18	18		MW4-5	<1
30 - 31.56	CLAYEY SAND with minor gravel, dark yellowish brown, very dense, coarse-grained	[Dotted pattern]	SC							

(Boring continued on next page)

BQ001820

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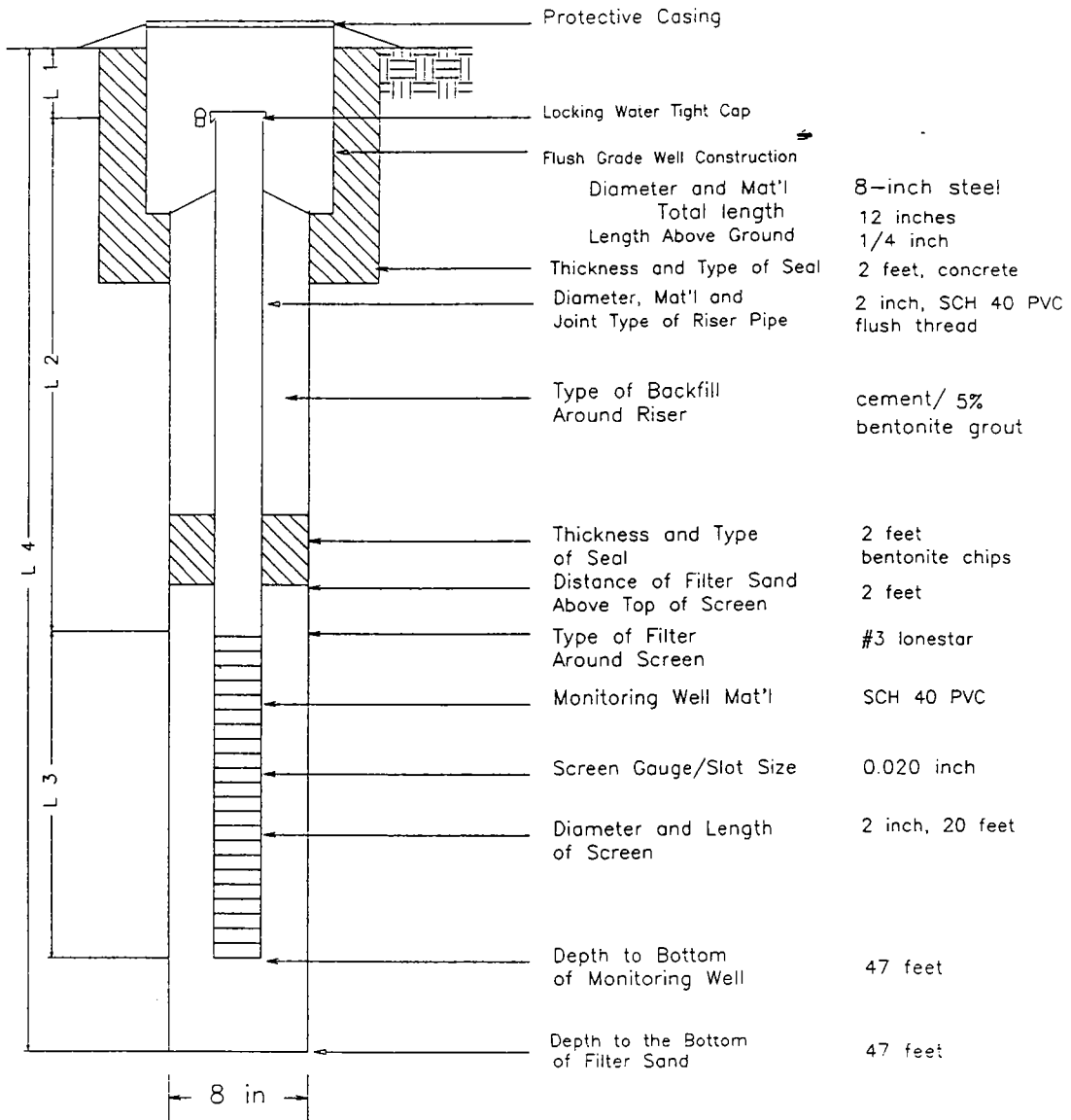
Log of Soil Boring: MW-4	OVM/OVA: hNu PID with 10.2 eV probe									
Project Number: 19024.03	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 30%;">Drilling</th> <th style="width: 30%;">Time</th> <th style="width: 40%;">Date</th> </tr> <tr> <td>Start</td> <td>1115</td> <td>3/30/94</td> </tr> <tr> <td>Finish</td> <td>1300</td> <td>3/30/94</td> </tr> </table>	Drilling	Time	Date	Start	1115	3/30/94	Finish	1300	3/30/94
Drilling	Time	Date								
Start	1115	3/30/94								
Finish	1300	3/30/94								
Location: Beacon #604 1619 West First Street Livermore, California	Water Depth (Date): 31.56 Feet (3/30/94) Casing Elevation: 99.35 Feet Completion Depth: 47 Feet Logged By: S. Liaty Checked By:									
Drilling Company: V & W Drilling Drilled By: Robert Vickery Drilling Method: 8" O.D. HSA, B-61 HDX Mobile Drill Rig Sampling Method: California Modified Split Spoon Sampler Fitted With 2"x6" Brass Sample Sleeves										

DEPTH (feet)	SAMPLE INTERVAL	DESCRIPTION	GRAPHIC LOG	USCS CLASS	WELL CONSTRUCTION	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOVD	COMMENTS	SAMPLE NO.	FIELD OVM/OVA READING (ppm)
32		CLAYEY SAND with minor gravel, dark yellowish brown, very dense, coarse-grained	SC	SC		29 32 34	18	18		MW4-6	<1
35		SANDY GRAVEL, dark yellowish brown, saturated, very dense, fine- to medium-grained sand	GW	GW		29 50/ 6"	12	12	Gravel up to 1.5 inches in diameter.	MW4-7	<1
40			GW	GW		17 23 36	18	14		MW4-8	<1
45			GW	GW		16 22 35	18	10	Boring terminated approximately 5 feet below the water table.	MW4-9	<1
50		Boring terminated. Total depth = 47 feet									

MONITORING WELL CONSTRUCTION DETAILS

PROJECT NO: 19024.03
 LOCATION: Beacon #604
 1619 West First Street
 Livermore, California

MONITORING WELL NO.: MW-4
 ELEVATION: 99.35 feet



- L1 = 0.25 feet
- L2 = 26.75 feet
- L3 = 20.00 feet
- L4 = 47.00 feet

MONITORING WELL WATER LEVEL MEASUREMENTS

Date:	Time:	Water Level*
03/30/94	1545	31.56

Completion Date and Time: 03/30/94 1500

* Measuring Point: Top Of Casing

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 El Dorado Hills, CA 95762

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Log of Soil Boring: MW-5	OVM/OVA: hNu PID with 10.2 eV probe									
Project Number: 19024.03	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Drilling</td> <td style="width: 33%;">Time</td> <td style="width: 34%;">Date</td> </tr> <tr> <td>Start</td> <td>1000</td> <td>3/29/94</td> </tr> <tr> <td>Finish</td> <td>1130</td> <td>3/29/94</td> </tr> </table>	Drilling	Time	Date	Start	1000	3/29/94	Finish	1130	3/29/94
Drilling	Time	Date								
Start	1000	3/29/94								
Finish	1130	3/29/94								
Location: Beacon #604 1619 West First Street Livermore, California	Water Depth (Date): 32.07 Feet (3/30/94) Casing Elevation: 98.37 Feet Completion Depth: 47 Feet Logged By: S. Liäty Checked By:									
Drilling Company: V & W Drilling Drilled By: Robert Vickery Drilling Method: 8" O.D. HSA, B-61 HDX Mobile Drill Rig Sampling Method: California Modified Split Spoon Sampler Fitted With 2"x6" Brass Sample Sleeves										


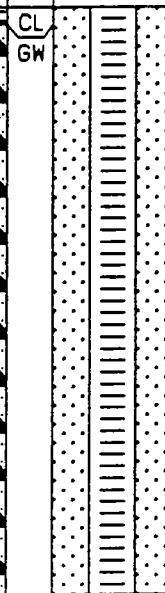
DEPTH (feet)	SAMPLE INTERVAL	DESCRIPTION	GRAPHIC LOG	USCS CLASS	WELL CONSTRUCTION	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOVERD	COMMENTS	SAMPLE NO.	FIELD OVM/OVA READING (ppm)
		CONCRETE AND ROAD BASE									
5		SILTY GRAVEL, moderate yellowish brown, damp, very dense		GM		50/6"	8	8	Gravel up to 1.5 inches in diameter.	MW-1	<1
10		SANDY GRAVEL, dark yellowish brown, damp, very dense, fine- to medium-grained sand		GW		50/3"	9	9	Gravel up to 1.5 inches in diameter.	MW-2	<1
15						38/50/6"	12	12		MW-3	<1
20		SILTY SAND, yellowish brown, moist, medium dense, slightly stiff, fine-grained		SM		7/11/14	18	18		MW-4	<1
25		CLAY, dark yellowish brown, moist, hard		CL		15/21/19	18	18	Minor gravel at 25 feet	MW-5	<1
30		SANDY GRAVEL, gray, moist, dense, saturated, fine- to medium-grained sand									

(Boring continued on next page)

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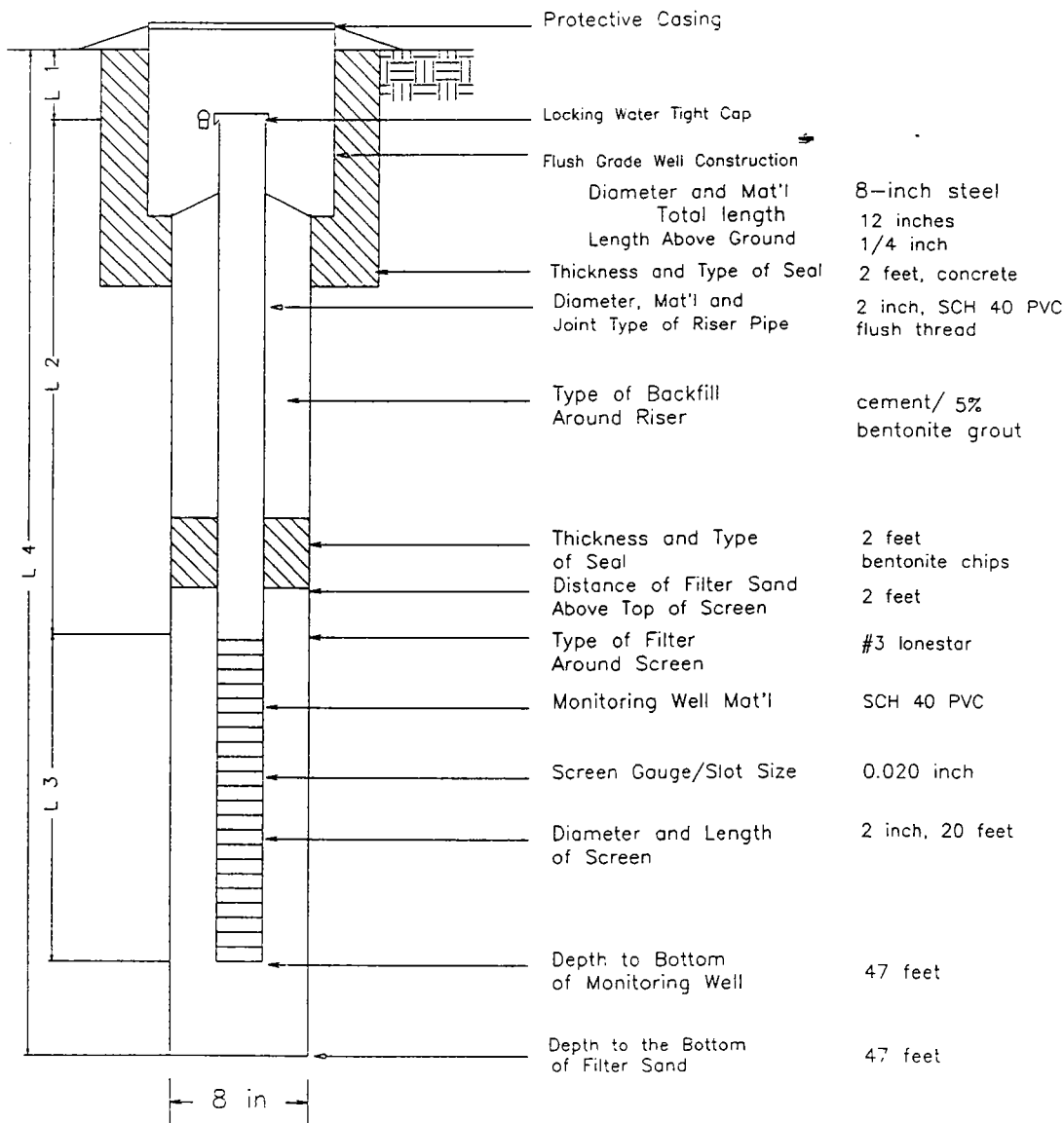
Log of Soil Boring: MW-5	OVM/OVA: hNu PID with 10.2 eV probe									
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Drilling	Time	Date								
Start	1000	3/29/94								
Finish	1130	3/29/94								
Location: Beacon #604 1619 West First Street Livermore, California	Water Depth (Date): 32.07 Feet (3/30/94) Casing Elevation: 98.37 Feet Completion Depth: 47 Feet Logged By: S. Liaty Checked By:									
Drilling Company: V & W Drilling Drilled By: Robert Vickery Drilling Method: 8" O.D. HSA, B-81 HDX Mobile Drill Rig Sampling Method: California Modified Split Spoon Sampler Fitted With 2"x6" Brass Sample Sleeves										

DEPTH (feet)	SAMPLE INTERVAL	DESCRIPTION	GRAPHIC LOG	USCS CLASS	WELL CONSTRUCTION	BLOMS/Ø IN.	INCHES DRIVEN	INCHES RECOVD	COMMENTS	SAMPLE NO.	FIELD OVM/OVA READING (ppm)
35		SANDY GRAVEL, gray, dense, saturated, fine- to medium-grained sand		CL GW		10 21 28	18	18	Gravel up to 1 inch in diameter.	MWS-6	<1
35						26 50/ 5"	11	10		MWS-7	<1
40						25 30 50/ 6"	18	18		MWS-8	<1
45								No sample collected at 45 feet.			
50		Boring terminated. Total depth = 47 feet							Boring terminated approximately 15 feet below the water table.		

MONITORING WELL CONSTRUCTION DETAILS

PROJECT NO: 19024.03
 LOCATION: Beacon #604
 1619 West First Street
 Livermore, Californic

MONITORING WELL NO.: MW-5
 ELEVATION: 98.37 feet



- Protective Casing
- Locking Water Tight Cap
- Flush Grade Well Construction
 - Diameter and Mat'l 8-inch steel
 - Total length 12 inches
 - Length Above Ground 1/4 inch
- Thickness and Type of Seal 2 feet, concrete
- Diameter, Mat'l and Joint Type of Riser Pipe 2 inch, SCH 40 PVC flush thread
- Type of Backfill Around Riser cement/ 5% bentonite grout
- Thickness and Type of Seal 2 feet bentonite chips
- Distance of Filter Sand Above Top of Screen 2 feet
- Type of Filter Around Screen #3 Ionestar
- Monitoring Well Mat'l SCH 40 PVC
- Screen Gauge/Slot Size 0.020 inch
- Diameter and Length of Screen 2 inch, 20 feet
- Depth to Bottom of Monitoring Well 47 feet
- Depth to the Bottom of Filter Sand 47 feet

L1 = 0.25 feet
 L2 = 26.75 feet
 L3 = 20.00 feet
 L4 = 47.00 feet

MONITORING WELL WATER LEVEL MEASUREMENTS

Date:	Time:	Water Level*
03/30/94	1525	32.07

Completion Date and Time: 03/29/94 1300



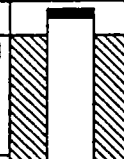

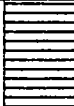

* Measuring Point: Top Of Casing

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Log of Soil Boring: MW-6	OVM/OVA: hNu PID with 10.2 eV probe									
Project Number: 19024.03	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">Drilling</td> <td style="text-align: center;">Time</td> <td style="text-align: center;">Date</td> </tr> <tr> <td style="text-align: center;">Start</td> <td style="text-align: center;">1310</td> <td style="text-align: center;">3/29/94</td> </tr> <tr> <td style="text-align: center;">Finish</td> <td style="text-align: center;">1445</td> <td style="text-align: center;">3/29/94</td> </tr> </table>	Drilling	Time	Date	Start	1310	3/29/94	Finish	1445	3/29/94
Drilling	Time	Date								
Start	1310	3/29/94								
Finish	1445	3/29/94								
Location: Beacon #604 1619 West First Street Livermore, California	Water Depth (Date): 33.38 Feet (3/30/94) Casing Elevation: 97.62 Feet Completion Depth: 48 Feet Logged By: S. Liaty Checked By:									
Drilling Company: V & W Drilling Drilled By: Robert Vickery Drilling Method: 8" O.D. HSA, B-61 HDX Mobile Drill Rig Sampling Method: California Modified Split Spoon Sampler Fitted With 2"x6" Brass Sample Sleeves										

DEPTH (feet)	SAMPLE INTERVAL	DESCRIPTION	GRAPHIC LOG	USCS CLASS	WELL CONSTRUCTION	BLOWS/9 IN.	INCHES DRIVEN	INCHES RECOVERD	COMMENTS	SAMPLE NO.	FIELD OVM/OVA READING (ppm)
		CONCRETE AND ROAD BASE							Gravel up to 1 inch in diameter.		
		SILTY GRAVEL, dark yellowish brown, damp, very dense		GM							
5		SANDY GRAVEL, dark yellowish brown, moist, very dense, fine- to medium-grained sand		GW		11 21 34	18	14	Gravel up to 1.5 inches in diameter.	MW6-1	<1
10						12 50/ 5"	11	11		MW6-2	<1
15						10 28 36	18	16		MW6-3	<1
20		SILTY CLAY, dark yellowish brown, moist, very stiff		CL		6 8 10	18	18		MW6-4	<1
25		SANDY GRAVEL, yellowish brown, moist, moderately dense, fine- to medium-grained sand		GW		7 17 25	18	18	Gravel up to 1.5 inches in diameter.	MW6-5	<1
30											

(Boring continued on next page)

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Log of Soil Boring: MW-6	OVM/OVA: hNu PID with 10.2 eV probe
Project Number: 19024.03	Drilling Time Date
Location: Beacon #604 1619 West First Street Livermore, California	Start 1310 3/29/94
Drilling Company: V & W Drilling Drilled By: Robert Vickery Drilling Method: 8" O.D. HSA, B-81 HDX Mobile Drill Rig Sampling Method: California Modified Split Spoon Sampler Fitted With 2"x6" Brass Sample Sleeves	Finish 1445 3/29/94
	Water Depth (Date): 33.38 Feet (3/30/94) Casing Elevation: 97.62 Feet Completion Depth: 48 Feet Logged By: S. Liaty Checked By:

DEPTH (feet)	SAMPLE INTERVAL	DESCRIPTION	GRAPHIC LOG	USCS CLASS	WELL CONSTRUCTION	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOVERD	COMMENTS	SAMPLE NO.	FIELD OVM/OVA READING (ppm)
33.38		SANDY GRAVEL, yellowish brown, moist, moderately dense, fine- to medium-grained sand		GW		6	18	18	Gravel up to .5 inches in diameter.	MW-6	<1
35		CLAYEY SAND with minor gravel, dark yellowish brown, moist, fine- to medium-grained sand		SC		9	18	18			
35		CLAYEY SAND with minor gravel, dark yellowish brown, moist, fine- to medium-grained sand		SC		10	18	18			
40		SANDY GRAVEL, gray, saturated, very dense, medium- to coarse-grained sand		GW		28	18	18			
40		SANDY GRAVEL, gray, saturated, very dense, medium- to coarse-grained sand		GW		40	18	18			
40		SANDY GRAVEL, gray, saturated, very dense, medium- to coarse-grained sand		GW		29	11	11	Soil appears to be stained. Gravel up to 1 inch in diameter.	MW-6	<1
40		SANDY GRAVEL, gray, saturated, very dense, medium- to coarse-grained sand		GW		50/5"	11	11			
48		Boring terminated. Total depth = 48 feet							Boring terminated approximately 5 feet below the water table.		

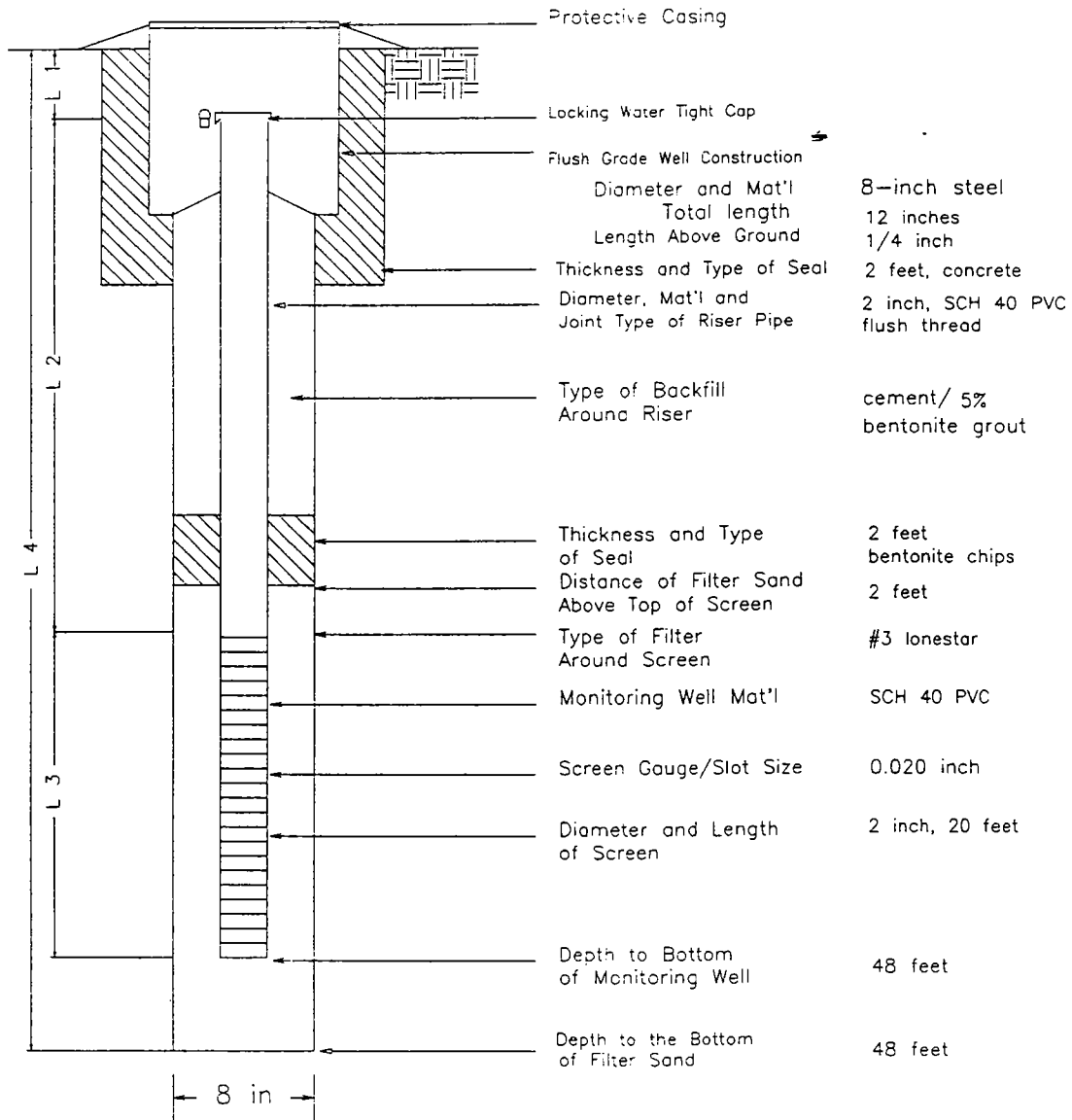
MONITORING WELL CONSTRUCTION DETAILS

PROJECT NO: 19024.03

MONITORING WELL NO.: MW-6

LOCATION: Beacon #604
1619 West First Street
Livermore, California

ELEVATION: 97.62 feet



L1 = 0.25 feet
L2 = 27.75 feet
L3 = 20.00 feet
L4 = 48.00 feet

MONITORING WELL WATER LEVEL MEASUREMENTS

Date:	Time:	Water Level*
03/30/94	1521	33.38

Completion Date and Time: 03/29/94 1600

* Measuring Point: Top Of Casing

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BQ001831

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Log of Soil Boring: MW-7	OVM/OVA: hNu PID with 10.2 eV probe									
Project Number: 19024.03	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Drilling</td> <td style="width: 33%;">Time</td> <td style="width: 33%;">Date</td> </tr> <tr> <td>Start</td> <td>0815</td> <td>3/30/94</td> </tr> <tr> <td>Finish</td> <td>0935</td> <td>3/30/94</td> </tr> </table>	Drilling	Time	Date	Start	0815	3/30/94	Finish	0935	3/30/94
Drilling	Time	Date								
Start	0815	3/30/94								
Finish	0935	3/30/94								
Location: Beacon #604 1619 West First Street Livermore, California	Water Depth (Date): 31.98 Feet (3/30/94) Casing Elevation: 98.03 Feet Completion Depth: 47 Feet Logged By: S. Liaty Checked By:									
Drilling Company: V & W Drilling Drilled By: Robert Vickery Drilling Method: 8" O.D. HSA, B-81 HDX Mobile Drill Rig Sampling Method: California Modified Split Spoon Sampler Fitted With 2"x6" Brass Sample Sleeves										

DEPTH (feet)	SAMPLE INTERVAL	DESCRIPTION	GRAPHIC LOG	USCS CLASS	WELL CONSTRUCTION	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOVERD	COMMENTS	SAMPLE NO.	FIELD OVM/OVA READING (ppm)
		ASPHALT AND ROAD BASE							Gravel up to 1.5 inches in diameter.		
5		SILTY GRAVEL, yellowish brown, damp, dense to very dense		GM		11 24 28	18	18	Gravel up to 1.5 inches in diameter.	MW7-1	<1
10		SANDY GRAVEL, dark yellowish brown with gray mottling, moist, very dense, fine- to medium-grained sand		GW		50 50/ 6"	12	12		MW7-2	<1
15				GW		37 50/ 6"	12	12		MW7-3	<1
20		SILTY CLAY, dark yellowish brown, moist, hard		CL		10 17 17	18	18		MW7-4	<1
25		SANDY GRAVEL, yellowish brown, moist, very dense, fine- to medium-grained sand		GW		21 50/ 6"	12	12	Gravel up to 1.5 inches in diameter.	MW7-5	<1
30						23					

(Boring continued on next page)

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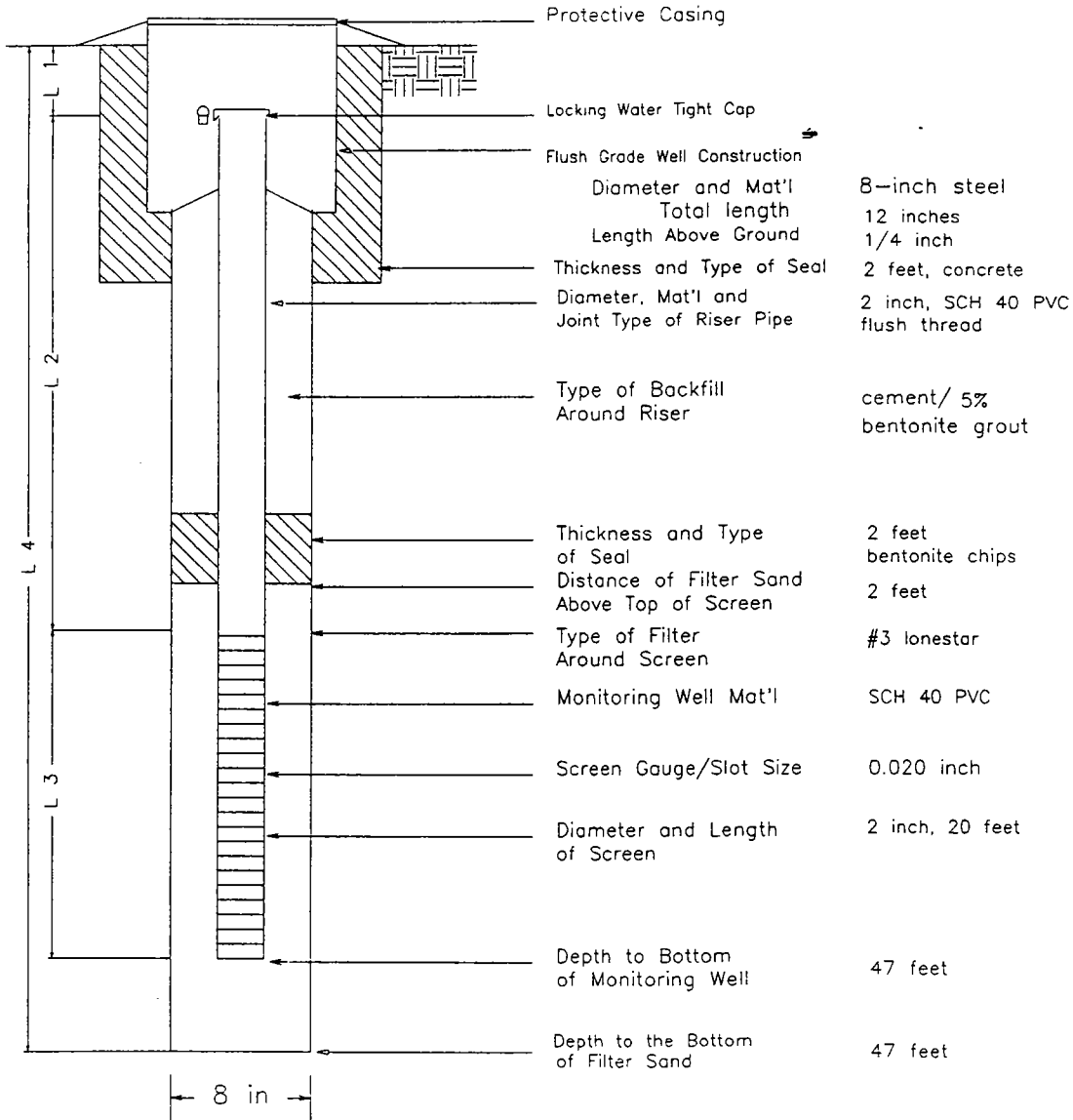
Log of Soil Boring: MW-7		OVM/OVA: hNu PID with 10.2 eV probe	
Project Number: 19024.03		Drilling	Time
Location: Beacon #604 1619 West First Street Livermore, California		Start	0815 3/30/94
		Finish	0935 3/30/94
Drilling Company: V & W Drilling Drilled By: Robert Vickery Drilling Method: 8" O.D. HSA, B-61 HDX Mobile Drill Rig Sampling Method: California Modified Split Spoon Sampler Fitted With 2"x6" Brass Sample Sleeves		Water Depth (Date): 31.98 Feet (3/30/94)	
		Casing Elevation: 98.03 Feet	
		Completion Depth: 47 Feet	
		Logged By: S. Liaty Checked By:	

DEPTH (feet)	SAMPLE INTERVAL	DESCRIPTION	GRAPHIC LOG	USCS CLASS	WELL CONSTRUCTION	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOVD	COMMENTS	SAMPLE NO.	FIELD OVM/OVA READING (ppm)
35		SANDY GRAVEL, yellowish brown, moist, very dense, fine- to medium-grained sand		GW		50/5"	11	11	Gravel up to 5 inches in diameter.	MW7-6	<1
35		CLAYEY SAND with minor gravel, dark yellowish brown, saturated, very dense, medium- to coarse-grained sand		SC		28 31 50/5"	17	17	Soil appears to be stained. Gravel up to 1.5 inches in diameter.	MW7-7	19
40		SANDY GRAVEL, light gray, saturated, very dense, fine- to coarse-grained sand		GW		9 17 36	18	15	No sample collected at 45 feet.	MW7-8	21
45									Boring terminated approximately 15 feet below the water table.		
50		Boring terminated. Total depth = 47 feet									

MONITORING WELL CONSTRUCTION DETAILS

PROJECT NO: 19024.03
 LOCATION: Beacon #604
 1619 West First Street
 Livermore, California

MONITORING WELL NO.: MW-7
 ELEVATION: 98.03 feet



L1 = 0.25 feet
 L2 = 26.75 feet
 L3 = 20.00 feet
 L4 = 47.00 feet

MONITORING WELL WATER LEVEL MEASUREMENTS

Date:	Time:	Water Level*
03/30/94	1519	31.98

Completion Date and Time: 03/30/94 1100

* Measuring Point: Top Of Casing

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PROJECT NO.: 41-0362-04
 LOCATION: Tesoro 67076
 1619 West First St.
 Livermore, California

DATE DRILLED: 9/2/03
 LOGGED BY: J. Hunter
 APPROVED BY: D. Padgett, RG
 DRILLING CO.: Woodward Drilling

NORTHING: NA
 EASTING: NA
 TOP OF CASING ELEVATION: 471.34 feet

PID/FID (ppm)	BLOWS PER 6 INCHES	RECOVERY	SAMPLE	DEPTH (feet below grade)	DRILLING METHOD: 8-inch Hollow-Stem Auger	USCS	LITHOLOGY	WELL CONSTRUCTION DETAIL
					SAMPLER TYPE: 2-inch Split Spoon			
					TOTAL DEPTH: 45.0 feet			
					DEPTH TO WATER: 32.0 feet			
					DESCRIPTION			
				0	Hole clearance to 5 fbg.			Well Box with Locking Cap
				5	GRAVELLY SAND (SW): Grayish brown (10YR 5/2), 60% fine to coarse sand, 40% rounded gravel, very dense, damp.	SW		2-inch Schedule 40 PVC
0	16 20 22	1.5/ 1.5						Neat Cement
				10	SANDY GRAVEL (GW): Grayish brown (10YR 5/2), 30% fine to coarse sand, 70% rounded gravel, very dense, dry.	GW		
0	50	0.5/ 1.5						
NA	50	0.5/ 1.5		15				
				20	SILTY CLAY (CL): Brown (10YR 5/3), 30% silt, 50% clay, 20% rounded gravel, very stiff, dry.	CL		Bentonite
0	7 7 15	1.5/ 1.5						No. 3 Monterey Sand
				25	- @ 25': no gravel.			
0	10 11 20	1.5/ 1.5						
				30	SILTY SAND (SM): Yellowish brown (10YR 5/4), 30% silt, 70% fine sand, very dense, moist.	SM		2-inch Schedule 40 PVC 0.020 Slot
0	17 21 35	1.5/ 1.5						
				35	SANDY GRAVEL (GP): Yellowish brown (10YR 5/4), 40% fine to coarse sand, 60% rounded gravel, very dense, wet.	GP		
0	25 50	1.0/ 1.5						
				40				



MONITORING WELL INSTALLATION LOG

MW-8

PROJECT NO.: 41-0362-04
 LOCATION: Tesoro 67076
 1619 West First St.
 Livermore, California

DATE DRILLED: 9/2/03
 LOGGED BY: J. Hunter
 APPROVED BY: D. Padgett, RG
 DRILLING CO.: Woodward Drilling

NORTHING: NA
 EASTING: NA
 TOP OF CASING ELEVATION: 471.34 feet

PID/FID (ppm)	BLOWS PER 6 INCHES	RECOVERY	SAMPLE	DEPTH (feet below grade)	DRILLING METHOD: 8-inch Hollow-Stem Auger SAMPLER TYPE: 2-inch Split Spoon TOTAL DEPTH: 45.0 feet DEPTH TO WATER: 32.0 feet		USCS	LITHOLOGY	WELL CONSTRUCTION DETAIL
					DESCRIPTION				
NA	50	0.5/1.5		40	SANDY GRAVEL (GP) (continued), wet.		GP		<p>2-inch Schedule 40 PVC 0.020 Slot No. 3 Monterey Sand End Cap</p>
				45					
				50					
				55					
				60					
				65					
				70					
				75					
				80					

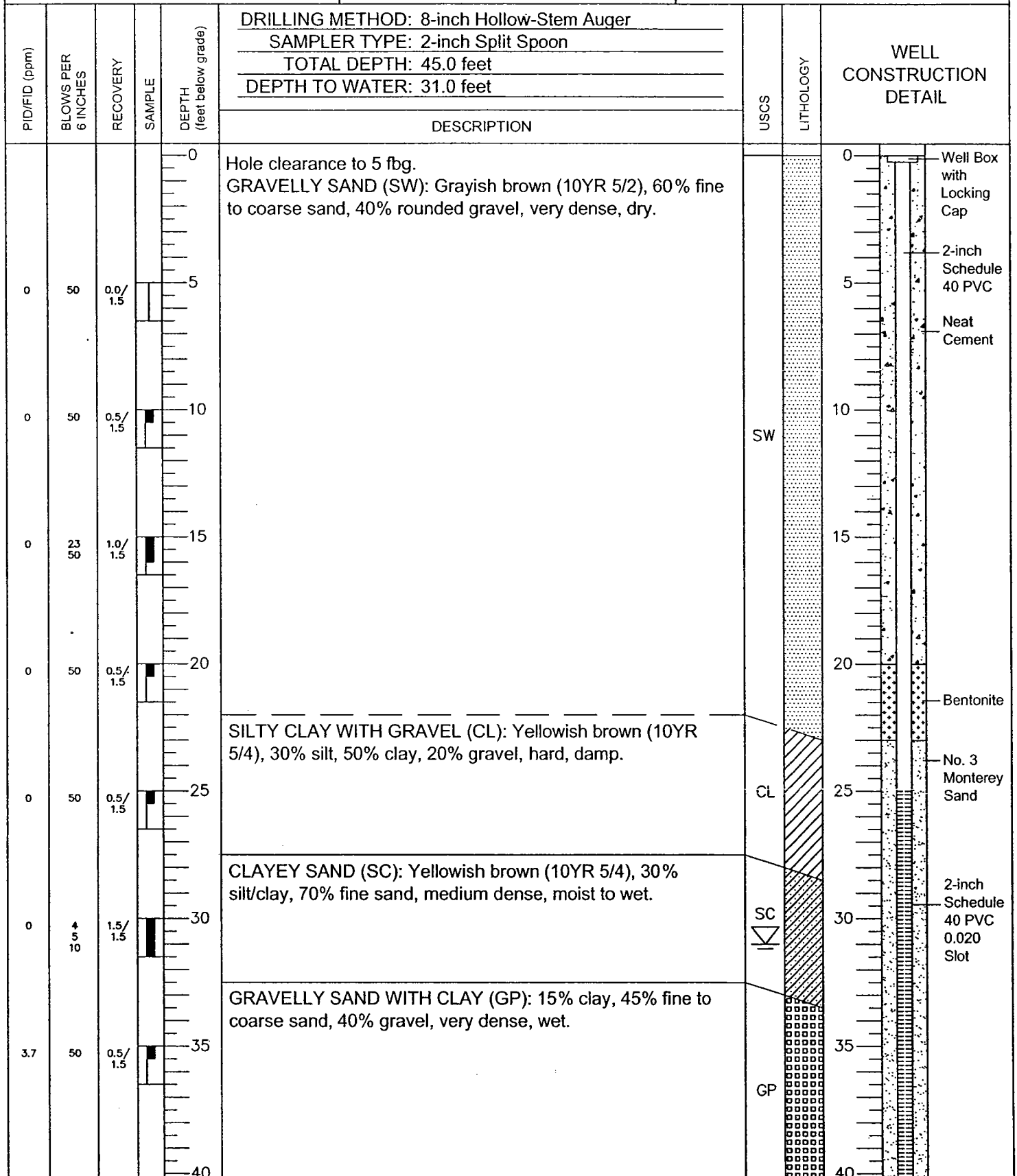


MONITORING WELL INSTALLATION LOG

PROJECT NO.: 41-0362-04
 LOCATION: Tesoro 67076
 1619 West First St.
 Livermore, California

DATE DRILLED: 9/3/03
 LOGGED BY: J. Hunter
 APPROVED BY: D. Padgett, RG
 DRILLING CO.: Woodward Drilling

NORTHING: NA
 EASTING: NA
 TOP OF CASING ELEVATION: 470.93 feet



MONITORING WELL INSTALLATION LOG

MW-9

PROJECT NO.: 41-0362-04
 LOCATION: Tesoro 67076
 1619 West First St.
 Livermore, California

DATE DRILLED: 9/3/03
 LOGGED BY: J. Hunter
 APPROVED BY: D. Padgett, RG
 DRILLING CO.: Woodward Drilling

NORTHING: NA
 EASTING: NA
 TOP OF CASING ELEVATION: 470.93 feet

PID/FID (ppm)	BLOWS PER 6 INCHES	RECOVERY	SAMPLE	DEPTH (feet below grade)	DRILLING METHOD: 8-inch Hollow-Stem Auger	USCS	LITHOLOGY	WELL CONSTRUCTION DETAIL
					SAMPLER TYPE: 2-inch Split Spoon			
					TOTAL DEPTH: 45.0 feet			
					DEPTH TO WATER: 31.0 feet			
DESCRIPTION								
9.6	22 50	1.0/ 1.5		40	GRAVELLY SAND WITH CLAY (GP) (continued).	GP		<p>2-inch Schedule 40 PVC 0.020 Slot No. 3 Monterey Sand End Cap</p>
				45				
				50				
				55				
				60				
				65				
				70				
				75				
				80				



MONITORING WELL INSTALLATION LOG

MW-9

PROJECT NO.: 41-0362-04	DATE DRILLED: 9/2/03	NORTHING: NA
LOCATION: Tesoro 67076	LOGGED BY: J. Hunter	EASTING: NA
1619 West First St.	APPROVED BY: D. Padgett, RG	TOP OF CASING ELEVATION: 471.79 feet
Livermore, California	DRILLING CO.: Woodward Drilling	

PID/FID (ppm)	BLOWS PER 6 INCHES	RECOVERY	SAMPLE	DEPTH (feet below grade)	DRILLING METHOD: 8-inch Hollow-Stem Auger	USCS	LITHOLOGY	WELL CONSTRUCTION DETAIL
					SAMPLER TYPE: 2-inch Split Spoon			
					TOTAL DEPTH: 45.0 feet			
					DEPTH TO WATER: 32.0 feet			
					DESCRIPTION			
				0	Hole clearance to 5 fbg.			0
				5	GRAVELLY SAND (SW): Grayish brown (10YR 5/2), 60% fine to coarse sand, 40% rounded gravel, very dense, dry.	SW		Well Box with Locking Cap
NA	15 20 25	0.5/ 1.5		5				2-inch Schedule 40 PVC
				10				Neat Cement
NA	50	0.5/ 1.5		10				
				15				
	50	0.5/ 1.5		15				
				20				
	39 50	1.0/ 1.5		20				Bentonite
				25	SILTY CLAY WITH GRAVEL (CL): Brown (10YR 5/3), 30% silt, 50% clay, 20% rounded gravel, hard, damp.	CL		No. 3 Monterey Sand
	35 50	1.0/ 1.5		25				
				30	CLAYEY SAND WITH GRAVEL (SM): Yellowish brown (10YR 5/3), 20% clay, 50% fine to coarse sand, 30% rounded gravel, very dense, moist.	SM		2-inch Schedule 40 PVC 0.020 Slot
	35 50	1.0/ 1.5		30				
				35	SANDY GRAVEL (GP): Yellowish brown (10YR 5/3), trace clay, 30% fine to coarse sand, 70% gravel, very dense, wet.	GP		
	39 50	1.0/ 1.5		35				
				40				



MONITORING WELL INSTALLATION LOG

PROJECT NO.: 41-0362-04
 LOCATION: Tesoro 67076
 1619 West First St.
 Livermore, California

DATE DRILLED: 9/2/03
 LOGGED BY: J. Hunter
 APPROVED BY: D. Padgett, RG
 DRILLING CO.: Woodward Drilling

NORTHING: NA
 EASTING: NA
 TOP OF CASING ELEVATION: 471.79 feet

DRILLING METHOD: 8-inch Hollow-Stem Auger
 SAMPLER TYPE: 2-inch Split Spoon
 TOTAL DEPTH: 45.0 feet
 DEPTH TO WATER: 32.0 feet

WELL
 CONSTRUCTION
 DETAIL

PID/FID (ppm)
 BLOWS PER
 6 INCHES
 RECOVERY
 SAMPLE
 DEPTH
 (feet below grade)

DESCRIPTION

USCS

LITHOLOGY

SANDY GRAVEL (GP) (continued).

GP

40
 45
 50
 55
 60
 65
 70
 75
 80

2-inch
 Schedule
 40 PVC
 0.020
 Slot
 No. 3
 Monterey
 Sand
 End Cap



MONITORING WELL INSTALLATION LOG

MW-10
 PAGE 2 OF 2

Project: Tesoro - Livermore
Project Location: 1619 First Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well MW-11

Sheet 1 of 2

Date(s) Drilled	11/10/08 - 11/11/08			Logged By	M. Nelson	Checked By	M. Purchase
Drilling Method	Sonic			Drill Bit Size/Type	8-inch-OD casing advancer	Total Depth of Borehole	43.3 feet
Drill Rig Type	Spider-06 ATV Sonic LAR Rig			Drilling Contractor	Boart Longyear	Surface Elevation	Not available
Groundwater Level (feet bgs)	First --	Completion --	Development --	Sampling Method	No sampling performed	Top of Casing Elevation	Not available
Diameter of Hole (inches)	8		Diameter of Well (inches)	4		Type of Well Casing	4-inch-dia. Schedule 40 PVC
Type of Sand Pack	Monterey #2/12 (25.5-43.3 feet)			Type and Depth of Seal(s)	Bentonite pellets 21.3-25.5 ft, portland cement 2-21.3 ft, concrete 0-2 ft		
Comments	Well installed by M. Nelson. EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete at surface.						

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number							
0					Concrete 5 inches thick					Air knife first 5 ft of borehole.
					MW-11 was installed near IP-8. The borehole for well MW-11 was advanced to 43.3 feet without collecting samples or observing cuttings. Refer to Log of Boring/Well IP-8 for lithology at this location.					
5										
10										
15										
20										
25										
30										

ORION_1W_TESLMOR.GPJ-MW-11; 1/7/09

Project: Tesoro - Livermore
Project Location: 1619 First Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well MW-11

Sheet 2 of 2

Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Blows / 6 in.							
30					MW-11 was installed near IP-8. The borehole for well MW-11 was advanced to 43.3 feet without collecting samples or observing cuttings. Refer to Log of Boring/Well IP-8 for lithology at this location.					
35										
40										
45					Bottom of boring at 43.3 feet					
50										
55										
60										
65										
70										


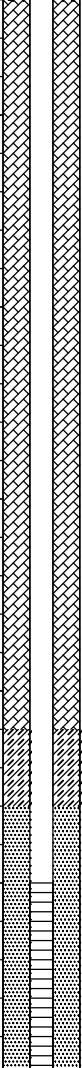
ORION_1W_TESLMOR.GPJ-MW-11; 1/7/09

Project: Tesoro - Livermore
Project Location: 1619 1st Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well MW-12

Sheet 1 of 2

Date(s) Drilled	6/5/12			Logged By	M. Purchase	Checked By	M. Nelson
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	10-inch-OD auger	Total Depth of Borehole	45.0 feet
Drill Rig Type	Marl M11			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	To be determined
Groundwater Level (feet bgs)	First	Completion	Development	Sampling Method	No sampling performed	Top of Casing Elevation	Not available
	40	--	--				
Diameter of Hole (inches)	10	Diameter of Well (inches)	4	Type of Well Casing	4-inch-dia. Schedule 40 PVC	Screen Perforation	0.020-inch slot (25-45 ft)
Type of Sand Pack	Monterey #2/12 (23-45 feet)			Type and Depth of Seal(s)	Hydrated bentonite chips 21-23 ft, portland cement 2-21 ft, concrete 0-2 ft		
Comments	Located at NW corner of 1st and P St., in Safeway parking log. Completed at surface with 12-inch-dia. flush-mount well vault.						

Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Blows / 6 in.							
0					Asphalt 4 inches thick					Hand auger first 5 ft.
5					<p>MW-12 was installed adjacent to DW-9. The borehole for well MW-12 was advanced to total depth of 45 feet without collecting samples or observing cuttings. Refer to Log of Boring/Well DW-9 for lithology at this location.</p>					
10										
15										
20										
25										
30										

ORION_1W; TESLMOR.GPJ-MW-12; 6/21/12

Project: Tesoro - Livermore
Project Location: 1619 1st Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well MW-12

Sheet 2 of 2

Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Blows / 6 in.							
30					MW-12 was installed adjacent to DW-9. The borehole for well MW-12 was advanced to total depth of 45 feet without collecting samples or observing cuttings. Refer to Log of Boring/Well DW-9 for lithology at this location.					
35										
40										
45					Bottom of boring at 45.0 feet					
50										
55										
60										
65										
70										

ORION_1W; TESLMOR.GPJ-MW-12; 6/21/12



BORING LOG

PROJECT NO.: D004-076
 LOCATION: 1619 FIRST AVENUE
 LIVERMORE, CA
 DATE DRILLED: 6/23/05
 CLIENT: TESORO

LOGGED BY: DJS
 DRILLER: MDE
 HOLE DIAMETER: 8"
 DRILLING METHOD: HOLLOW STEM
 SAMPLING METHOD: SPLIT SPOON

BORING/WELL #

TP-1

PAGE 1 OF 1

DEPTH (FT.)	WELL CONSTRUCTION DETAIL	PID READING (PPM)	PENETRATION (BLOWS/6")	DEPTH (FT.)	LITHOLOGY/DESCRIPTION
0		10/16/28		0	CONCRETE SURFACE 8" THICK CLEARED TO 4'
5	2" FLUSH THREAD PVC CASING			5	GW/GM- CLAYEY SILT WITH GRAVELS; ORANGEY BROWN, GRAVELS RANGE FROM <1cm TO 4cm, 75 % GRAVEL, SLIGHTLY MOIST
10		5/11/15		10	GW/GM- SAME AS ABOVE
15	NEAT PORTLAND CEMENT	4/8/13		15	GW/GM- CLAYEY SILT WITH GRAVELS; ORANGE AND BROWN CLAYEY, SILT GRAVELS RANGE FROM <1cm TO 2cm, 90% GRAVELS, MOSTLY DECOMPOSING, SLIGHTLY MOIST, NO ODOR
20	BENTONITE SEAL	6/8/15		20	GP/GM- CLAYEY SILT WITH SMALL (≤ 1 cm) GRAVELS SLIGHTLY MOIST, YELLOWY BROWN/ ORANGEY BROWN, SLIGHT ODOR
25	BLANK TO 28'	4/6/10		25	MH- CLAYEY SILT; ORANGEY BROWN, OLIVE GREEN SPOTS, (2mm), SLIGHTLY MOIST, ODOR
30		11.4	5/7/10	30	SC- CLAYEY SAND; ORANGEY BROWN WITH OLIVE LENSES, MEDIUM GRAINED SAND, FATTY CLAY, SLIGHTLY MOIST, NO ODOR, 70% SAND
35		321	5/8/14	35	SC- CLAYEY SAND, OLIVE/GRAYISH BROWN, SMALL GRAVELS (≤ 1 cm) WET, SOFT CLAY, STRONG ODOR
40		2,253	6/9/11	40	SW/SC- CLAYEY SAND; WELL GRADED, COBBLES UP TO 5cm, GREEN AND OLIVE BROWN, IN COLOR, WET, 10% COBBLES, 60% SAND, VERY STRONG ODOR
45	0.020 SLOTTED SCREEN				TERMINATED AT 43'
50					
55					
60					



BORING LOG

PROJECT NO.: D004-076
 LOCATION: 1619 FIRST AVENUE
 LIVERMORE, CA
 DATE DRILLED: 6/23/05
 CLIENT: TESORO

LOGGED BY: DJS
 DRILLER: MDE
 HOLE DIAMETER: 8"
 DRILLING METHOD: HOLLOW STEM
 SAMPLING METHOD: SPLIT SPOON

BORING/WELL #

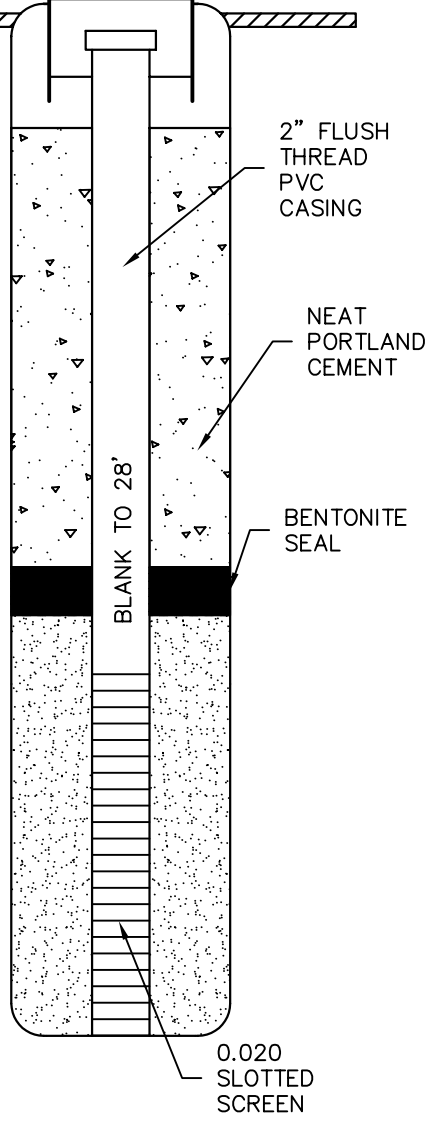
TP-2

PAGE 1 OF 1

DEPTH (FT.)	WELL CONSTRUCTION DETAIL	PID READING (PPM)	PENETRATION (BLOWS/6")	DEPTH (FT.)	LITHOLOGY/DESCRIPTION
0				0	CONCRETE SURFACE 8" THICK CLEARED TO 4'
5		50/6		5	SM- UNCONSOLIDATED SILTY SAND AND GRAVEL; DRY, COBBLES UP TO 5cm, NO ODOR
10		5/6/9		10	SM- SAME AS ABOVE; COBBLES, UP TO 2cm, NO ODOR
15		7/8/13		15	SM- SAME AS ABOVE, NO ODOR
20		4/5/7		20	MH- CLAYEY SILT; LIGHT BROWN, SOFT, LOW PLASTICITY, SLIGHTLY MOIST, NO ODOR
25		5/8/10		25	MH- SAME AS ABOVE WITH SMALL GRAVELS ≤ 1cm, DRY, NO ODOR
30		268	6/9/11	30	MH- CLAYEY SILT; SMALL GRAVELS (≤ 1cm) MOIST 15% GRAVELS, STRONG ODOR
35		288	4/9/16	35	GW- GRAVEL; UNCONSOLIDATED, SATURATED, SUBANGULAR PEBBLES RANGE FROM SILT TO 6cm VERY STRONG ODOR
40		485	7/11/17	40	CH- SANDY CLAY; GRAVELS RANGE FROM 1cm TO 5cm, 80% CLAY, SATURATED, SLIGHT ODOR
45					TERMINATED AT 43'

DEPTH (FT.)
5
10
15
20
25
30
35
40
45
50
55
60

WELL CONSTRUCTION DETAIL



LITHOLOGY/DESCRIPTION

CONCRETE SURFACE 8" THICK
CLEARED TO 4'

SM- UNCONSOLIDATED SILTY SAND AND GRAVEL;
DRY, COBBLES UP TO 5cm, NO ODOR

SM- SAME AS ABOVE; COBBLES, UP TO 2cm, NO
ODOR

SM- SAME AS ABOVE, NO ODOR

MH- CLAYEY SILT; LIGHT BROWN, SOFT, LOW
PLASTICITY, SLIGHTLY MOIST, NO ODOR

MH- SAME AS ABOVE WITH SMALL GRAVELS ≤ 1cm,
DRY, NO ODOR

MH- CLAYEY SILT; SMALL GRAVELS (≤ 1cm) MOIST
15% GRAVELS, STRONG ODOR

GW- GRAVEL; UNCONSOLIDATED, SATURATED,
SUBANGULAR PEBBLES RANGE FROM SILT TO 6cm
VERY STRONG ODOR

CH- SANDY CLAY; GRAVELS RANGE FROM 1cm TO
5cm, 80% CLAY, SATURATED, SLIGHT ODOR

TERMINATED AT 43'

Acton • Mickelson • van Dam, Inc.
 Consulting Scientists, Engineers, and Geologists

Log of Soil Boring VW-1

Casing Elevation:

Completion Depth: 37 feet

Project No.
19024.01

Location: Beacon 604
1619 W. First Street
Livermore, CA.

Drilling Company: Turner Exploration
 Driller: Mike Barr
 Drilling and Sampling Methods:
 BK-81 HSA California Modified
 split-spoon sampler

OVM/OVA HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-27-93	08:30
Finish	05-27-93	10:30
Water Depth	Initial	Completion N/A

Logged by: H. Hansen
 Checked by: DJD
 Description

Graphic Log BORING/WELL DETAIL
 Blows/6 in
 Inches Driven
 Inches Recov'd
 Comments
 Sample #
 Field OVM/OVA Reading (ppm)

Depth (feet)	Sample Int.	Graphic Log BORING/WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
0		Concrete						
1		0 to 27 feet; conductor casing, no samples collected						
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

BQ001251

Acton • Mickelson • van Dam, Inc.
 Consulting Scientists, Engineers, and Geologists
 Log of Soil Boring VW-1
 (cont)

Project No.
19024.01

Location: Beacon 604
1619 W. First Street
Livermore, CA.

Drilling Company: Turner Exploration
 Driller: Mike Barr
 Drilling and Sampling Methods:
 BK-81 HSA California Modified
 split-spoon sampler

Casing Elevation:

OVM/OVA HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-27-93	08:30
Finish	05-27-93	10:30
Water Depth	Initial	Completion N/A

Completion Depth: 37 feet

Depth (feet)	Sample Int.	Logged by: H. Hansen		Graphic Log	BORING/ WELL DETAIL	Blows/6 In	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
		Checked by: <i>DV</i>									
20		(continued from above)									
21		0 to 27 feet; conductor casing, no samples collected									
22											
23											
24											
25											
26											
27											
28											
29											
30						23					
31						13	18	9		VW1-6	225
32						11					
33											
34						21					
35						31	18	16		VW1-7	325
36						33					
37											
38											
39											
40						37	14	18		VW1-8	500
41						13					

CLAYEY GRAVEL
 olive brown, 1/2 to 1 inch gravel,
 fine to coarse-grained sand,
 common plastic fines, very moist, (GC)

Saturated at 39.5 feet

BQ001252

Acton • Mickelson • van Dam, Inc.
 Consulting Scientists, Engineers, and Geologists
 Log of Soil Boring VW-1
 (cont)

Casing Elevation:

Completion Depth: 37 feet

Project No.
19024.01

Location: Beacon 604
1619 W. First Street
Livermore, CA.

Drilling Company: Turner Exploration
 Driller: Mike Barr
 Drilling and Sampling Methods:
 BK-81 HSA California Modified
 split-spoon sampler

OVM/OVA HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-27-93	08:30
Finish	05-27-93	10:30
Water Depth	Initial	Completion N/A

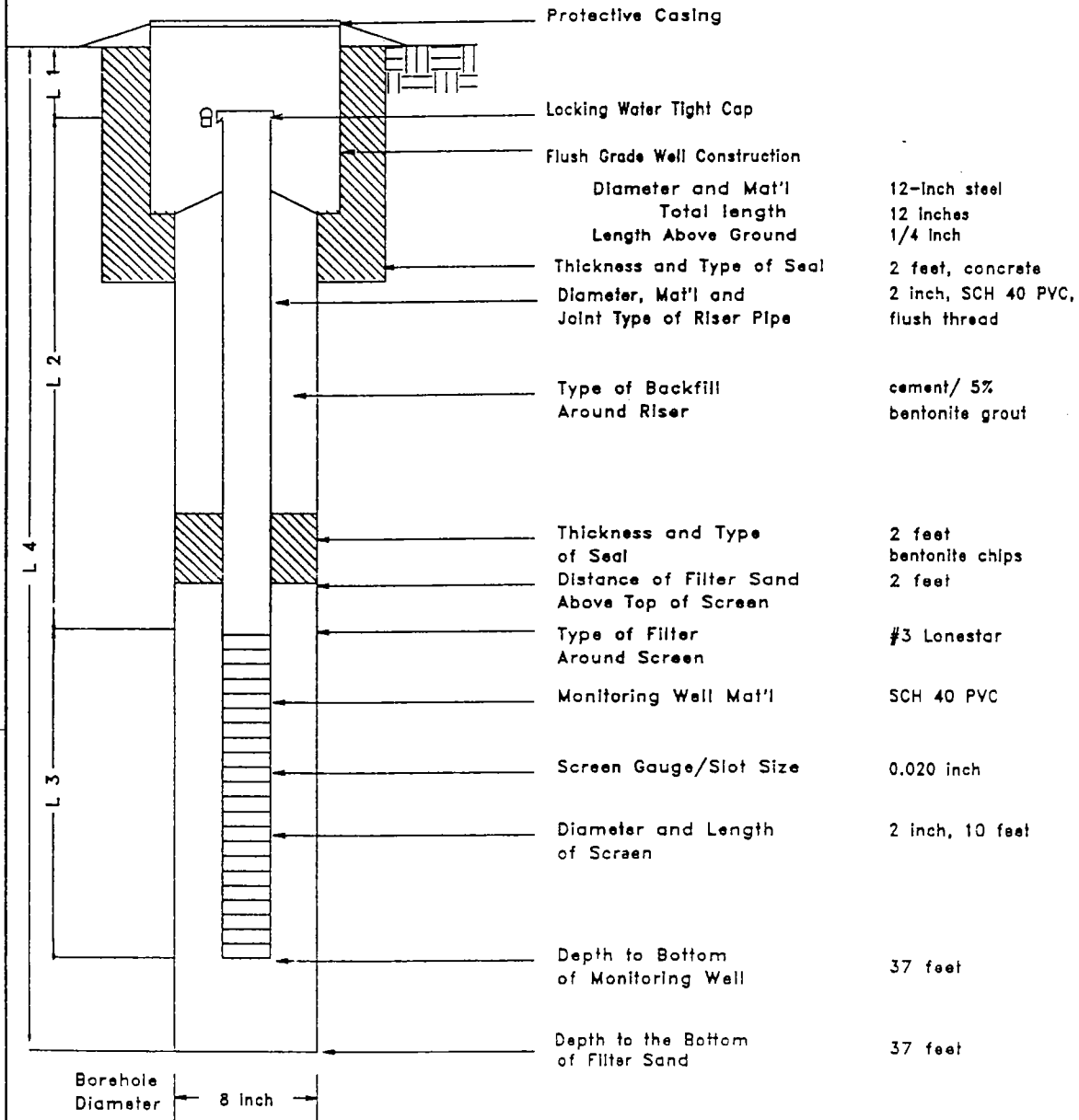
Depth (feet)	Sample Int.	Logged by: H. Hansen	Graphic Log	BORING/ WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
		Checked by: DJD								
40										
41										
42										
43										
44										
45					19					
46					22	18	18		VW1-9	300
47					18					
48										
49										
50					26					
51					36	18	18		VW1-10	450
52					24					
53										
54										
55										
56										
57										
58										
59										
60										
61										

BQ001253

VADOSE WELL CONSTRUCTION DETAILS

VADOSE WELL NO. VW-1

PROJECT: Beacon #604
 1619 W. First Street
 Livermore, CA



- L1 = 0.25
- L2 = 26.75
- L3 = 10
- L4 = 37

COMPLETION DATE AND TIME 18:45 05-28-93

Note: hole backfilled with bentonite chips 37 to 50 feet

BQ001264

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Log of Soil Boring VW-2

Casing Elevation:

Completion Depth: 37 feet

Project No.
19024.01

Location: Beacon 504
1619 W. First Street
Livermore, CA.

Drilling Company: Turner Exploration
Driller: Mike Barr
Drilling and Sampling Methods:
BK-81 HSA California Modified
split-spoon sampler

OVM/OVA HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-28-93	08:45
Finish	05-27-93	09:45

Water Depth	Initial	Completion
		N/A

Depth (feet)	Sample Int.	Logged by: H. Hansen		Graphic Log	BORING/ WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
		Checked by: DJD									
Description											
0		Concrete									
1		CLAYEY GRAVEL olive brown, 1/2 to 2 Inch gravel, fine to coarse-grained sand common plastic fines, slightly moist, (GC)									
4						17					
5						19	18	17		VW2-1	0
6						24					
10						25	12	9		VW2-2	0
11						35					
15						49	12	8		VW2-3	0
16						38					
19						11					
20						9	18	10		VW2-4	
						22					

BQ001257

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 Log of Soil Boring VW-2
 (cont)

Project No. 19024.01
 Location: Beacon 604
 1619 W. First Street
 Livermore, CA.

Drilling Company: Turner Exploration
 Driller: Mike Barr
 Drilling and Sampling Methods:
 BK-81 HSA California Modified
 split-spoon sampler

Casing Elevation:

OVM/OVA HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-28-93	08:45
Finish	05-27-93	09:45

Completion Depth: 37 feet

Water Depth Initial Completion N/A

Depth (feet)	Sample Int.	Logged by: H. Hansen	Graphic Log	BORING/ WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
		Checked by: DvD								
		Description								

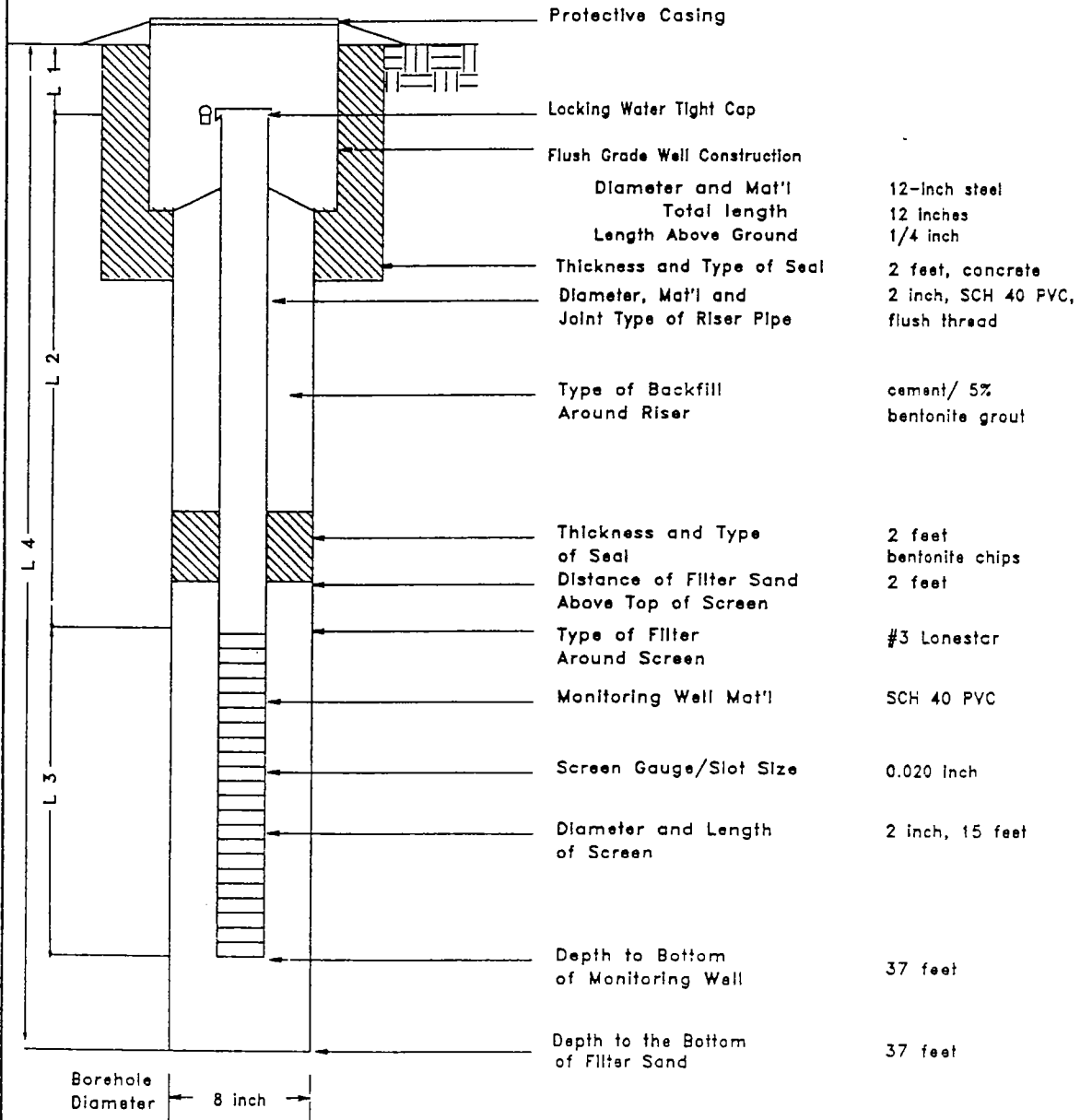
20		(continued from above)								
21		CLAYEY GRAVEL, olive brown, 1/2 to 2 inch gravel, fine- to coarse-grained sand, common plastic fines, slightly moist (GC)	GC							
22		SILTY CLAY								
23		brown, moderately plastic moist, (CL)	CL							
24										
25		CLAYEY GRAVEL			15					
26		1/2 to 2 inch gravel, fine to coarse-grained sand, common plastic fines, (GC)			17	18	2		VW2-5	225
27					19					
28										
29										
30			GC		12	18	6	Retained for chemical analysis.	VW2-6	
31					19					
32					27					
33										
34										
35										
36					42				VW2-7	475
37		boring terminated at 37 feet			50/d					
38										
39										
40										
41										

BQ001254

VADOSE WELL CONSTRUCTION DETAILS

VADOSE WELL NO. YW-2

PROJECT: Beacon #604
1619 W. First Street
Livermore, CA



- L1 = 0.25
- L2 = 21.75
- L3 = 15
- L4 = 37

COMPLETION DATE AND TIME 10:45 05-28-93

BQ001265

Acton • Mickelson • van Dam, Inc.

Consulting Scientists, Engineers, and Geologists

Log of Soil Boring VW-3

Casing Elevation:

Completion Depth: 36 feet

Project No.
19024.01

Location: Beacon 604
1619 W. First Street
Livermore, CA.

Drilling Company: Turner Exploration

Driller: Mike Barr

Drilling and Sampling Methods:

BK-81 HSA California Modified
split-spoon sampler

OVM/OVA HNu PID with 10.2 eV probe

Drilling	Time	Date
----------	------	------

Start	06-01-93	08:40
-------	----------	-------

Finish	06-01-93	09:30
--------	----------	-------

Water Depth	Initial	Completion
-------------	---------	------------

N/A

Depth (feet)	Sample Int.	Logged by: H. Hansen	Graphic Log	BORING/ WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
		Checked by: <i>DR</i>								
		Description								

0	Concrete										
1	CLAYEY GRAVEL olive brown, 1/2 to 2 inch gravel, fine to coarse-grained sand, common plastic fines, moist, (GC)										
2											
3											
4											
5						12					
6						12	18	18		VW3-1	2
7						14					
8											
9											
10						15					
11						17	16	16		VW3-2	0
12						22					
13											
14											
15				26	12	12		VW3-3	0		
16				50/6							
17											
18	SILTY CLAY olive brown, moderately plastic, (CL)										
19											
20					15	18	18		VW3-4	0	
					19						
				25							

BQ001255

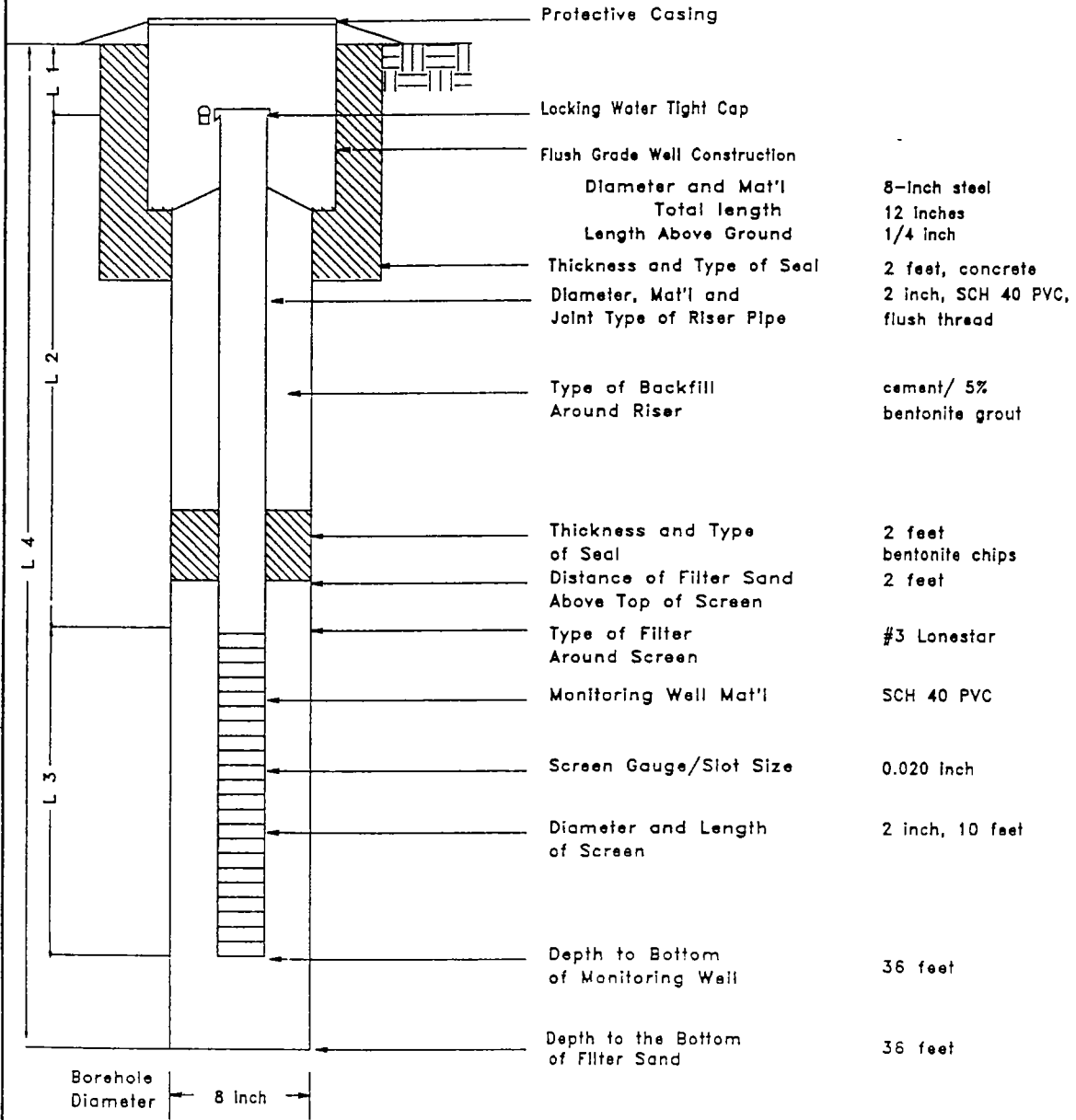
Acton • Mickelson • van Dam, Inc. Consulting Scientists, Engineers, and Geologists Log of Soil Boring VW-3 (cont) Casing Elevation:		Project No. 19024.01		Location: Beacon 504 1519 W. First Street Livermore, CA.							
		Drilling Company: Turner Exploration Driller: Mike Barr Drilling and Sampling Methods: BK-81 HSA California Modified split-spoon sampler.									
		OVM/OVA HNu PID with 10.2 eV probe									
		Drilling		Time	Date						
Start		06-01-93	08:40								
Finish		06-01-93	09:30								
Completion Depth: 36 feet		Water Depth		Initial	Completion N/A						
Depth (feet)	Sample Int.	Logged by: H. Hansen		Graphic Log	BORING/ WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
		Checked by: <i>DJD</i>									
Description											
(continued from above)											
20											
21											
22											
23											
24											
25											
26											
27											
28		CLAYEY GRAVEL									
29		brown, fine to coarse-grained,									
30		common plastic fines, very moist, (GC)									
31											
32											
33											
34											
35											
36		boring terminated at 36.0 feet									
37											
38											
39											
40											
41											

BQ001256

VADOSE WELL CONSTRUCTION DETAILS

VADOSE WELL NO. VV-3

PROJECT: Beacon #604
 1619 W. First Street
 Livermore, CA



- L1 = 0.25
- L2 = 20.75
- L3 = 15
- L4 = 36

COMPLETION DATE AND TIME 10:40 06-01-93

BQ001266

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Key to Log of Boring / Well













Sheet 1 of 1

Elevation, feet	Depth, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Blows / 6 in.							
1	2	3	4	5	6	7	8	9	10	11	12







COLUMN DESCRIPTIONS

- | | |
|---|--|
| <p>1 Elevation: Elevation in feet relative to mean sea level (MSL).</p> <p>2 Depth: Depth in feet below the ground surface.</p> <p>3 Sample Type: Type of soil sample collected at depth interval shown; sampler symbols are explained below.</p> <p>4 Sample Number: Sample identification number.</p> <p>5 Blows / 6 in.: Number of blows required to advance driven sampler each 6-inch drive interval, or distance noted, using a 140-lb hammer with a 30-inch drop. "-" indicates data not recorded on field log.</p> <p>6 Graphic Log: Graphic depiction of subsurface material encountered; typical symbols are explained below.</p> | <p>7 Material Description: Description of material encountered; may include density/consistency, moisture, and color.</p> <p>8 Well Completion Diagram: Well schematic; materials are listed in header block; graphics are explained below.</p> <p>9 Headspace PID: Photoionization device (PID) field sample headspace reading in parts per million (ppm).</p> <p>10 Background PID: Photoionization device (PID) background reading in parts per million (ppm).</p> <p>11 Drilling Progress: Time (in 24-hour clock) at sampling and other events during downhole advance.</p> <p>12 Remarks: Comments and observations regarding drilling or sampling made by driller or field personnel.</p> |
|---|--|




TYPICAL SOIL GRAPHIC SYMBOLS

 Poorly Graded SAND (SP)	 Well-Graded SAND (SW)	 SAND with SILT (SP-SM)	 SILTY SAND (SM)
 CLAY (CL)	 SILTY CLAY (CL)	 CLAYEY SILT (ML)	 CLAYEY SAND (SC)
 SILT (ML)	 SANDY SILT (ML)	 Poorly Graded GRAVEL (GP)	 CLAYEY GRAVEL (GC)





TYPICAL WELL GRAPHIC SYMBOLS

 Blank casing in concrete	 Blank casing in filter sand
 Blank casing in cement slurry	 Slotted casing in filter sand
 Blank casing in hydrated bentonite chips	 Natural fill / slough

TYPICAL SAMPLER GRAPHIC SYMBOLS

 2.5-inch-OD split barrel with brass liners (California Modified)
 Portion of sample retained for analysis
 No recovery interval in sampler

OTHER GRAPHIC SYMBOLS

-  First water encountered at time of drilling
-  Static water level measured in well
-  Change in material properties within a stratum
-  Inferred contact between strata or gradational change in lithology

GENERAL NOTES

- Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive; actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
- Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

ORION_1W_KEY; TESLVMOR_GP-J-wellkey; 6/30/08

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring / Well DW-1

Sheet 1 of 2

Date(s) Drilled	5/14/08			Logged By	M. Nelson	Checked By	M. Purchase
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	10-inch-OD auger	Total Depth of Borehole	65.5 feet
Drill Rig Type	Mobile B-61			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	Not available
Groundwater Level (feet bgs)	First	Completion	Development	Sampling Method	California Modified split spoon	Top of Casing Elevation	Not available
	43	--	37.0				
Diameter of Hole (inches)	10	Diameter of Well (inches)	4	Type of Well Casing	4-inch-dia. Schedule 40 PVC	Screen Perforation	0.020-inch slot (55-65 ft)
Type of Sand Pack	#2/12 Monterey (53-65.5 feet)			Type and Depth of Seal(s)	Hydrated bentonite chips 50-53 ft, cement slurry 2-50 ft, concrete 0-2 ft		
Comments	EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete at surface.						

Elevation, feet	Depth, feet	SAMPLES			MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Blows / 6 in.						
0					Concrete 5 inches thick					Hand auger first 5 ft.
5	10-16			10 12 16	Medium dense, dry, light brown, well-graded SAND with GRAVEL (SW), fine- to coarse-grained sand, no odor		0.6	0.1	0817	
10	20-22			10 20 22	↓ Becomes dense, moist, with trace clay		0.6	0.1	0819	
15	18-18	DW-1-15'		12 18 18	Medium dense, moist, light brown, poorly graded SAND with CLAY and GRAVEL (SP-SC), fine- to coarse-grained sand, fine gravel to 3/4 inch, no odor		0.7	0.1	0824	PID in operator breathing zone (OBZ) = 0.1 ppm DW-1-15' particle size analysis results: 21.4% gravel 15.9% c. sand 38.2% m. sand 18.7% f. sand 5.8% silt/clay
20	7-7			7 5 7	Loose, moist, light brown, SILTY SAND (SM), fine-grained sand, no odor		0.8	0.1	0828	
25	3-12			3 19 12	Very stiff, moist, light brown, SANDY SILT (ML), coarse-grained sand, trace clay, no odor		0.9	0.1	0834	
30	12-23			12 18 23	Dense, moist, grayish brown, SILTY SAND with GRAVEL (SM), medium- to coarse-grained sand, fine gravel to 3/4 inch, odor		433	0.1	0842	OBZ=0.6 ppm

ORION_1W_TESLMOR.GPJ-DW-01: 6/30/08

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring / Well DW-1

Sheet 2 of 2

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number							
30					Dense, moist, grayish brown, SILTY SAND with GRAVEL (SM), medium- to coarse-grained sand, fine gravel to 3/4 inch, odor (continued)					
35	34.5			12 50/2"	▼ Becomes very dense		125	0.1	0848	
40	39.5			22 50/3"	▼ With orange-brown silt, trace clay, no odor		79.2	0.2	0857	
45	44.5	⊗	DW-1-45'	16 50/5"	▼ Very dense, wet, grayish brown, poorly graded GRAVEL with SILT and SAND (GP-GM), coarse gravel, odor		47.7	0.1	0907	OBZ=0.4 ppm
50	49.5	⊗	DW-1-50'	15 17 22	▼ Medium dense to dense, wet, light brown, poorly graded SAND with SILT and GRAVEL (SP-SM), fine- to coarse-grained sand, odor		293	0.1	0919	DW-1-50' particle size analysis results: 24.2% gravel 12.6% c. sand 27.8% m. sand 23.9% f. sand 11.5% silt/clay
55	54.5			19 50/5"	▼ Very dense, wet, orange-brown, SILTY SAND (SM), medium- to coarse-grained sand, odor		998	0.1	0927	
60	59.5	⊗	DW-1-60'	8 17 32	▼ Dense, wet, light brown, poorly graded SAND with GRAVEL (SP), fine- to coarse-grained sand, fine to coarse gravel, trace silt, odor		251	0.1	0937	DW-1-60' particle size analysis results: 35.8% gravel 19.3% c. sand 27.2% m. sand 14.1% f. sand 3.6% silt/clay
65	64.5	⊗	DW-1-65'	16 18 22			127	0.1	0947	
					Bottom of boring at 65.5 feet					
70										

ORION_1W_TESLMOR.GP-JDW-01: 6/30/08

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring / Well DW-2

Sheet 1 of 2

Date(s) Drilled	5/15/08			Logged By	M. Nelson	Checked By	M. Purchase
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	10-inch-OD auger	Total Depth of Borehole	60.5 feet
Drill Rig Type	Mobile B-61			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	Not available
Groundwater Level (feet bgs)	First 35	Completion --	Development 39.9	Sampling Method	California Modified split spoon	Top of Casing Elevation	Not available
Diameter of Hole (inches)	10	Diameter of Well (inches)	4	Type of Well Casing	4-inch-dia. Schedule 40 PVC	Screen Perforation	0.020-inch slot (50-60 ft)
Type of Sand Pack	#2/12 Monterey (49-60.5 feet)			Type and Depth of Seal(s)	Hydrated bentonite chips 45-49 ft, cement slurry 2-45 ft, concrete 0-2 ft		
Comments	EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete at surface.						

Elevation, feet	Depth, feet	SAMPLES			MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Blows / 6 in.						
0					Asphalt surface					Hand auger first 5 ft.
5	6			6	Medium dense, dry, light brown, well-graded SAND with GRAVEL (SW), fine- to coarse-grained sand, fine gravel to 3/4 inch, no odor		0.0	0.0	0757	
	16			16						
10	20			20	Medium dense, dry, light brown, SILTY SAND with GRAVEL (SM), medium- to coarse-grained sand, fine gravel to 3/4 inch, no odor		0.2	0.0	0801	
	15			15						
15	15			15	Becomes moist		0.3	0.0	0808	PID in operator breathing zone (OBZ) = 0.0 ppm
	17			17						
20	20			20	Becomes dense, with trace orange silt		0.4	0.0	0814	
	23			23						
25	25			25	Increased sand content, no orange silt		0.3	0.0	0820	
	27			27						
30	30			30	Becomes very dense, grayish brown		0.6	0.0	0826	
	50/3"			50/3"						

ORION_1W_TESLMOR.GP-JDW-02: 6/30/08

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring / Well DW-2

Sheet 2 of 2

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number							
30					Very dense, moist, grayish brown, SILTY SAND with GRAVEL (SM), medium- to coarse-grained sand, fine gravel to 3/4 inch, no odor					
35	34.5		19	51 1/2"	Trace clay		139	0.0	0835	
40	39.5		21	50 5/8"	Becomes moist to wet, with trace orange silt, no clay		18.7	0.0	0841	
45	44.5		19	50 1/4"	Very dense, wet, light brown, SILTY SAND (SM), medium- to coarse-grained sand, trace gravel, no odor		14.1	0.0	0850	
50	49.5		11	48	Very dense, wet, grayish brown, poorly graded SAND with GRAVEL (SP), fine- to medium-grained sand, fine gravel to 3/4 inch, no odor		350	0.0	0904	OBZ=0.0 ppm
55	54.5	⊗	31	50 5/8"	Very dense, wet, grayish brown, SILTY SAND with GRAVEL (SM), medium- to coarse-grained sand, gravel 3/4 to 1 inch, odor		159	0.0	0908	
60	59.5		17	50 1/4"	Becomes light brown		33.1	0.0	0915	
	60.5				Bottom of boring at 60.5 feet					
65										
70										

ORION_1W_TESLMOR.GPJ-DW-02_6/30/08

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring / Well DW-3

Sheet 1 of 2

Date(s) Drilled	5/14/08			Logged By	M. Nelson	Checked By	M. Purchase
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	10-inch-OD auger	Total Depth of Borehole	60.5 feet
Drill Rig Type	Marl M10			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	Not available
Groundwater Level (feet bgs)	First 45	Completion --	Development 40.2	Sampling Method	California Modified split spoon	Top of Casing Elevation	Not available
Diameter of Hole (inches)	10	Diameter of Well (inches)	4	Type of Well Casing	4-inch-dia. Schedule 40 PVC	Screen Perforation	0.020-inch slot (50-60 ft)
Type of Sand Pack	#2/12 Monterey (48-60.5 feet)			Type and Depth of Seal(s)	Hydrated bentonite chips 45-48 ft, cement slurry 2-45 ft, concrete 0-2 ft		
Comments	EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete at surface.						

Elevation, feet	Depth, feet	SAMPLES			MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Blows / 6 in.						
0					Asphalt surface					Hand auger first 5 ft.
5	9 17 24				Dense, dry, grayish brown, well-graded SAND with GRAVEL (SW), fine- to coarse-grained sand, fine to coarse gravel to >1 inch, no odor		0.9	0.1	1208	
10	27 30 20						1.2	0.0	1213	
15	21 22 26	DW-3-15'			Dense, moist, light brown, poorly graded SAND (SP), fine- to coarse-grained sand (mostly medium-grained), few fine gravel to 3/4 inch, trace silt, no odor		1.1	0.0	1222	PID in operator breathing zone (OBZ) = 0.0 ppm DW-3-15' particle size analysis results: 5.0% gravel 18.8% c. sand 56.1% m. sand 15.8% f. sand 4.3% silt/clay
20	8 12 20				↓ Becomes medium dense, with trace clay and orange silt		0.6	0.0	1227	
25	8 10 11				Very stiff, moist, light brown, SANDY SILT (ML), no odor		0.6	0.1	1234	
30	7 19 11						0.4	0.0	1241	

ORION_1W: TESLMOR.GPJ-DW-03: 6/30/08

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring / Well DW-3

Sheet 2 of 2

Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Blows / 6 in.							
30					Very stiff, moist, light brown, SANDY SILT (ML), no odor (continued)					
35			13 16 30		Dense, moist, light brown, SILTY SAND (SM), fine- to coarse-grained sand, trace gravel, no odor		0.6	0.0	1252	
40			11 22 24				1.0	0.0	1303	OBZ=0.0 ppm
45	⊗	DW-3-45'	18 20 25		Dense, moist, light brown, poorly graded SAND with GRAVEL (SP), fine- to coarse-grained sand, trace silt and clay		1.9	0.0	1310	DW-3-45' particle size analysis results: 41.8% gravel 17.1% c. sand 22.7% m. sand 14.3% f. sand 4.1% silt/clay
50	⊗	DW-3-50'	9 30 32		↳ Becomes wet, without clay		25.0	0.0	1318	
55	⊗	DW-3-55'	5 15 16		Medium dense, wet, grayish brown, poorly graded GRAVEL with SILT (GP-GM), no odor		22.3	0.0	1328	
60					Bottom of boring at 60.5 feet					No recovery in sampler driven at 58.5 ft; assume material similar to sample above.
65										
70										

ORION_1W_TESLMOR.GPJ-DW-03: 6/30/08

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring / Well DW-4

Sheet 1 of 2

Date(s) Drilled	5/13/08 - 5/14/08			Logged By	M. Nelson	Checked By	M. Purchase
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	10-inch-OD auger	Total Depth of Borehole	70.0 feet
Drill Rig Type	Mobile B-61			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	Not available
Groundwater Level (feet bgs)	First	Completion	Development	Sampling Method	California Modified split spoon	Top of Casing Elevation	Not available
	48	--	37.1				
Diameter of Hole (inches)	10	Diameter of Well (inches)	4	Type of Well Casing	4-inch-dia. Schedule 40 PVC	Screen Perforation	0.020-inch slot (59-69 ft)
Type of Sand Pack	#2/12 Monterey (53-70 feet)			Type and Depth of Seal(s)	Hydrated bentonite chips 50-53 ft, cement slurry 2-50 ft, concrete 0-2 ft		
Comments	EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete at surface.						

Elevation, feet	Depth, feet	SAMPLES			MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Blows / 6 in.						
0					Asphalt surface					Hand auger first 5 ft.
5										0758 No recovery in sampler driven at 3.5 ft; assume material similar to sample below.
10				50/6"	Very dense, dry, light brown, SILTY SAND with GRAVEL (SM), fine gravel to 3/4 inch, no odor		1.2	0.1	0804	PID in operator breathing zone (OBZ) = 0.1 ppm
15				24 50/5"	Very dense, moist, light brown, CLAYEY GRAVEL (GC), no odor		1.1	0.1	0811	
20				12 50/6"	Hard, moist, light brown, CLAYEY SILT with GRAVEL (ML), fine gravel to 3/4 inch, no odor		0.7	0.1	0935	
25				28 34 40	Gravel grades coarser, 3/4 to 1 inch		0.5	0.1	0942	
30				10 16 27	Dense, moist, light brown with trace orange, SILTY SAND with GRAVEL (SM), medium-grained sand, fine gravel to 3/4 inch, no odor		0.8	0.1	0948	OBZ=0.1 ppm

ORION_1W: TESLVMOR.GP-JDW-04: 6/30/08

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring / Well DW-4

Sheet 2 of 2

Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Blows / 6 in.							
30					Dense, moist, light brown with trace orange, SILTY SAND with GRAVEL (SM), medium-grained sand, fine gravel to 3/4 inch, no odor (continued)					
35			28 50/5"		↓ Becomes very dense, with gravel to 1 inch		1.0	0.1	0957	
40			12 26 38		↓ Becomes wet, sand grades medium- to coarse-grained, with coarse gravel 3/4 to 1 inch		0.9	0.1	1007	
45			6 12 18		↓ Becomes medium dense, increase in moisture		1.1	0.1	1014	
50			6 14 21		↓ Decrease in silt		1.0	0.1	1022	
55			6 11 21		Medium dense, wet, dark gray, SILTY GRAVEL (GM), odor		399	0.1	1035	OBZ=0.1 ppm
60			26 50/5"		↓ Becomes very dense, light brown, no odor		42.2	0.1	1050	
65			12 18 25		↓ Becomes dense, with trace gravel >1 inch		18.7	0.1	1057	
70			18 22 34		↓ Becomes dense, gravel grades finer Bottom of boring at 70.0 feet		5.6	0.1	1109	

ORION_1W: TESLMOR.GP-JDW-04: 6/30/08

Project: Tesoro - Livermore
Project Location: 1619 1st Street, Livermore, CA
Project Number: 01LV

Key to Log of Boring / Well

Sheet 1 of 1

Elevation, feet	Depth, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Blows / 6 in.							
1	2	3	4	5	6	7	8	9	10	11	12

COLUMN DESCRIPTIONS

- | | |
|---|--|
| <p>1 Elevation: Elevation in feet relative to mean sea level (MSL).</p> <p>2 Depth: Depth in feet below the ground surface.</p> <p>3 Sample Type: Type of soil sample collected at depth interval shown; sampler symbols are explained below.</p> <p>4 Sample Number: Sample identification number.</p> <p>5 Blows / 6 in.: Number of blows required to advance driven sampler each 6-inch drive interval, or distance noted, using a 140-lb hammer with a 30-inch drop. "-" indicates data not recorded on field log.</p> <p>6 Graphic Log: Graphic depiction of subsurface material encountered; typical symbols are explained below.</p> | <p>7 Material Description: Description of material encountered; may include density/consistency, moisture, and color.</p> <p>8 Well Completion Diagram: Well schematic; materials are listed in header block; graphics are explained below.</p> <p>9 Headspace PID: Photoionization device (PID) field sample headspace reading in parts per million (ppm).</p> <p>10 Background PID: Photoionization device (PID) background reading in parts per million (ppm).</p> <p>11 Drilling Progress: Time (in 24-hour clock) at sampling and other events during downhole advance.</p> <p>12 Remarks: Comments and observations regarding drilling or sampling made by driller or field personnel.</p> |
|---|--|

TYPICAL SOIL GRAPHIC SYMBOLS

Poorly Graded SAND (SP)	Well-Graded SAND (SW)	SAND with SILT (SP-SM)	SILTY SAND (SM)
CLAY (CL)	SILTY CLAY (CL)	CLAYEY SILT (ML)	CLAYEY SAND (SC)
SILT (ML)	SANDY SILT (ML)	Poorly Graded GRAVEL (GP)	CLAYEY GRAVEL (GC)

TYPICAL WELL GRAPHIC SYMBOLS

Blank casing in concrete	Blank casing in filter sand
Blank casing in portland cement grout	Slotted casing in filter sand
Blank casing in bentonite pellets	Natural fill / slough

TYPICAL SAMPLER GRAPHIC SYMBOLS

2.5-inch-OD split barrel with brass liners (California Modified)
Portion of sample retained for analysis
No recovery interval in sampler

OTHER GRAPHIC SYMBOLS

- First water encountered at time of drilling
- Static water level measured in well
- Change in material properties within a stratum
- Inferred contact between strata or gradational change in lithology

GENERAL NOTES

- Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive; actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
- Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

ORION_1W_KEY: TESLVIMOR_GP-J-wellkey: 1/4/10

Project: Tesoro - Livermore
Project Location: 1619 1st Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well DW-5

Sheet 1 of 2

Date(s) Drilled	11/23/09			Logged By	M. Nelson	Checked By	M. Purchase
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	10-inch-OD auger	Total Depth of Borehole	60.0 feet
Drill Rig Type	CME 95			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	472.36 feet
Groundwater Level (feet bgs)	First	Completion	Development	Sampling Method	California Modified split spoon	Top of Casing Elevation	471.86 feet
	--	--	43.08				
Diameter of Hole (inches)	10	Diameter of Well (inches)	4	Type of Well Casing	4-inch-dia. Schedule 40 PVC	Screen Perforation	0.020-inch slot (50-60 ft)
Type of Sand Pack	#2/12 Monterey (47-60 feet)			Type and Depth of Seal(s)	Bentonite pellets 45-47 ft, portland cement grout 2-45 ft, concrete 0-2 ft		
Comments	EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete at surface.						

Elevation, feet	Depth, feet	SAMPLES			MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Blows / 6 in.						
0					Asphalt 4 inches thick					Hand auger first 5 ft.
470										
5		⊗ DW-5-5		8 26 32	Dense, dry, brown, well-graded SAND with GRAVEL (SW), fine- to coarse-grained sand, fine gravel to 3/4 inch, no odor		1.4	0.0	0810	
465										
10									0815	No recovery in sampler driven at 8.5 ft; assume material similar to sample above.
460										
15		⊗ DW-5-15		49 50/5"	▼ Becomes very dense, trace cobbles		749	0.0	0820	
455										
20		⊗ DW-5-20		16 18 25	Dense, moist, brown, SILTY SAND with GRAVEL (SM), fine- to coarse-grained sand, fine gravel to 3/4 inch, trace orange silt, no odor		1,658	0.0	0827	PID in operator breathing zone (OBZ) = 0.0 ppm
450										
25		⊗ DW-5-25		10 19 20	Hard, moist, reddish brown, SANDY SILT (ML), fine- to medium-grained sand, no odor		288	0.0	0834	
445										
30		⊗ DW-5-30		23 24 32	Dense, wet, reddish brown, SILTY SAND (SM), fine- to coarse-grained sand, trace gravel, trace orange silt, no odor		301	0.0	0842	

ORION_1W_TESLMOR.GPJ-DW-05: 1/4/10

Project: Tesoro - Livermore
Project Location: 1619 1st Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well DW-5

Sheet 2 of 2

Elevation, feet	Depth, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Blows / 6 in.							
30					Dense, wet, reddish brown, SILTY SAND (SM), fine- to coarse-grained sand, trace gravel, trace orange silt, no odor (continued)						
440					▼ Becomes very dense, trace cobbles						
	35	⊗	DW-5-35	29 50/5"			112	0.0	0850		
435					▼ Becomes dense						
	40	⊗	DW-5-40	25 26 27			69	0.0	0858		
430					▼ Increase in coarse-grained sand						
	45	⊗	DW-5-45	17 28 30			25	0.0	0907	OBZ=0.0 ppm	
425					▼ Becomes brown; sand grades to medium- to coarse-grained, with trace gravel to 3/4 inch, odor						
	50	⊗	DW-5-50	27 29 31			1,057	0.0	0916		
420											
	55	⊗	DW-5-55	27 30 26	Dense, wet, grayish brown, poorly graded GRAVEL with SILT (GP-GM), slight odor		375	0.0	0924		
415											
	60	⊗	DW-5-60	16 21 23			68	0.0	0932		
					Bottom of boring at 60.0 feet						
410											
65											
405											
70											

ORION_11W_TESLMOR.GPJ-DW-05_1/4/10

Project: Tesoro - Livermore
Project Location: 1619 1st Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well DW-6

Sheet 1 of 2

Date(s) Drilled	11/24/09			Logged By	M. Nelson	Checked By	M. Purchase
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	10-inch-OD auger	Total Depth of Borehole	60.0 feet
Drill Rig Type	CME 95			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	472.05 feet
Groundwater Level (feet bgs)	First	Completion	Development	Sampling Method	California Modified split spoon	Top of Casing Elevation	471.77 feet
	43	--	43.70				
Diameter of Hole (inches)	10	Diameter of Well (inches)	4	Type of Well Casing	4-inch-dia. Schedule 40 PVC	Screen Perforation	0.020-inch slot (50-60 ft)
Type of Sand Pack	#2/12 Monterey (47.7-60 feet)			Type and Depth of Seal(s)	Bentonite pellets 46-47.7 ft, portland cement grout 2-46 ft, concrete 0-2 ft		
Comments	EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete at surface.						

Elevation, feet	Depth, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Blows / 6 in.							
0					Asphalt 6 inches thick					1040	Hand auger first 5 ft.
470											
5				5	Very dense, dry, brown, well-graded SAND with GRAVEL (SW), fine- to coarse-grained sand, fine gravel to 3/4 inch, no odor		11	0.0	1115		
465		DW-6-5	18	50							
10				16	Dense, dry, brown, SILTY SAND with GRAVEL (SM), fine- to coarse-grained sand, fine gravel to 3/4 inch, no odor		178	0.0	1119		
460		DW-6-10	18	22							
15				20	Stiff to very stiff, moist, brown, CLAYEY SILT (ML), no odor		7.8	0.0	1123		
455		DW-6-15	27	32							
20				20			5.8	0.0	1127		
450		DW-6-20	28	30							
25				5			5.1	0.0	1132		
445		DW-6-25	10	10							
30				4			3.3	0.0	1137		
		DW-6-30	4	8							

ORION_1W_TESLMOR.GPJ-DW-06: 1/4/10

Project: Tesoro - Livermore
Project Location: 1619 1st Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well DW-6

Sheet 2 of 2

Elevation, feet	Depth, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Blows / 6 in.							
30						Stiff to very stiff, moist, brown, CLAYEY SILT (ML), no odor (continued)					
440											
35		DW-6-35		15 30 22		Dense, wet, reddish brown, SILTY SAND with GRAVEL (SM), fine- to coarse-grained sand, fine gravel to 3/4 inch, trace clay, no odor		2.1	0.0	1144	
435											
40		DW-6-40		15 28 32		Trace orange silt		3.1	0.0	1148	
430											
45		DW-6-45		17 22 28				19	0.0	1154	PID in operator breathing zone (OBZ) = 0.0 ppm
425											
50		DW-6-50		6 7 11		Medium dense, wet, brown, SILTY SAND (SM), fine- to coarse-grained sand, no odor		63	0.0	1204	
420											
55		DW-6-55		27 50/3"		Dense to very dense, wet, grayish brown, well-graded SAND with SILT and GRAVEL (SW-SM), fine- to coarse-grained sand, odor		1,210	0.0	1213	
415											
60		DW-6-60		32 50/2"		Dense to very dense, wet, brown, poorly graded SAND (SP), medium- to coarse-grained sand, odor		315	0.0	1219	
						Bottom of boring at 60.0 feet					
410											
65											
405											
70											

ORION_1W_TESLMOR.GPJ-DW-06: 1/4/10

Project: Tesoro - Livermore
Project Location: 1619 1st Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well DW-7

Sheet 1 of 2

Date(s) Drilled	11/25/09			Logged By	M. Nelson	Checked By	M. Purchase
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	10-inch-OD auger	Total Depth of Borehole	65.0 feet
Drill Rig Type	CME 95			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	470.60 feet
Groundwater Level (feet bgs)	First	Completion	Development	Sampling Method	California Modified split spoon	Top of Casing Elevation	470.07 feet
	43	--	43.15				
Diameter of Hole (inches)	10	Diameter of Well (inches)	4	Type of Well Casing	4-inch-dia. Schedule 40 PVC	Screen Perforation	0.020-inch slot (55-65 ft)
Type of Sand Pack	#2/12 Monterey (53-65 feet)			Type and Depth of Seal(s)	Bentonite pellets 51-53 ft, portland cement grout 2-51 ft, concrete 0-2 ft		
Comments	EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete at surface.						

Elevation, feet	Depth, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Blows / 6 in.							
470	0				Asphalt 4 inches thick					0945	Hand auger first 5 ft.
465	5	DW-7-5		22 50/3"	Very dense, dry, brown, well-graded SAND with GRAVEL (SW), fine- to coarse-grained sand, fine gravel to 3/4 inch, trace silt, trace cobbles, no odor		162	0.0	0956		
460	10	DW-7-10		19 50/2"	Very dense, moist, brown, SILTY SAND with GRAVEL (SM), fine- to coarse-grained sand, fine gravel to 3/4 inch, trace orange silt, trace cobbles, no odor		1,340	0.0	1000		
455	15	DW-7-15		21 24 30	↓ Becomes dense, with trace clay		517	0.0	1007		
450	20	DW-7-20		15 21 30			31	0.0	1012		
445	25	DW-7-25		11 15 10	↓ Becomes medium dense; increase in clay		1.7	0.0	1019		
30	30	DW-7-30		16 21 28	↓ Becomes dense; increase in coarse-grained sand, decrease in clay		7.5	0.0	1024		

ORION_1W_TESLMOR.GPJ-DW-07: 1/4/10

Project: Tesoro - Livermore
Project Location: 1619 1st Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well DW-7

Sheet 2 of 2

Elevation, feet	Depth, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Blows / 6 in.							
440	30					Dense, moist, brown, SILTY SAND with GRAVEL (SM), fine- to coarse-grained sand, fine gravel to 3/4 inch, trace clay and orange silt, trace cobbles, no odor (continued)					
435	35	DW-7-35		17 22 23			20	0.0	1034		
430	40	DW-7-40		17 22 25			3.6	0.0	1041		
425	45	DW-7-45		13 19 27		Dense, wet, brown, CLAYEY SAND with GRAVEL (SC), medium- to coarse-grained sand, fine gravel to 3/4 inch, no odor	11	0.0	1049		
420	50	DW-7-50		26 50/6"		Dense to very dense, wet, brown, poorly graded SAND with SILT and GRAVEL (SP-SM), medium- to coarse-grained sand, fine gravel to 3/4 inch, odor	1,211	0.0	1057		
415	55	DW-7-55		4 9 17		Very stiff, wet, brown, CLAYEY SILT (ML), odor	1,279	0.0	1104		
410	60	DW-7-60		16 19 21		Dense, wet, brown, poorly graded SAND (SP), medium- to coarse-grained sand, odor	341	0.0	1110		
405	65	DW-7-65		20 21 24		Dense, wet, brown, poorly graded SAND with GRAVEL (SP), medium- to coarse-grained sand, fine gravel to 3/4 inch, odor	108	0.0	1120		
						Bottom of boring at 65.0 feet					

ORION_1W_TESLMOR.GPJ-DW-07: 1/4/10

Project: Tesoro - Livermore
Project Location: 1619 1st Street, Livermore, CA
Project Number: 01LV

Key to Log of Boring / Well

Sheet 1 of 1

Elevation, feet	Depth, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Blows / 6 in.							
1	2	3	4	5	6	7	8	9	10	11	12

COLUMN DESCRIPTIONS

- | | |
|---|--|
| <p>1 Elevation: Elevation in feet relative to mean sea level (MSL).</p> <p>2 Depth: Depth in feet below the ground surface.</p> <p>3 Sample Type: Type of soil sample collected at depth interval shown; sampler symbols are explained below.</p> <p>4 Sample Number: Sample identification number.</p> <p>5 Blows / 6 in.: Number of blows required to advance driven sampler each 6-inch drive interval, or distance noted, using a 140-lb hammer with a 30-inch drop. "-" indicates data not recorded on field log.</p> <p>6 Graphic Log: Graphic depiction of subsurface material encountered; typical symbols are explained below.</p> | <p>7 Material Description: Description of material encountered; may include density/consistency, moisture, and color.</p> <p>8 Well Completion Diagram: Well schematic; materials are listed in header block; graphics are explained below.</p> <p>9 Headspace PID: Photoionization device (PID) field sample headspace reading in parts per million (ppm).</p> <p>10 Background PID: Photoionization device (PID) background reading in parts per million (ppm).</p> <p>11 Drilling Progress: Time (in 24-hour clock) at sampling and other events during downhole advance.</p> <p>12 Remarks: Comments and observations regarding drilling or sampling made by driller or field personnel.</p> |
|---|--|

TYPICAL SOIL GRAPHIC SYMBOLS

Poorly Graded SAND (SP)	Well-Graded SAND (SW)	SAND with SILT (SP-SM)	SILTY SAND (SM)
CLAY (CL)	SILTY CLAY (CL)	CLAYEY SILT (ML)	CLAYEY SAND (SC)
SILT (ML)	SANDY SILT (ML)	Poorly Graded GRAVEL (GP)	CLAYEY GRAVEL (GC)

TYPICAL WELL GRAPHIC SYMBOLS

Blank casing in concrete	Blank casing in filter sand
Blank casing in portland cement grout	Slotted casing in filter sand
Blank casing in bentonite pellets	Natural fill / slough

TYPICAL SAMPLER GRAPHIC SYMBOLS

2.5-inch-OD split barrel with brass liners (California Modified)
Portion of sample retained for analysis
No recovery interval in sampler

OTHER GRAPHIC SYMBOLS

- First water encountered at time of drilling
- Static water level measured in well
- Change in material properties within a stratum
- Inferred contact or gradational change

GENERAL NOTES

- Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive; actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
- Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

ORION_1W_KEY: TESLVIMOR_GP-U-wellkey: 5/9/11

Project: Tesoro - Livermore
Project Location: 1619 1st Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well DW-8

Sheet 1 of 3

Date(s) Drilled	4/13/11 (well installed 4/14/11)			Logged By	S. Stromberg	Checked By	M. Nelson
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	6-inch-OD auger for sampling; 10-inch-OD auger for reaming	Total Depth of Borehole	90.0 feet
Drill Rig Type	Marl M5T			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	To be determined
Groundwater Level (feet bgs)	First 30	Completion 27.18	Development 26.8	Sampling Method	California Modified split spoon	Top of Casing Elevation	To be determined
Diameter of Hole (inches)	10	Diameter of Well (inches)	4	Type of Well Casing	4-inch-dia. Schedule 40 PVC	Screen Perforation	0.020-inch slot (55-65 ft)
Type of Sand Pack	#2/12 Monterey (54-70 feet)			Type and Depth of Seal(s)	Bentonite pellets 70-90 feet and 51-54 feet, portland cement grout 2-51 feet, concrete 0-2 feet		
Comments	Located on east side of P Street, west of site. Completed at surface with 12-inch-diameter flush-mount well vault set in concrete.						

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number							
0					Asphalt at surface				0912	Hand auger first 5 ft.
					Subsurface material not observed or logged during hand augering to depth of 5 feet or during advance to first sample at depth of 10 feet.				0916	
	10				Moist, brown, well-graded SAND with GRAVEL (SW), medium- to coarse-grained sand, some gravel, trace to no fines, no odor				0918	Blows not recorded for drive samples.
	15								0920	
	20				Moist, brown, SILT with CLAY (ML), medium plasticity, trace fine-grained sand, no odor				0924	DW-8-20 particle size analysis results: 5% fine sand 71% silt 24% clay
	25				Moist, brown, SANDY SILT (ML), fine-grained sand, trace medium- to coarse-grained sand, gray staining, no odor				0928	
	30									

ORION_1W_TESLMOR.GPJ-DW-08: 5/9/11

Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Blows / 6 in.							
30					Moist, brown, well-graded SAND with GRAVEL (SW), fine- to coarse-grained sand, trace silt, no odor		21	0.0	0930	
35		DW-8-35					49	0.0	0937	
40		DW-8-40		▼ Odor			>15,000	0.0	0940	DW-8-40 particle size analysis results: 42% gravel 20% coarse sand 27% medium sand 9% fine sand 2% silt/clay
45		DW-8-45		▼ Becomes gray to brown, slight odor			267	0.0	0945	
50		DW-8-50		▼ Becomes brown, no odor			3,594	0.0	0951	
55		DW-8-55			Moist, brown, CLAYEY SILT (ML), medium plasticity, no odor					
55		DW-8-55			Wet, brown, well-graded GRAVEL with SAND (GW), fine to coarse gravel, fine- to coarse-grained sand, trace silt, odor		>15,000	0.0	0955	
60		DW-8-60					>15,000	0.0	1004	DW-8-60 particle size analysis results: 54% gravel 13% coarse sand 19% medium sand 11% fine sand 3% silt/clay
65		DW-8-65		▼ Increasing silt content, gray staining, odor			140	0.0	1042	
70										

ORION_1W_TESLMOR.GPJ-DW-08: 5/9/11

Project: Tesoro - Livermore
Project Location: 1619 1st Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well DW-8

Sheet 3 of 3

Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Blows / 6 in.							
70	⊗	DW-8-70			Moist, brown, well-graded SAND with GRAVEL (SW), fine- to coarse-grained sand, trace silt, slight odor		1,371	0.0	1048	DW-8-70 particle size analysis results: 46% gravel 13% coarse sand 24% medium sand 13% fine sand 4% silt/clay
75	⊗	DW-8-75			Moist, brown, well-graded SAND (SW), fine- to coarse-grained sand, trace gravel, trace silt, no odor		326	0.0	1055	
80					[No sample recovery]				1058	
85	⊗	DW-8-85			Moist, red, poorly graded SAND (SP), medium-grained sand, rounded grains, trace silt, no odor		36	0.0	1115	
90	⊗	DW-8-90			Moist, brown, well-graded SAND (SW), fine- to coarse-grained sand, trace angular gravel, trace silt, no odor		42	0.0	1128	
					Bottom of boring at 90.0 feet					
95										
100										
105										
110										

ORION_1W_TESLMOR.GPJ-DW-08: 5/9/11

Project: Tesoro - Livermore
Project Location: 1619 1st Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well DW-9

Sheet 1 of 3

Date(s) Drilled	6/4/12 (well installed 6/5/12)			Logged By	M. Purchase	Checked By	M. Nelson
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	8-inch-OD auger for sampling; 10-inch-OD auger for reaming	Total Depth of Borehole	80.0 feet
Drill Rig Type	Marl M11			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	To be determined
Groundwater Level (feet bgs)	First	Completion	Development	Sampling Method	California Modified split spoon	Top of Casing Elevation	To be determined
	40	--	--				
Diameter of Hole (inches)	10	Diameter of Well (inches)	4	Type of Well Casing	4-inch-dia. Schedule 40 PVC	Screen Perforation	0.020-inch slot (50-60 ft)
Type of Sand Pack	#2/12 Monterey (48-62 ft)			Type and Depth of Seal(s)	Hydrated bentonite chips 62-80 ft and 46-48 ft, portland cement grout 2-46 ft, concrete 0-2 ft		
Comments	Located at NW corner of 1st and P St., in Safeway parking log. Completed at surface with 12-inch-dia. flush-mount well vault.						

Elevation, feet	Depth, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Blows / 6 in.							
0						Asphalt at surface					Hand auger first 5 ft.
						Subsurface material not observed or logged during hand augering to depth of 5 feet.					
5		⊗ DW-9@5		13 29 30		Dense, moist, brown, well-graded SAND with GRAVEL (SW), fine- to coarse-grained sand, fine to coarse subangular gravel to 1-1/2 inches, no odor	0.2	0.1	0809		
10				15 50/2"			0.3	0.1			
15		⊗ DW-9@15		14 20 17		Medium dense, moist, brown, SILTY SAND (SM), fine- to coarse-grained sand, trace fine subangular gravel to 1/2 inch, no odor	0.2	0.2	0820		PID in operator breathing zone (OBZ) = 0.0 ppm
20		⊗ DW-9@20		17 25 10		Very stiff to hard, moist, brown, SILT with SAND (ML), fine- to coarse-grained sand, trace clay, trace fine subrounded gravel to 1/2 inch, no odor	0.3	0.1	0830		
25		⊗ DW-9@25		7 7 7		Stiff, moist, brown, SILT (ML), trace clay, no odor	0.4	0.1	0837		OBZ PID=0.1 ppm
30		⊗ DW-9@30		5 7 8		Stiff, moist, brown, SANDY SILT (ML), fine-grained sand, no odor	--	--	0845		

ORION_1W; TESLMOR.GPJ-DW-09; 6/21/12

Project: Tesoro - Livermore
Project Location: 1619 1st Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well DW-9

Sheet 2 of 3

Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Blows / 6 in.							
30					Stiff, moist, brown, SANDY SILT (ML), fine-grained sand, no odor (continued)					
35			10 12 15		Medium dense, moist to wet, brown, well-graded SAND with SILT (SW-SM), fine- to coarse-grained sand, ~10% silt, trace fine to coarse subangular gravel to 1 inch, no odor		0.7	0.1	0850	OBZ PID=0.1 ppm
40	⊗	DW-9@40	17 17 25		Dense, wet, brown, poorly graded SAND (SP), medium- to coarse-grained sand, ~10% fine to coarse subangular to subrounded gravel to 1 inch, trace clay, no odor		5.8	0.1	0858	
45	⊗	DW-9@45	17 23 26		Dense, wet, brown, poorly graded SAND with GRAVEL (SP), medium- to coarse-grained sand, ~20% fine to coarse subangular to subrounded gravel to 1 inch, trace clay, no odor		12	0.1	0905	OBZ PID=0.0 ppm
50	⊗	DW-9@50	6 14 31		Dense, wet, brown, well-graded SAND (SW), fine- to coarse-grained sand, trace fines, trace fine gravel to 3/4 inch, odor		132	0.1	0915	
55			50/5"		↓ Becomes very dense		836	0.2		OBZ PID=0.1 ppm
60	⊗	DW-9@60	14 17 17		↓ Becomes medium dense		---	---	0930	
65	⊗	DW-9@65	12 17 50/2"		↓ Becomes dense to very dense, slight odor		34	0.1	0945	
70	⊗	DW-9@70	12 15 18		Stiff, wet, brown, SANDY SILT (ML), fine-grained sand, trace coarse-grained sand, slight odor		25	0.1	1000	

ORION_1W: TESLMOR.GPJ-DW-09: 6/21/12

Project: Tesoro - Livermore
Project Location: 1619 1st Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well DW-9

Sheet 3 of 3

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number							
70					Stiff, wet, brown, SANDY SILT (ML), fine-grained sand, trace coarse-grained sand, slight odor (continued)					
	75	⊗	DW-9@75	12 18 25			18	0.2	1015	OBZ PID=0.0 ppm
	80	⊗	DW-9@80	10 17 33	Dense, wet, brown, SILTY SAND (SM), fine- to coarse-grained sand, trace fine to coarse subrounded gravel to 1 inch, no odor		11	0.2	1025	
					Bottom of boring at 80.0 feet At completion of drilling on 6/4/12, backfilled 8-inch-dia. borehole to 62 feet below grade with bentonite chips. On 6/5/12, overdrilled borehole to 62 feet with 10-inch-dia. auger and installed well using materials and placement depths recorded on sheet 1 and shown in well completion schematic.					
	85									
	90									
	95									
	100									
	105									
	110									

ORION_1W; TESLMOR.GPJ-DW-09; 6/21/12

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Key to Log of Boring / Well

Sheet 1 of 1

Elevation, feet	Depth, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Blows / 6 in.							
1	2	3	4	5	6	7	8	9	10	11	12

COLUMN DESCRIPTIONS

- | | |
|---|--|
| <p>1 Elevation: Elevation in feet relative to mean sea level (MSL).</p> <p>2 Depth: Depth in feet below the ground surface.</p> <p>3 Sample Type: Type of soil sample collected at depth interval shown; sampler symbols are explained below.</p> <p>4 Sample Number: Sample identification number.</p> <p>5 Blows / 6 in.: Number of blows required to advance driven sampler each 6-inch drive interval, or distance noted, using a 140-lb hammer with a 30-inch drop. "-" indicates data not recorded on field log.</p> <p>6 Graphic Log: Graphic depiction of subsurface material encountered; typical symbols are explained below.</p> | <p>7 Material Description: Description of material encountered; may include density/consistency, moisture, and color.</p> <p>8 Well Completion Diagram: Well schematic; materials are listed in header block; graphics are explained below.</p> <p>9 Headspace PID: Photoionization device (PID) field sample headspace reading in parts per million (ppm).</p> <p>10 Background PID: Photoionization device (PID) background reading in parts per million (ppm).</p> <p>11 Drilling Progress: Time (in 24-hour clock) at sampling and other events during downhole advance.</p> <p>12 Remarks: Comments and observations regarding drilling or sampling made by driller or field personnel.</p> |
|---|--|

TYPICAL SOIL GRAPHIC SYMBOLS

Poorly Graded SAND (SP)	Well-Graded SAND (SW)	SAND with SILT (SP-SM)	SILTY SAND (SM)
CLAY (CL)	SILTY CLAY (CL)	CLAYEY SILT (ML)	CLAYEY SAND (SC)
SILT (ML)	SANDY SILT (ML)	Poorly Graded GRAVEL (GP)	CLAYEY GRAVEL (GC)

TYPICAL WELL GRAPHIC SYMBOLS

Blank casing in concrete	Blank casing in filter sand
Blank casing in cement slurry	Slotted casing in filter sand
Blank casing in hydrated bentonite chips	Natural fill / slough

TYPICAL SAMPLER GRAPHIC SYMBOLS

2.5-inch-OD split barrel with brass liners (California Modified)
Portion of sample retained for analysis
No recovery interval in sampler

OTHER GRAPHIC SYMBOLS

- First water encountered at time of drilling
- Static water level measured in well
- Change in material properties within a stratum
- Inferred contact between strata or gradational change in lithology

GENERAL NOTES

- Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive; actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
- Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

ORION_1W_KEY; TESLVMOR_GP-J-wellkey; 7/18/08

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring / Well IP-1

Sheet 1 of 2

Date(s) Drilled	6/5/08			Logged By	C. Rentz	Checked By	M. Purchase
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	10-inch-OD auger bit	Total Depth of Borehole	65.0 feet
Drill Rig Type	SIMCO 2400 LAR			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	Not available
Groundwater Level (feet bgs)	First	Completion	Development	Sampling Method	No sampling performed	Top of Casing Elevation	Not available
	--	--	41.2				
Diameter of Hole (inches)	10	Diameter of Well (inches)	1 and 2	Type of Well Casing	1-in. and 2-in.-dia. Sch. 40 PVC	Screen Perforation	0.020-inch slotted PVC (60-65 feet)
Type of Sand Pack	#2/12 Monterey (59-65 feet)			Type and Depth of Seal(s)	Hydrated bentonite chips 55-59 ft, cement grout 2-55 ft, concrete 0-2 ft		
Comments	EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete at surface.						

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID/FID, ppm	Background PID/FID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number							
0					Concrete 5 inches thick					Hand auger first 5 ft.
					IP-1 was installed near DB-1. The borehole for well IP-1 was advanced to 65 feet without collecting samples or observing cuttings. Refer to Log of Boring DB-1 for lithology at this location.					
	5									
	10									
	15									
	20									
	25									
	30									

ORION_1W_TESLMOR.GP.J-IP-01: 7/18/08

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring / Well IP-1

Sheet 2 of 2

Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID/FID, ppm	Background PID/FID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Blows / 6 in.							
30					IP-1 was installed near DB-1. The borehole for well IP-1 was advanced to 65 feet without collecting samples or observing cuttings. Refer to Log of Boring DB-1 for lithology at this location.					
35										
40										
45										
50										
55										
60										
65				Bottom of boring at 65.0 feet						
70										


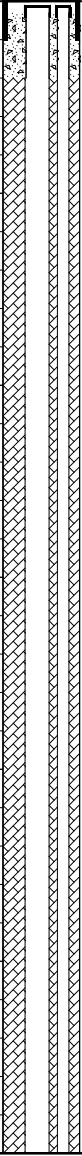
ORION_1W_TESLMOR.GP.J-IP-01; 7/18/08

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring / Well IP-2

Sheet 1 of 2

Date(s) Drilled	5/29/08			Logged By	M. Nelson	Checked By	M. Purchase
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	10-inch-OD auger bit	Total Depth of Borehole	65.0 feet
Drill Rig Type	SIMCO 2400 LAR			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	Not available
Groundwater Level (feet bgs)	First --	Completion 38.4	Development 40.2	Sampling Method	No sampling performed	Top of Casing Elevation	Not available
Diameter of Hole (inches)	10	Diameter of Well (inches)	1 and 2	Type of Well Casing	1-in. and 2-in.-dia. Sch. 40 PVC	Screen Perforation	0.020-inch slotted PVC (60-65 feet)
Type of Sand Pack	#2/12 Monterey (59-65 feet)			Type and Depth of Seal(s)	Hydrated bentonite chips 54-59 ft, cement grout 2-54 ft, concrete 0-2 ft		
Comments	EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete at surface.						

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID/FID, ppm	Background PID/FID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number							
0					Concrete 5 inches thick					Hand auger first 5 ft.
					IP-2 was installed near DB-1. The borehole for well IP-2 was advanced to 65 feet without collecting samples or observing cuttings. Refer to Log of Boring DB-1 for lithology at this location.					
5										
10										
15										
20										
25										
30										

ORION_1W; TESLMOR.GP.J-IP-02; 7/18/08

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring / Well IP-2

Sheet 2 of 2

Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID/FID, ppm	Background PID/FID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Blows / 6 in.							
30					IP-2 was installed near DB-1. The borehole for well IP-2 was advanced to 65 feet without collecting samples or observing cuttings. Refer to Log of Boring DB-1 for lithology at this location.					
35										
40										
45										
50										
55										
60										
65				Bottom of boring at 65.0 feet						
70										


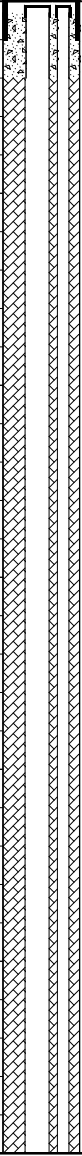
ORION_1W_TESLMOR.GPJ-IP-02_7/18/08

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring / Well IP-3

Sheet 1 of 2

Date(s) Drilled	6/5/08 and 6/6/08			Logged By	C. Rentz	Checked By	M. Purchase
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	10-inch-OD auger bit	Total Depth of Borehole	65.0 feet
Drill Rig Type	SIMCO 2400 LAR			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	Not available
Groundwater Level (feet bgs)	First --	Completion --	Development 50.0	Sampling Method	No sampling performed	Top of Casing Elevation	Not available
Diameter of Hole (inches)	10	Diameter of Well (inches)	1 and 2	Type of Well Casing	1-in. and 2-in.-dia. Sch. 40 PVC	Screen Perforation	0.020-inch slotted PVC (60-65 feet)
Type of Sand Pack	#2/12 Monterey (59-65 feet)			Type and Depth of Seal(s)	Hydrated bentonite chips 55-59 ft, cement grout 2-55 ft, concrete 0-2 ft		
Comments	EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete at surface.						

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID/FID, ppm	Background PID/FID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number							
0					Concrete 5 inches thick					Hand auger first 5 ft.
					IP-3 was installed near DW-1. The borehole for well IP-3 was advanced to 65 feet without collecting samples or observing cuttings. Refer to Log of Boring / Well DW-1 for lithology at this location.					
5										
10										
15										
20										
25										
30										

ORION_1W_TESLMOR.GP.J-IP-03: 7/18/08

Project: Tesoro - Livermore
 Project Location: 1619 First Street
 Project Number: 01LV

Log of Boring / Well IP-3

Sheet 2 of 2

Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID/FID, ppm	Background PID/FID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Blows / 6 in.							
30					<p>IP-3 was installed near DW-1. The borehole for well IP-3 was advanced to 65 feet without collecting samples or observing cuttings. Refer to Log of Boring / Well DW-1 for lithology at this location.</p>					
35										
40										
45										
50										
55										
60										
65				Bottom of boring at 65.0 feet						
70										


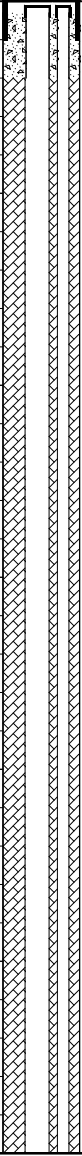
ORION_1W_TESLMOR.GPJ-IP-03: 7/18/08

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring / Well IP-4

Sheet 1 of 2

Date(s) Drilled	5/28/08			Logged By	M. Nelson	Checked By	M. Purchase
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	10-inch-OD auger bit	Total Depth of Borehole	65.0 feet
Drill Rig Type	SIMCO 2400 LAR			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	Not available
Groundwater Level (feet bgs)	First --	Completion 38.9	Development 40.5	Sampling Method	No sampling performed	Top of Casing Elevation	Not available
Diameter of Hole (inches)	10	Diameter of Well (inches)	1 and 2	Type of Well Casing	1-in. and 2-in.-dia. Sch. 40 PVC	Screen Perforation	0.020-inch slotted PVC (60-65 feet)
Type of Sand Pack	#2/12 Monterey (59-65 feet)			Type and Depth of Seal(s)	Hydrated bentonite chips 55-59 ft, cement grout 2-55 ft, concrete 0-2 ft		
Comments	EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete at surface.						

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID/FID, ppm	Background PID/FID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number							
0					Concrete 5 inches thick					Hand auger first 5 ft.
					IP-4 was installed near DB-3. The borehole for well IP-4 was advanced to 65 feet without collecting samples or observing cuttings. Refer to Log of Boring DB-3 for lithology at this location.					
5										
10										
15										
20										
25										
30										

ORION_1W; TESLMOR.GP.J-IP-04; 7/18/08

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring / Well IP-4

Sheet 2 of 2

Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID/FID, ppm	Background PID/FID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Blows / 6 in.							
30					IP-4 was installed near DB-3. The borehole for well IP-4 was advanced to 65 feet without collecting samples or observing cuttings. Refer to Log of Boring DB-3 for lithology at this location.					
35										
40										
45										
50										
55										
60										
65				Bottom of boring at 65.0 feet						
70										

ORION_1W_TESLMOR.GPJ-IP-04; 7/18/08

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring / Well IP-5

Sheet 1 of 2

Date(s) Drilled	5/28/08			Logged By	M. Nelson	Checked By	M. Purchase
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	10-inch-OD auger bit	Total Depth of Borehole	65.0 feet
Drill Rig Type	SIMCO 2400 LAR			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	Not available
Groundwater Level (feet bgs)	First --	Completion 38.4	Development 39.6	Sampling Method	No sampling performed	Top of Casing Elevation	Not available
Diameter of Hole (inches)	10	Diameter of Well (inches)	1 and 2	Type of Well Casing	1-in. and 2-in.-dia. Sch. 40 PVC	Screen Perforation	0.020-inch slotted PVC (60-65 feet)
Type of Sand Pack	#2/12 Monterey (59-61, 62-65 feet)			Type and Depth of Seal(s)	Hydrated bentonite chips 52-55 ft, cement grout 2-52 ft, concrete 0-2 ft		
Comments	EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete at surface.						

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID/FID, ppm	Background PID/FID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number							
0					Concrete 5 inches thick					Hand auger first 5 ft.
					IP-5 was installed near DB-4. The borehole for well IP-5 was advanced to 65 feet without collecting samples or observing cuttings. Refer to Log of Boring DB-4 for lithology at this location.					
5										
10										
15										
20										
25										
30										

ORION_1W_TESLMOR.GP.J-IP-05: 7/18/08

Project: Tesoro - Livermore
 Project Location: 1619 First Street
 Project Number: 01LV

Log of Boring / Well IP-5

Sheet 2 of 2

Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID/FID, ppm	Background PID/FID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Blows / 6 in.							
30					<p>IP-5 was installed near DB-4. The borehole for well IP-5 was advanced to 65 feet without collecting samples or observing cuttings. Refer to Log of Boring DB-4 for lithology at this location.</p>					
35										
40										
45										
50										
55										
60										
65				Bottom of boring at 65.0 feet						
70										


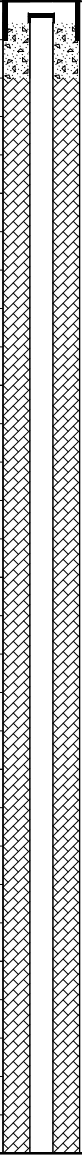
ORION_1W_TESLMOR.GP.J-IP-05: 7/18/08

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring / Well IP-6

Sheet 1 of 3

Date(s) Drilled	5/29/08 and 5/30/08			Logged By	M. Nelson	Checked By	M. Purchase
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	8-inch-OD auger bit	Total Depth of Borehole	72.0 feet
Drill Rig Type	SIMCO 2400 LAR			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	Not available
Groundwater Level (feet bgs)	First --	Completion 43.0	Development 45.0	Sampling Method	No sampling performed	Top of Casing Elevation	Not available
Diameter of Hole (inches)	8	Diameter of Well (inches)	2	Type of Well Casing	2-inch-dia. Sch. 40 PVC	Screen Perforation	0.020-inch slotted PVC (67-72 feet)
Type of Sand Pack	#2/12 Monterey (65-72 feet)			Type and Depth of Seal(s)	Hydrated bentonite chips 61-65 ft, cement grout 2-61 ft, concrete 0-2 ft		
Comments	Borehole drilled at 25° from vertical. EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete at surface.						

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID/FID, ppm	Background PID/FID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number							
0					Concrete 5 inches thick					Hand auger first 5 ft. Borehole drilled at 25° from vertical; all depths recorded are linear feet downhole.
5					<p>IP-6 was installed near DW-1. The borehole for well IP-6 was advanced to 72 feet without collecting samples or observing cuttings. Refer to Log of Boring / Well DW-1 for lithology at this location.</p>					
10										
15										
20										
25										
30										

ORION_1W; TESLMOR.GP.J-IP-06; 7/18/08

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring / Well IP-6

Sheet 2 of 3

Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID/FID, ppm	Background PID/FID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Blows / 6 in.							
30					IP-6 was installed near DW-1. The borehole for well IP-6 was advanced to 72 feet without collecting samples or observing cuttings. Refer to Log of Boring / Well DW-1 for lithology at this location.					
35										
40										
45										
50										
55										
60										
65										
70										

ORION_1W_TESLMOR.GPJ-IP-06: 7/18/08

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring / Well IP-6

Sheet 3 of 3

Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID/FID, ppm	Background PID/FID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Blows / 6 in.							
70					IP-6 was installed near DW-1. The borehole for well IP-6 was advanced to 72 feet without collecting samples. Refer to Log of Boring / Well DW-1 for lithology.					
					Bottom of boring at 72.0 feet					
75										
80										
85										
90										
95										
100										
105										
110										

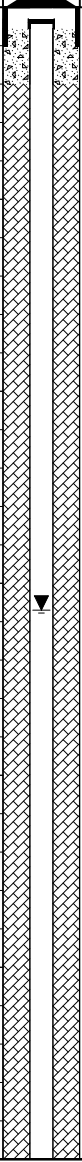
ORION_1W_TESLMOR.GP.J-IP-06: 7/18/08

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring / Well IP-7

Sheet 1 of 3

Date(s) Drilled	5/30/08			Logged By	M. Nelson	Checked By	M. Purchase
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	8-inch-OD auger bit	Total Depth of Borehole	72.0 feet
Drill Rig Type	SIMCO 2400 LAR			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	Not available
Groundwater Level (feet bgs)	First --	Completion 17.2	Development 15.7	Sampling Method	No sampling performed	Top of Casing Elevation	Not available
Diameter of Hole (inches)	8		Diameter of Well (inches)	2		Type of Well Casing	2-inch-dia. Sch. 40 PVC
Type of Sand Pack	#2/12 Monterey (65-72 feet)			Type and Depth of Seal(s)	Hydrated bentonite chips 61-65 ft, cement grout 2-61 ft, concrete 0-2 ft		
Comments	Borehole drilled at 25° from vertical. EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete at surface.						

Elevation, feet	Depth, feet	SAMPLES			MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID/FID, ppm	Background PID/FID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Blows / 6 in.						
0					Concrete 5 inches thick					Hand auger first 5 ft.
					IP-7 was installed near DW-1. The borehole for well IP-7 was advanced to 72 feet without collecting samples or observing cuttings. Refer to Log of Boring / Well DW-1 for lithology at this location.					
5										
10										
15										
20										
25										
30										

ORION_1W_TESLMOR.GP.J-IP-07: 7/18/08

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring / Well IP-7

Sheet 2 of 3

Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID/FID, ppm	Background PID/FID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Depth, feet	Type	Number							
30					<p>IP-7 was installed near DW-1. The borehole for well IP-7 was advanced to 72 feet without collecting samples or observing cuttings. Refer to Log of Boring / Well DW-1 for lithology at this location.</p>					
35										
40										
45										
50										
55										
60										
65										
70										

ORION_1W_TESLMOR.GPJ-IP-07: 7/18/08

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring / Well IP-7

Sheet 3 of 3

Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID/FID, ppm	Background PID/FID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Blows / 6 in.							
70					IP-7 was installed near DW-1. The borehole for well IP-7 was advanced to 72 feet without collecting samples. Refer to Log of Boring / Well DW-1 for lithology.					
					Bottom of boring at 72.0 feet					
75										
80										
85										
90										
95										
100										
105										
110										

ORION_1W_TESLMOR.GP.J-IP-07: 7/18/08

Project: Tesoro - Livermore
Project Location: 1619 First Street, Livermore, CA
Project Number: 01LV

Key to Log of Boring / Well

Sheet 1 of 1

Elevation, feet	Depth, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Blows / 6 in.							
1	2	3	4	5	6	7	8	9	10	11	12

COLUMN DESCRIPTIONS

- | | |
|---|--|
| <p>1 Elevation: Elevation in feet relative to mean sea level (MSL).</p> <p>2 Depth: Depth in feet below the ground surface.</p> <p>3 Sample Type: Type of soil sample collected at depth interval shown; sampler symbols are explained below.</p> <p>4 Sample Number: Sample identification number.</p> <p>5 Blows / 6 in.: Number of blows required to advance driven sampler each 6-inch drive interval, or distance noted, using a 140-lb hammer with a 30-inch drop. "-" indicates data not recorded on field log.</p> <p>6 Graphic Log: Graphic depiction of subsurface material encountered; typical symbols are explained below.</p> | <p>7 Material Description: Description of material encountered; may include density/consistency, moisture, and color.</p> <p>8 Well Completion Diagram: Well schematic; materials are listed in header block; graphics are explained below.</p> <p>9 Headspace PID: Photoionization device (PID) field sample headspace reading in parts per million (ppm).</p> <p>10 Background PID: Photoionization device (PID) background reading in parts per million (ppm).</p> <p>11 Drilling Progress: Time (in 24-hour clock) at sampling and other events during downhole advance.</p> <p>12 Remarks: Comments and observations regarding drilling or sampling made by driller or field personnel.</p> |
|---|--|

TYPICAL SOIL GRAPHIC SYMBOLS

Poorly Graded SAND (SP)	Well-Graded SAND (SW)	SAND with SILT (SP-SM)	SILTY SAND (SM)
CLAY (CL)	SILTY CLAY (CL)	CLAYEY SILT (ML)	CLAYEY SAND (SC)
SILT (ML)	SANDY SILT (ML)	Poorly Graded GRAVEL (GP)	CLAYEY GRAVEL (GC)

TYPICAL WELL GRAPHIC SYMBOLS

Blank casing in concrete	Blank casing in filter sand
Blank casing in portland cement grout	Slotted casing in filter sand
Blank casing in hydrated bentonite pellets / chips	Natural fill / slough

TYPICAL SAMPLER GRAPHIC SYMBOLS

2.5-inch-OD split barrel with brass liners (California Modified)
Portion of sample retained for analysis
No recovery interval in sampler

OTHER GRAPHIC SYMBOLS

- First water encountered at time of drilling
- Static water level measured in well
- Change in material properties within a stratum
- Inferred contact between strata or gradational change in lithology

GENERAL NOTES

- Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive; actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
- Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

ORION_1W_KEY: TESLVMOR_GP-J-wellkey: 1/7/09

Project: Tesoro - Livermore
Project Location: 1619 First Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well IP-8

Sheet 1 of 2

Date(s) Drilled	10/2/08 (well installed 11/10/08)			Logged By	C. Rentz / M. Purchase	Checked By	M. Purchase
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	5-1/2-inch-OD auger (sample) / 10-inch-OD auger (ream for well)	Total Depth of Borehole	65.3 feet
Drill Rig Type	SIMCO 2400 LAR			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	Not available
Groundwater Level (feet bgs)	First	Completion	Development	Sampling Method	California Modified split spoon	Top of Casing Elevation	Not available
	--	--	--				
Diameter of Hole (inches)	10	Diameter of Well (inches)	1 and 2	Type of Well Casing	1-in. and 2-in.-dia. Sch. 40 PVC	Screen Perforation	0.020-in. slotted PVC (60-65 feet)
Type of Sand Pack	Monterey #2/12 (59.3-65.3 feet)			Type and Depth of Seal(s)	Bentonite pellets 56-59.3 ft, portland cement grout 2-56 ft, concrete 0-2 ft		
Comments	Well installed by M. Nelson on 11/10/08 using Spider-06 ATV Sonic rig operated by Boart Longyear. EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete at surface.						

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number							
0		[no samples retained for lab testing]			Concrete 5 inches thick					Air knife first 5 ft of borehole.
5					Brown, well-graded SAND with GRAVEL (SW), fine- to coarse-grained sand, no odor		0.4	0.2	0752	
10					Brown, well-graded SAND with SILT and GRAVEL (SW-SM), fine- to coarse-grained sand, no odor		0.3	0.2	0758	
15							1.1	0.2		PID in operator breathing zone (OBZ)=0.3 ppm
20					Brownish gray, CLAYEY SILT with SAND (ML), odor		879	0.2		
25					Moist, gray, well-graded SAND with GRAVEL (SW), fine- to coarse-grained sand, subrounded gravel, odor		3,470	0.2	0805	
30										

ORION_1W_TESLMOR.GP.J-IP-08: 1/7/09

Project: Tesoro - Livermore
Project Location: 1619 First Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well IP-8

Sheet 2 of 2

Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Blows / 6 in.							
30					Moist, reddish brown, CLAYEY SILT (ML), odor		2,637	0.2		
35					Moist, brown, well-graded SAND with SILT and GRAVEL (SW-SM), fine- to coarse-grained sand, fine to coarse gravel, odor		624	0.2	0815	
40					↳ Becomes brownish gray		634	0.2	0830	
45					Moist, mottled reddish brown, poorly graded SAND with CLAY (SP-SC), coarse-grained sand, odor		726	0.2		OBZ=6.4 ppm
50					Moist, brown, well-graded SAND with GRAVEL (SW), fine-to coarse-grained sand, strong odor		518	0.2	0850	
55					Moist, gray mottled with reddish brown, poorly graded SAND with CLAY (SP-SC), coarse-grained sand, odor		269	0.2		
60					Moist, brown, SILTY SAND with GRAVEL (SM), fine- to coarse-grained sand, odor				0902	No sample recovery. OBZ=1.4 ppm
65					Boring sampled to 65.0 feet; reamed for well to 65.3 feet.		3,127	0.3		
70										

ORION_1W: TESLVMOR.GP.J-IP-08: 1/7/09

Project: Tesoro - Livermore
Project Location: 1619 First Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well IP-9

Sheet 1 of 2

Date(s) Drilled	11/11/08			Logged By	M. Nelson	Checked By	M. Purchase
Drilling Method	Sonic			Drill Bit Size/Type	8-inch-OD casing advancer	Total Depth of Borehole	65.0 feet
Drill Rig Type	Spider-06 ATV Sonic LAR Rig			Drilling Contractor	Boart Longyear	Surface Elevation	Not available
Groundwater Level (feet bgs)	First	Completion	Development	Sampling Method	No sampling performed	Top of Casing Elevation	Not available
	--	--	--				
Diameter of Hole (inches)	8		Diameter of Well (inches)	1 and 2		Type of Well Casing	1-in. and 2-in.-dia. Sch. 40 PVC
Type of Sand Pack	Monterey #2/12 (58.7-65 feet)			Type and Depth of Seal(s)	Bentonite pellets 55-58.7 ft, portland cement grout 2-55 ft, concrete 0-2 ft		
Comments	Well installed by M. Nelson. EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete at surface.						

Elevation, feet	SAMPLES			MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Blows / 6 in.						
0				Concrete 5 inches thick					Air knife first 5 ft of borehole.
5				IP-9 was installed near IP-8. The borehole for well IP-9 was advanced to 65 feet without collecting samples or observing cuttings. Refer to Log of Boring/Well IP-8 for lithology at this location.					
10									
15									
20									
25									
30									

ORION_1W: TESLMOR.GP.J-IP-09: 1/7/09

Project: Tesoro - Livermore
Project Location: 1619 First Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well IP-9

Sheet 2 of 2

Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Blows / 6 in.							
30					<p>IP-9 was installed near IP-8. The borehole for well IP-9 was advanced to 65 feet without collecting samples or observing cuttings. Refer to Log of Boring/Well IP-8 for lithology at this location.</p>					
35										
40										
45										
50										
55										
60										
65				Bottom of boring at 65.0 feet						
70										

ORION_1W_TESLMOR.GPJ-IP-09: 1/7/09

Project: Tesoro - Livermore
Project Location: 1619 1st Street, Livermore, CA
Project Number: 01LV

Key to Log of Boring / Well

Sheet 1 of 1

Elevation, feet	Depth, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Blows / 6 in.							
1	2	3	4	5	6	7	8	9	10	11	12

COLUMN DESCRIPTIONS

- | | |
|---|--|
| <p>1 Elevation: Elevation in feet relative to mean sea level (MSL).</p> <p>2 Depth: Depth in feet below the ground surface.</p> <p>3 Sample Type: Type of soil sample collected at depth interval shown; sampler symbols are explained below.</p> <p>4 Sample Number: Sample identification number.</p> <p>5 Blows / 6 in.: Number of blows required to advance driven sampler each 6-inch drive interval, or distance noted, using a 140-lb hammer with a 30-inch drop. "-" indicates data not recorded on field log.</p> <p>6 Graphic Log: Graphic depiction of subsurface material encountered; typical symbols are explained below.</p> | <p>7 Material Description: Description of material encountered; may include density/consistency, moisture, and color.</p> <p>8 Well Completion Diagram: Well schematic; materials are listed in header block; graphics are explained below.</p> <p>9 Headspace PID: Photoionization device (PID) field sample headspace reading in parts per million (ppm).</p> <p>10 Background PID: Photoionization device (PID) background reading in parts per million (ppm).</p> <p>11 Drilling Progress: Time (in 24-hour clock) at sampling and other events during downhole advance.</p> <p>12 Remarks: Comments and observations regarding drilling or sampling made by driller or field personnel.</p> |
|---|--|

TYPICAL SOIL GRAPHIC SYMBOLS

Poorly Graded SAND (SP)	Well-Graded SAND (SW)	SAND with SILT (SP-SM)	SILTY SAND (SM)
CLAY (CL)	SILTY CLAY (CL)	CLAYEY SILT (ML)	CLAYEY SAND (SC)
SILT (ML)	SANDY SILT (ML)	Poorly Graded GRAVEL (GP)	CLAYEY GRAVEL (GC)

TYPICAL WELL GRAPHIC SYMBOLS

Blank casing in concrete	Blank casing in filter sand
Blank casing in portland cement grout	Slotted casing in filter sand
Blank casing in hydrated bentonite pellets / chips	Natural fill / slough

TYPICAL SAMPLER GRAPHIC SYMBOLS

2.5-inch-OD split barrel with brass liners (California Modified)
Portion of sample retained for analysis
No recovery interval in sampler

OTHER GRAPHIC SYMBOLS

- First water encountered at time of drilling
- Static water level measured in well
- Change in material properties within a stratum
- Inferred contact between strata or gradational change in lithology

GENERAL NOTES

- Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive; actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
- Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

ORION_1W_KEY; TESLVMOR_GP-J-wellkey; 2/19/09

Project: Tesoro - Livermore
Project Location: 1619 1st Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well IP-10

Sheet 1 of 2

Date(s) Drilled	2/2/09 (well installed 2/2/09-2/3/09)			Logged By	M. Nelson	Checked By	M. Purchase
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	6-inch-OD auger (sample) / 10-inch-OD auger (ream for well)	Total Depth of Borehole	65.0 feet
Drill Rig Type	Rhino M5T LAR			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	Not available
Groundwater Level (feet bgs)	First	Completion	Development	Sampling Method	California Modified split spoon	Top of Casing Elevation	Not available
	55	--	--				
Diameter of Hole (inches)	10	Diameter of Well (inches)	1 and 2	Type of Well Casing	1-in. and 2-in.-dia. Sch. 40 PVC	Screen Perforation	0.020-in. slotted PVC (58-63 feet)
Type of Sand Pack	Monterey #2/12 (57-64 feet)			Type and Depth of Seal(s)	Bentonite chips 64-65 ft and 55-57 ft, portland cement grout 2-55 ft, concrete 0-2 ft		
Comments	Well completed at surface with EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete.						

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number							
0		[no samples retained for lab testing]			Concrete 5 inches thick					Air knife first 5 ft of borehole.
	5		12 20		[No soil logging in upper 10 feet; air knife to 5 feet and recover only slough from air knifing in first drive sample.]		0.0	0.0	0745	Slough from air knifing in 5-ft sample.
	10		10 18 22		Medium dense, dry, brown, well-graded SAND with SILT and GRAVEL (SW-SM), fine- to coarse-grained sand, no odor		0.0	0.0	0750	
	15		20 22 26		Very stiff to hard, dry, brown, CLAYEY SILT with SAND and GRAVEL (ML), no odor		0.3	0.0	0755	
	20		10 20 26				0.2	0.0	0800	PID in operator breathing zone (OBZ)=0.0 ppm
	25		6 10 31		Very stiff to hard, dry, reddish brown, CLAYEY SILT (ML), no odor		0.1	0.0	0808	
	30		15 19 23		Medium dense, moist, brown, SILTY SAND with GRAVEL (SM), fine- to coarse-grained sand, no odor		0.3	0.0	0815	

ORION_1W_TESLMOR.GP.JP-10; 2/19/09

Project: Tesoro - Livermore
Project Location: 1619 1st Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well IP-10

Sheet 2 of 2

Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Blows / 6 in.							
30					Medium dense, moist, brown, SILTY SAND with GRAVEL (SM), fine- to coarse-grained sand, no odor (continued)					
35			9 17 20		Medium dense, moist, gray, well-graded SAND with GRAVEL (SW), fine- to coarse-grained sand, no odor		1.3	0.0	0822	OBZ=0.0 ppm
40			18 18 20		Medium dense, moist, brown, SILTY SAND with GRAVEL (SM), fine- to coarse-grained sand, no odor		33.4	0.0	0830	
45			7 7 31		Medium dense, moist, brown and gray, poorly graded SAND with CLAY (SP-SC), coarse-grained sand, odor		36.8	0.0	0835	
50			18 23 29		▼ Becomes dense, with gravel		19.0	0.0	0843	OBZ=0.6 ppm
55			13 17 54		▼ Becomes dense to very dense		62.5	0.0	0852	
60			7 9 11		Stiff to very stiff, wet, reddish brown, CLAYEY SILT (ML), strong odor		1,243	0.0	0858	OBZ=0.4 ppm
65			23 27 29		Dense, wet, reddish brown, SILTY SAND with GRAVEL (SM), fine- to coarse-grained sand, trace clay, slight odor		7.3	0.0	0908	
					Bottom of boring at 65.0 feet.					

ORION_1W_TESLMOR.GP-J-IP-10_2/19/09

Project: Tesoro - Livermore
Project Location: 1554 1st Street, Livermore, CA
Project Number: 01LV

Key to Log of Boring / Well

Sheet 1 of 1

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number							
1	2	3	4	5	6	7	8	9	10	11

COLUMN DESCRIPTIONS

- | | |
|---|---|
| <p>1 Elevation: Elevation in feet relative to mean sea level (MSL).</p> <p>2 Depth: Depth in feet below the ground surface.</p> <p>3 Sample Type: Type of soil sample collected at depth interval shown; sampler symbols are explained below.</p> <p>4 Sample Number: Sample identification number.</p> <p>5 Graphic Log: Graphic depiction of subsurface material encountered; typical symbols are explained below.</p> <p>6 Material Description: Description of material encountered; in addition to soil classification and USCS, may include consistency, moisture, color, plasticity, and grain size.</p> | <p>7 Well Completion Diagram: Schematic of well installation in borehole; materials and depths are listed in header block; graphics are explained below.</p> <p>8 Headspace PID: Photoionization device (PID) field sample headspace reading in parts per million (ppm).</p> <p>9 Background PID: Photoionization device (PID) background reading in parts per million (ppm).</p> <p>10 Drilling Progress: Time (in 24-hour clock) at sampling and other events during downhole advance.</p> <p>11 Remarks: Comments and observations regarding drilling or sampling made by driller or field personnel.</p> |
|---|---|

TYPICAL SOIL GRAPHIC SYMBOLS

POORLY GRADED SAND (SP)	WELL-GRADED SAND (SW)	SAND WITH SILT (SP-SM)	SILTY SAND (SM)
LEAN CLAY (CL)	SILTY CLAY (CL)	CLAYEY SILT (ML)	CLAYEY SAND (SC)
SILT (ML)	SANDY SILT (ML)	POORLY GRADED GRAVEL (GP)	CLAYEY GRAVEL (GC)

TYPICAL WATER SAMPLING GRAPHIC SYMBOLS

Blank casing in concrete	Blank casing in filter sand
Blank casing in portland cement grout	Slotted casing in filter sand
Blank casing in bentonite pellets	Natural fill / slough

TYPICAL SAMPLER GRAPHIC SYMBOLS

Soil core barrel (5 ft long, 2.5 in. dia.)
No recovery interval in core barrel
Portion of sample retained for analysis

OTHER GRAPHIC SYMBOLS

- First water encountered at time of drilling
- Static water level measured in well
- Change in material properties within a stratum
- Inferred contact or gradational change

GENERAL NOTES

- Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive; actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
- Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

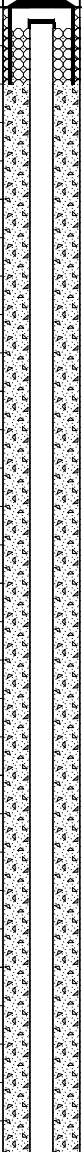
ORION_3WS_KEY: TESLMOR-GPJ-wellipkey2013; 1/1/13

Project: Tesoro - Livermore
Project Location: 1554 1st Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well IP-11

Sheet 1 of 2

Date(s) Drilled	4/9/11 and 4/11/13			Logged By	E. Chow	Checked By	M. Purchase
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	8-inch-OD auger (sample), 10-inch-OD auger (ream for well)	Total Depth of Borehole	65.0 feet
Drill Rig Type	Marl M11			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	To be determined
Groundwater Level (feet bgs)	First --	Completion --	Development --	Sampling Method	5-ft-long, 2.5-inch-dia. core barrel	Top of Casing Elevation	To be determined
Diameter of Hole (inches)	10	Diameter of Well (inches)	4	Type of Well Casing	4-inch-dia. Schedule 40 PVC	Screen Perforation	0.010-inch slot (50-60 ft)
Type of Sand Pack	Monterey #2/16 (48-65 feet)			Type and Depth of Seal(s)	Hydrated bentonite chips 44-48 ft, portland cement 2-44 ft, concrete 0-2 ft		
Comments	Well completed at surface with EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete.						

Elevation, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number							
0				Asphalt 13 inches thick				1015	Start on 4/9/13. Break asphalt, then clear to 5 ft using airknife, hand auger, and water pressure.
5				IP-11 was installed adjacent to DW-5. The borehole for well IP-11 was cleared to 5 feet with airknife and hand auger, then was blind-drilled to depth of 45 feet without collecting samples or observing cuttings. Refer to Log of Boring DW-5 for lithology to 45 feet at this location.				1140 0730	End for 4/9/13. Start hollow-stem auger drilling on 4/11/13. Blind drill to 45 ft using 8-in.-OD augers.
10									
15									
20									
25									
30									

ORION_1WC: TESLMOR.GPJ:IP-11: 5/16/13

Elevation, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number							
30				IP-11 was installed adjacent to DW-5. The borehole for well IP-11 was cleared to 5 feet with airknife and hand auger, then was blind-drilled to depth of 45 feet without collecting samples or observing cuttings. Refer to Log of Boring DW-5 for lithology to 45 feet at this location.					
35									
40									
45				CLAYEY GRAVEL WITH SAND (GC), medium brown, wet, ~45% well-graded, subangular to subrounded gravel to 2 inches, ~40% well-graded sand, ~15% fines, no odor ↓ Becomes moist, increase in clay, zones of rust coloring		6.2	0.3	0810	Start soil sampling with 5-ft core barrel.
50				↓ Becomes wet, odor ↓ Becomes moist, with zones of rust coloring and zones of greenish gray staining		12	0.4		
55				↓ Becomes orange-brown with zones of rust coloring and gray staining		12	0.3	0817	
60				SANDY LEAN / FAT CLAY (CL/CH), orange-brown, very soft, moist, ~55% medium to high plasticity fines, ~30% sand, <15% fine to coarse, subangular to subrounded gravel to 1 inch, no odor		12	0.5		
65				CLAYEY GRAVEL WITH SAND (GC), orange-brown, wet, ~45% well-graded, subangular to subrounded gravel, ~40% well-graded sand, ~15% fines, no odor		74	0.4	0825	
						21	0.8		
						28	0.7	0832	
						32	1.0		
				Bottom of boring at 65.0 feet					End drilling and sampling with 8-in.-OD auger. Ream boring with 10-in.-OD auger for well installation.
70									

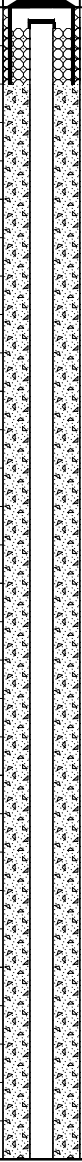
ORION_1WC: TESLMOR.GPJ-IP-11: 5/18/13

Project: Tesoro - Livermore
Project Location: 1554 1st Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well IP-12

Sheet 1 of 2

Date(s) Drilled	4/9/11 - 4/10/13			Logged By	E. Chow	Checked By	M. Purchase
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	10-inch-OD auger	Total Depth of Borehole	61.0 feet
Drill Rig Type	Marl M11			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	To be determined
Groundwater Level (feet bgs)	First	Completion	Development	Sampling Method	No sampling performed	Top of Casing Elevation	To be determined
	40	--	--				
Diameter of Hole (inches)	10	Diameter of Well (inches)	4	Type of Well Casing	4-inch-dia. Schedule 40 PVC	Screen Perforation	0.010-inch slot (50-60 ft)
Type of Sand Pack	Monterey #2/16 (48-61 feet)			Type and Depth of Seal(s)	Hydrated bentonite chips 44-48 ft, portland cement 2-44 ft, concrete 0-2 ft		
Comments	Well completed at surface with EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete.						

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number							
0		[no sampling performed]			Asphalt 10 inches thick				1230	Start on 4/9/13. Break asphalt, then clear to 5.3 ft using airknife, hand auger, and water pressure.
5					IP-12 was installed adjacent to DW-5. The borehole for well IP-12 was cleared to 5.3 feet with airknife and hand auger, then was blind-drilled to total depth of 61 feet without collecting samples or observing cuttings. Refer to Log of Boring DW-5 for lithology at this location.				1405 0725	End for 4/9/13. Start hollow-stem auger drilling on 4/10/13. Blind drill to total depth.
10										
15										
20										
25										
30										

ORION_1WC: TESLMOR.GPJ:IP-12; 5/18/13

Project: Tesoro - Livermore
 Project Location: 1554 1st Street, Livermore, CA
 Project Number: 01LV

Log of Boring / Well IP-12

Sheet 2 of 2

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS	
		Type	Number								
30					<p>IP-12 was installed adjacent to DW-5. The borehole for well IP-12 was cleared to 5.3 feet with airknife and hand auger, then was blind-drilled to total depth of 61 feet without collecting samples or observing cuttings. Refer to Log of Boring DW-5 for lithology at this location.</p>		0.3	0.2	0810	PID readings from soil cuttings 30-35 ft. Odor of Simple Green cleaning product.	
35											
40								0.7	0.3	0830	PID readings from soil cuttings 40-45 ft.
45								1.2	0.2	0837	PID readings from soil cuttings 45-50 ft. Soil cuttings still have odor of Simple Green cleaning product.
50								2.2	0.3	0845	PID readings from soil cuttings 50-55 ft.
55								4.8	0.3	0850	PID readings from soil cuttings 55-60 ft.
60					Bottom of boring at 61.0 feet				0900		
65											
70											

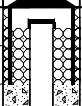
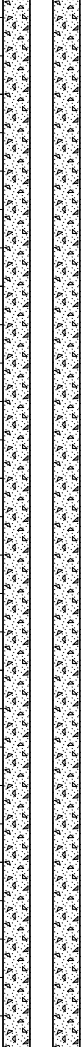
ORION_1WC: TESLMOR.GPJ-IP-12; 5/16/13

Project: Tesoro - Livermore
Project Location: 1554 1st Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well IP-13

Sheet 1 of 2

Date(s) Drilled	4/9/11 and 4/15/13			Logged By	E. Chow	Checked By	M. Purchase
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	10-inch-OD auger	Total Depth of Borehole	60.5 feet
Drill Rig Type	Marl M11			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	To be determined
Groundwater Level (feet bgs)	First 40-45	Completion --	Development --	Sampling Method	No sampling performed	Top of Casing Elevation	To be determined
Diameter of Hole (inches)	10	Diameter of Well (inches)	4	Type of Well Casing	4-inch-dia. Schedule 40 PVC	Screen Perforation	0.010-inch slot (50-60 ft)
Type of Sand Pack	Monterey #2/16 (48-60.5 feet)			Type and Depth of Seal(s)	Hydrated bentonite chips 44-48 ft, portland cement 2-44 ft, concrete 0-2 ft		
Comments	Well completed at surface with EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete.						

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number							
0		[no sampling performed]			Asphalt 10 inches thick				1510	Start on 4/9/13. Break asphalt, then clear to 5 ft using airknife, hand auger, and water pressure.
5					IP-13 was installed adjacent to DW-2. The borehole for well IP-13 was cleared to 5 feet with airknife and hand auger, then was blind-drilled to total depth of 60.5 feet without collecting samples or observing cuttings. Refer to Log of Boring DW-2 for lithology at this location.				1600 0715	End for 4/9/13. Start hollow-stem auger drilling on 4/15/13. Blind drill to total depth.
10										
15										
20										
25										
30										

ORION_1WC: TESLMOR.GPJ:IP-13: 5/18/13

Project: Tesoro - Livermore
 Project Location: 1554 1st Street, Livermore, CA
 Project Number: 01LV

Log of Boring / Well IP-13

Sheet 2 of 2

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number							
30					<p>IP-13 was installed adjacent to DW-2. The borehole for well IP-13 was cleared to 5 feet with airknife and hand auger, then was blind-drilled to total depth of 60.5 feet without collecting samples or observing cuttings. Refer to Log of Boring DW-2 for lithology at this location.</p>					
35							0.4	0.3	0815	PID readings from soil cuttings 35-40 ft.
40							0.3	0.3	0825	PID readings from soil cuttings 40-45 ft.
45							2.1	0.3	0830	PID readings from soil cuttings 45-50 ft.
50							1.3	04	0835	PID readings from soil cuttings 50-55 ft.
55							4.9	0.4	0845	PID readings from soil cuttings 55-60 ft.
60					Bottom of boring at 60.5 feet					
65										
70										

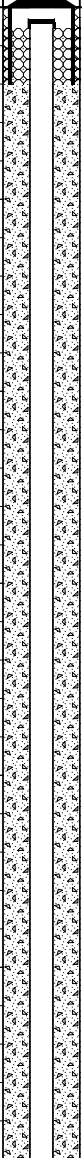
ORION_1WC: TESLMOR.GPJ:IP-13: 5/16/13

Project: Tesoro - Livermore
Project Location: 1554 1st Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well IP-14

Sheet 1 of 2

Date(s) Drilled	4/16/11 - 4/17/13			Logged By	E. Chow	Checked By	M. Purchase
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	8-inch-OD auger (sample), 10-inch-OD auger (ream for well)	Total Depth of Borehole	61.0 feet
Drill Rig Type	Marl M11			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	To be determined
Groundwater Level (feet bgs)	First --	Completion --	Development --	Sampling Method	5-ft-long, 2.5-inch-dia. core barrel	Top of Casing Elevation	To be determined
Diameter of Hole (inches)	10		Diameter of Well (inches)	4		Type of Well Casing	4-inch-dia. Schedule 40 PVC
Type of Sand Pack	Monterey #2/16 (48-61 feet)			Type and Depth of Seal(s)	Hydrated bentonite chips 44-48 ft, portland cement 2-44 ft, concrete 0-2 ft		
Comments	Well completed at surface with EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete.						

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number							
0		[no sampling performed]			Asphalt 5 inches thick				1400	Start on 4/16/13. Break asphalt, then clear to 5 ft using airknife, hand auger, and water pressure.
5					IP-14 was installed adjacent to DW-2. The borehole for well IP-14 was cleared to 5 feet with airknife and hand auger, then was blind-drilled to total depth of 61 feet without collecting samples or observing cuttings. Refer to Log of Boring DW-2 for lithology at this location.				1510 0710	End for 4/16/13. Start hollow-stem auger drilling on 4/17/13. Blind drill to total depth.
10										
15										
20										
25										
30										

ORION_1WC: TESLMOR.GPJ:IP-14: 5/16/13

Project: Tesoro - Livermore
Project Location: 1554 1st Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well IP-14

Sheet 2 of 2

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS	
		Type	Number								
30					IP-14 was installed adjacent to DW-2. The borehole for well IP-14 was cleared to 5 feet with airknife and hand auger, then was blind-drilled to total depth of 61 feet without collecting samples or observing cuttings. Refer to Log of Boring DW-2 for lithology at this location.						
35											
40								2.3	0.1	0830	PID readings from soil cuttings 40-45 ft.
45								2.7	0.1	0835	PID readings from soil cuttings 45-50 ft.
50								5.6	0.1	0840	PID readings from soil cuttings 50-55 ft.
55								1.9	0.2	0850	PID readings from soil cuttings 55-60 ft.
60									0900		
					Bottom of boring at 61.0 feet						
65											
70											

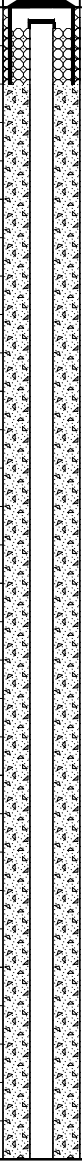
ORION_1WC: TESLMOR.GPJ:IP-14: 5/16/13

Project: Tesoro - Livermore
Project Location: 1554 1st Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well IP-15

Sheet 1 of 2

Date(s) Drilled	4/8/11 - 4/9/13			Logged By	S. Stromberg / E. Chow		Checked By	M. Purchase		
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	8-inch-OD auger (sample), 10-inch-OD auger (ream for well)		Total Depth of Borehole	65.0 feet		
Drill Rig Type	Marl M11			Drilling Contractor	Gregg Drilling & Testing		Surface Elevation	To be determined		
Groundwater Level (feet bgs)	First	Completion	Development	Sampling Method	5-ft-long, 2.5-inch-dia. core barrel		Top of Casing Elevation	To be determined		
	35	--	--							
Diameter of Hole (inches)	10		Diameter of Well (inches)	4		Type of Well Casing	4-inch-dia. Schedule 40 PVC		Screen Perforation	0.010-inch slot (50-60 ft)
Type of Sand Pack	#60 sand (63-65 feet), Monterey #2/16 (48-63 feet)			Type and Depth of Seal(s)	Hydrated bentonite chips 44-48 ft, portland cement 2-44 ft, concrete 0-2 ft					
Comments	Well completed at surface with EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete.									

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number							
0					Asphalt 6 inches thick				0938	Start on 4/8/13. Airknife to 1.2 ft.
					IP-15 was installed adjacent to DW-2. The borehole for well IP-15 was cleared to 5.3 feet with airknife and hand auger, then was blind-drilled to depth of 45 feet without collecting samples or observing cuttings. Refer to Log of Boring DW-2 for lithology to 45 feet at this location.		0.6	0.8	1000	Begin hand augering at 1.2 ft. Encounter gravel and cobbles. Finish clearing hole to 5.3 ft using airknife, hand auger, and water pressure. End for 4/8/13.
						1015				
5										
									1125	
								0745	Start hollow-stem auger drilling on 4/9/13. Blind drill to 45 ft using 8-in.-OD augers.	
10										
15										
20										
25										
30										

ORION_1WC: TESLMOR.GPJ:IP-15: 5/18/13

Project: Tesoro - Livermore
 Project Location: 1554 1st Street, Livermore, CA
 Project Number: 01LV

Log of Boring / Well IP-15

Sheet 2 of 2

Elevation, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number							
30				IP-15 was installed adjacent to DW-2. The borehole for well IP-15 was cleared to 5.3 feet with airknife and hand auger, then was blind-drilled to depth of 45 feet without collecting samples or observing cuttings. Refer to Log of Boring DW-2 for lithology to 45 feet at this location.		0.0	0.0	0800	PID in operator breathing zone (OBZ) = 0.0 ppm.
35									
40									
45				CLAYEY GRAVEL WITH SAND (GC), medium brown, wet, ~45% well-graded, subangular to subrounded gravel to 2.5 inches, ~40% well-graded sand, ~15% fines, odor ↓ Becomes moist, increase in clay		0.0 458	0.0 0.0	0830	Start soil sampling with 5-ft core barrel.
50				↓ Becomes wet, with zones of orange iron oxidation ← Lens of mostly medium-grained sand 2 inches thick ↓ Trace gray staining ↓ Becomes moist		73	0.0	0845	
55				↓ Becomes wet		427	0.0	0900	
60				↓ No gray staining, no odor		147	0.0	0910	
65				Bottom of boring at 65.0 feet		37 38	0.0 0.0	0920	End drilling and sampling with 8-in.-OD auger. Ream boring with 10-in.-OD auger for well installation.
70									

ORION_1WC: TESLMOR.GPJ:IP-15: 5/16/13

Project: Tesoro - Livermore
Project Location: 1554 1st Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well IP-16

Sheet 1 of 2

Date(s) Drilled	4/9/11 and 4/12/13			Logged By	E. Chow	Checked By	M. Purchase
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	8-inch-OD auger (sample), 10-inch-OD auger (ream for well)	Total Depth of Borehole	65.0 feet
Drill Rig Type	Marl M11			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	To be determined
Groundwater Level (feet bgs)	First --	Completion --	Development --	Sampling Method	5-ft-long, 2.5-inch-dia. core barrel	Top of Casing Elevation	To be determined
Diameter of Hole (inches)	10		Diameter of Well (inches)	4		Type of Well Casing	4-inch-dia. Schedule 40 PVC
Type of Sand Pack	Monterey #2/16 (48-65 feet)			Type and Depth of Seal(s)	Hydrated bentonite chips 44-48 ft, portland cement 2-44 ft, concrete 0-2 ft		
Comments	Well completed at surface with EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete.						

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number							
0					Asphalt 8 inches thick		0.7	0.7	0715	Start on 4/9/13.
					IP-16 was installed adjacent to DW-7. The borehole for well IP-16 was cleared to 5.2 feet with airknife and hand auger, then was blind-drilled to depth of 45 feet without collecting samples or observing cuttings. Refer to Log of Boring DW-7 for lithology to 45 feet at this location.			0720	Break asphalt, then clear to 5.2 ft using airknife, hand auger, and water pressure.	
								0755		
5									0845	End for 4/9/13.
								0720	Start hollow-stem auger drilling on 4/12/13. Blind drill to 45 ft using 8-in.-OD augers.	
10										
15										
20										
25										
30										

ORION_1WC: TESLMOR.GPJ:IP-16: 5/18/13

Project: Tesoro - Livermore
 Project Location: 1554 1st Street, Livermore, CA
 Project Number: 01LV

Log of Boring / Well IP-16

Sheet 2 of 2

Elevation, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number							
30				IP-16 was installed adjacent to DW-7. The borehole for well IP-16 was cleared to 5.2 feet with airknife and hand auger, then was blind-drilled to depth of 45 feet without collecting samples or observing cuttings. Refer to Log of Boring DW-7 for lithology to 45 feet at this location.					
35									
40									
45				CLAYEY GRAVEL WITH SAND (GC), medium brown, wet, ~45% well-graded, subangular to subrounded gravel to 2 inches, ~40% well-graded sand, ~15% fines, no odor ↓ Becomes moist, increase in clay, zones of rust coloring and greenish gray staining		4.1	0.2	0800	Start soil sampling with 5-ft core barrel.
						21	0.3		
50				↓ Becomes wet, gravel to 3 inches, odor		4.7	0.2	0805	
55						544	0.3	0815	
60				↳ Lens of WELL-GRADED GRAVEL (GW) to 1.5 inches ↓ Becomes orange-brown, moist, gravel to 1 inch, odor		44	0.6	0820	
65				Bottom of boring at 65.0 feet					End drilling and sampling with 8-in.-OD auger. Ream boring with 10-in.-OD auger for well installation.
70									

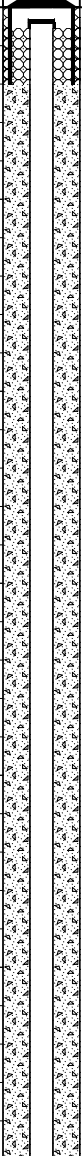
ORION_1WC: TESLMOR.GPJ-IP-16: 5/18/13

Project: Tesoro - Livermore
Project Location: 1554 1st Street, Livermore, CA
Project Number: 01LV

Log of Boring / Well IP-17

Sheet 1 of 2

Date(s) Drilled	4/9/11 and 4/16/13			Logged By	E. Chow	Checked By	M. Purchase
Drilling Method	Hollow-Stem Auger			Drill Bit Size/Type	10-inch-OD auger	Total Depth of Borehole	60.5 feet
Drill Rig Type	Marl M11			Drilling Contractor	Gregg Drilling & Testing	Surface Elevation	To be determined
Groundwater Level (feet bgs)	First --	Completion --	Development --	Sampling Method	No sampling performed	Top of Casing Elevation	To be determined
Diameter of Hole (inches)	10	Diameter of Well (inches)	4	Type of Well Casing	4-inch-dia. Schedule 40 PVC	Screen Perforation	0.010-inch slot (50-60 ft)
Type of Sand Pack	Monterey #2/16 (48-60.5 feet)			Type and Depth of Seal(s)	Hydrated bentonite chips 44-48 ft, portland cement 2-44 ft, concrete 0-2 ft		
Comments	Well completed at surface with EMCO-Wheaton 12-inch-diameter flush-mount vault installed with concrete.						

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number							
0		[no sampling performed]			Asphalt 5 inches thick				0855	Start on 4/9/13. Break asphalt, then clear to 5.3 ft using airknife, hand auger, and water pressure.
5					IP-17 was installed adjacent to DW-6. The borehole for well IP-17 was cleared to 5.3 feet with airknife and hand auger, then was blind-drilled to total depth of 60.5 feet without collecting samples or observing cuttings. Refer to Log of Boring DW-6 for lithology at this location.				0940	End for 4/9/13. Start hollow-stem auger drilling on 4/16/13. Blind drill to total depth.
10								1000		
15										
20										
25										
30										

ORION_1WC: TESLMOR.GPJ:IP-17: 5/16/13

Project: Tesoro - Livermore
 Project Location: 1554 1st Street, Livermore, CA
 Project Number: 01LV

Log of Boring / Well IP-17

Sheet 2 of 2

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Well Completion Diagram	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number							
30					IP-17 was installed adjacent to DW-6. The borehole for well IP-17 was cleared to 5.3 feet with airknife and hand auger, then was blind-drilled to total depth of 60.5 feet without collecting samples or observing cuttings. Refer to Log of Boring DW-6 for lithology at this location.					
	35						0.1	0.1	1040	PID readings from soil cuttings 35-40 ft.
	40						0.6	0.1	1055	PID readings from soil cuttings 40-45 ft.
	45						0.3	0.1	1100	PID readings from soil cuttings 45-50 ft.
	50						0.9	0.1	1105	PID readings from soil cuttings 50-55 ft.
	55						3.5	0.1	1110	PID readings from soil cuttings 55-60 ft.
	60				Bottom of boring at 60.5 feet					
	65									
	70									

ORION_1WC: TESLMOR.GPJ-IP-17: 5/16/13

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Key to Log of Boring













Sheet 1 of 1

Elevation, feet	Depth, feet	SAMPLES		Water Sampling	Graphic Log	MATERIAL DESCRIPTION	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number							
1	2	3	4	5	6	7	8	9	10	11

COLUMN DESCRIPTIONS

- | | |
|---|--|
| <p>1 Elevation: Elevation in feet relative to mean sea level (MSL).</p> <p>2 Depth: Depth in feet below the ground surface.</p> <p>3 Sample Type: Type of soil sample collected at depth interval shown; sampler symbols are explained below.</p> <p>4 Sample Number: Identification number of retained sample.</p> <p>5 Water Sampling: Graphic depiction of groundwater sampling interval; bottom line depicts penetration depth of sampler screen cover (Geoprobe or Hydropunch), slotted "pipe" indicates exposed screen interval (PVC or Hydropunch) for sample collection.</p> <p>6 Graphic Log: Graphic depiction of subsurface material encountered; typical symbols are explained below.</p> | <p>7 Material Description: Description of material encountered; in addition to soil classification and USCS, may include relative density or consistency, moisture, color, grain size, and plasticity.</p> <p>8 Headspace PID: Photoionization device (PID) field sample headspace reading in parts per million (ppm).</p> <p>9 Background PID: Photoionization device (PID) background reading in parts per million (ppm).</p> <p>10 Drilling Progress: Time (in 24-hour clock) at sampling and other events during downhole advance.</p> <p>11 Remarks: Comments and observations regarding drilling or sampling made by driller or field personnel.</p> |
|---|--|





TYPICAL SOIL GRAPHIC SYMBOLS

 Poorly Graded SAND (SP)	 Well-Graded SAND (SW)	 SAND with SILT (SP-SM)	 SILTY SAND (SM)
 LEAN CLAY (CL)	 FAT CLAY (CH)	 SILTY CLAY (CL)	 CLAYEY SAND (SC)
 SILT (ML)	 CLAYEY SILT (ML)	 Poorly Graded GRAVEL (GP)	 Clayey Gravel (GC)

TYPICAL SAMPLER GRAPHIC SYMBOLS

 Macrocore continuous sampler with acetate sleeves	 No recovery interval in acetate sleeve	 Portion of sample retained for analysis	 Slotted PVC pipe for groundwater sampling
---	--	---	---

OTHER GRAPHIC SYMBOLS

-  First water encountered at time of drilling
-  Static water level measured in well
-  Change in material properties within a stratum
-  Inferred contact between strata or gradational change in lithology

GENERAL NOTES

- Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive; actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
- Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

ORION_2S_H2O_KEY; TESLMOR.GP_J-geopkey; 9/16/06

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring DB-1

Sheet 1 of 2

Date(s) Drilled	1/27/06	Logged By	J. Blair	Checked By	J. Gwinn
Drilling Method	Direct Push	Drill Bit Size/Type	1-1/2-inch-dia. direct push rod	Total Depth of Borehole	60.0 feet
Drill Rig Type	Geoprobe 6600	Drilling Contractor	Vironex	Approximate Surface Elevation	Not available
Groundwater Level and Date Measured	51 feet bgs ATD (1/27/06)	Sampling Method	Macrocore continuous sampler with 5-foot-long acetate sleeve (soil); slotted PVC pipe via Geoprobe sampler (groundwater)		
Borehole Completion	Cement slurry to ground surface	Comments	Hand augered to 5 feet. Refer to site plan for boring location.		

Elevation, feet	Depth, feet	SAMPLES			MATERIAL DESCRIPTION	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Water Sampling					
0					Concrete 5 inches thick				Hand auger first 5 ft.
5					Moist, light brown, well-graded SAND with GRAVEL (SW), fine to coarse gravel	1.9	0.0		
10			DB-1-10		With trace clay	0.3	0.0	0725	PID in operator breathing zone (OBZ) = 0.0 ppm
15					Moist, light gray, CLAYEY SAND (SC), trace fine gravel	1.2	0.0	0732	
20			DB-1-20			2.8	0.0		
25					Moist, light brown, well-graded SAND with GRAVEL (SW), fine to coarse gravel	0.7	0.0		
					Moist, light brown, SANDY SILT (ML), fine-grained sand, trace clay	3.0	0.0	0750	
			DB-1-27		Moist, light brown, SILTY CLAY (CL), trace fine-grained sand	3.4	0.0	0800	
					Moist, grayish brown, CLAYEY SAND (SC), trace fine gravel	95.4	0.0	0805	
30			DB-1-30			988	0.0	0805	OBZ=0.0 ppm

ORION_2S_H2O; TESLVNOR.GPJ+DB-01; 9/16/06

Project: Tesoro - Livermore
 Project Location: 1619 First Street
 Project Number: 01LV

Log of Boring DB-1

Sheet 2 of 2

Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Water Sampling						
30					Moist, light brown, SILTY CLAY (CL), trace fine-grained sand	189	0.0		
						61.2	0.0		
					Grades with more sand	20.7	0.0	0815	
	DB-1-34					195	0.0	0830	
35					Moist, brown, poorly graded GRAVEL with SILT and SAND (GP-GM), fine gravel	70.0	0.0	0840	
	DB-1-37					32.1	0.0	0850	
					Grades with more sand	1223	0.0		
40	DB-1-40				Moist, light brown, SILTY CLAY (CL)	1444	0.0	0900	OBZ=0.0 ppm
						532	0.0		
	DB-1-43				Very moist, brown, poorly graded GRAVEL with SILT and SAND (GP-GM), fine gravel	388	0.0		
						766	0.0	0910	
45	DB-1-45				Very moist, brown, SILT with SAND and GRAVEL (ML), fine gravel	642	0.0		
						1981	0.0	0915	
					Some clay, less sand and gravel	537	0.0		
	DB-1-48					421	0.0		
					Very moist, brown, well-graded SAND with SILT and GRAVEL (SW-SM), fine gravel	1844	0.0	0925	
	DB-1-50					492	0.0		
50					Wet, light brown, SANDY SILT (ML), fine-grained sand	643	0.0	0930	OBZ=0.0 ppm Groundwater sample DB-1@50 collected from slotted PVC pipe at 0940.
	DB-1-52					826	0.0		
					Wet, light brown, SILT with SAND and GRAVEL (ML), fine gravel	498	0.0	1200	
						202	0.0		
55						196	0.0	1215	
	DB-1-57					1440	0.0	1235	
60					Boring was drilled and soil sampled to 57.0 feet (refusal). Geoprobe sampler was pushed to 60.0 feet to sample groundwater.			1310	Groundwater sample DB-1@60 collected.
65									

ORION_2S_H2O; TESLMOR.GPJ-DB-01; 9/16/06

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring DB-2

Sheet 1 of 2

Date(s) Drilled	1/26/06 and 1/27/06	Logged By	J. Blair	Checked By	J. Gwinn
Drilling Method	Direct Push	Drill Bit Size/Type	1-1/2-inch-dia. direct push rod	Total Depth of Borehole	55.0 feet
Drill Rig Type	Geoprobe 6600	Drilling Contractor	Vironex	Approximate Surface Elevation	Not available
Groundwater Level and Date Measured	42 feet bgs ATD (1/26/06)	Sampling Method	Macrocore continuous sampler with 5-foot-long acetate sleeve (soil); slotted PVC pipe via Geoprobe sampler (groundwater)		
Borehole Completion	Cement slurry to ground surface	Comments	Hand augered to 5 feet. Refer to site plan for boring location.		

Elevation, feet	Depth, feet	SAMPLES			MATERIAL DESCRIPTION	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Water Sampling					
0					Concrete 5 inches thick				Hand auger first 5 ft.
5					Moist, light brown, well-graded SAND with GRAVEL (SW), fine to coarse gravel	0.0	0.0		
					Gravel grades finer, trace clay				
10			DB-2-10			0.0	0.0	1410	PID in operator breathing zone (OBZ) = 0.0 ppm
						0.0	0.0		
						0.0	0.0		
15					Moist, light gray, CLAYEY SAND (SC), trace fine gravel	0.0	0.0	1420	
						0.0	0.0		
20			DB-2-20		Moist, light brown, SANDY SILT (ML), fine-grained sand, trace clay	0.0	0.0	1428	OBZ=0.0 ppm
						0.0	0.0		
						0.0	0.0		
25					Moist, light brown, SILTY CLAY (CL), trace fine-grained sand	0.0	0.0	1435	
						0.0	0.0		
						0.0	0.0		
30			DB-2-30		Moist, grayish brown, CLAYEY SAND (SC), trace fine gravel	46.4	0.0	1442	OBZ=0.0 ppm
						654	0.0		

ORION_2S_H2O; TESLVNOR.GPJ+DB-02; 9/16/06

Project: Tesoro - Livermore
 Project Location: 1619 First Street
 Project Number: 01LV

Log of Boring DB-2

Sheet 2 of 2

Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Water Sampling						
30					Moist, grayish brown, CLAYEY SAND (SC), trace fine gravel (continued)	96.1	0.0		
		DB-2-32				2376	0.0	1448	
						1393	0.0		
						714	0.0		
35						390	0.0	1450	
		DB-2-36			Moist, light brown, poorly graded GRAVEL with SILT and SAND (GP-GM), fine gravel	0.0	0.0	1455	
						16.2	0.0		
					Moist, light brown, SANDY SILT (ML), trace fine gravel	7.3	0.0		
40		DB-2-40			Very moist, light brown, SILTY SAND (SM), trace clay	11.1	0.0	1500	
						191	0.0		
						83.4	0.0		
		DB-2-43			Wet, light brown, well-graded SAND with SILT and GRAVEL (SW-SM), fine gravel	505	0.0	1510	
						110	0.0		
45		DB-2-45				263	0.0	1515	Groundwater sample DB-2@45 collected from slotted PVC pipe at 1520 on 1/26/06. Soil sampling terminated at 45 ft on 1/26/06. Sampler pushed to 55 ft to collect groundwater sample. Returned on 1/27/06 to attempt to deepen borehole.
50									
55					Boring drilled to 54.0 feet (refusal) and soil sampled to 45.0 feet. Geoprobe sampler was pushed to 55.0 feet to sample groundwater.				Groundwater sample DB-2@55 collected at 1540 on 1/26/06.
60									
65									

ORION_2S_H2O; TESLMOR.GPJ-DB-02; 9/16/06

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring DB-3

Sheet 1 of 3

Date(s) Drilled	1/26/06	Logged By	J. Blair	Checked By	J. Gwinn
Drilling Method	Direct Push	Drill Bit Size/Type	1-1/2-inch-dia. direct push rod	Total Depth of Borehole	67.0 feet
Drill Rig Type	Geoprobe 6600	Drilling Contractor	Vironex	Approximate Surface Elevation	Not available
Groundwater Level and Date Measured	49 feet bgs ATD (1/26/06)	Sampling Method	Macrocore continuous sampler with 5-foot-long acetate sleeve (soil); slotted PVC pipe via Geoprobe sampler (groundwater)		
Borehole Completion	Cement slurry to ground surface	Comments	Hand augered to 5 feet. Refer to site plan for boring location.		

Elevation, feet	SAMPLES			MATERIAL DESCRIPTION	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Water Sampling					
0				Concrete 5 inches thick				Hand auger first 5 ft.
5				Moist, light brown, well-graded SAND with GRAVEL (SW), fine to coarse gravel	0.0	0.0	0725	
10		DB-3-10		Moist, light brown, well-graded SAND with GRAVEL (SW), fine to coarse gravel	0.3	0.0	0732	PID in operator breathing zone (OBZ) = 0.0 ppm
				With trace clay	0.2	0.0		
				Moist, light gray, CLAYEY SAND (SC), trace fine gravel	0.9	0.0		
15				Moist, light gray, CLAYEY SAND (SC), trace fine gravel	0.0	0.0	0745	
				Moist, light brown, SANDY SILT (ML), fine-grained sand, trace clay	1.0	0.0		
20		DB-3-20		Moist, light brown, SANDY SILT (ML), fine-grained sand, trace clay	1.7	0.0	0800	OBZ=0.0 ppm
				Moist, light brown, SILTY CLAY (CL), trace fine-grained sand	0.8	0.0		
				Moist, grayish brown, CLAYEY SAND (SC), trace fine gravel	4.0	0.0		
25				Moist, grayish brown, CLAYEY SAND (SC), trace fine gravel	3.1	0.0	0820	
					28.0	0.0		
					105	0.0		
30		DB-3-30			776	0.0	0840	OBZ=0.0 ppm

ORION_2S_H2O; TESLVNOR.GPJ+DB-03; 9/16/06

Project: Tesoro - Livermore
 Project Location: 1619 First Street
 Project Number: 01LV

Log of Boring DB-3

Sheet 2 of 3



Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Water Sampling						
30					Moist, grayish brown, CLAYEY SAND (SC), trace fine gravel (continued) Becomes gray, with more gravel	226	0.0		
						334	0.0		
						1345	0.0	0855	
						535	0.0		
						407	0.0	0900	
35						380	0.0		
						1206	0.0	0910	
					Moist, light brown, poorly graded GRAVEL with SILT and SAND (GP-GM), fine gravel, trace orange-brown silt	733	0.0		
						426	0.0	0915	OBZ=0.0 ppm
						1299	0.0		
						1365	0.0	0925	
						781	0.0		
					Becomes very moist	47.1	0.0		
						57.2	0.0	0930	
						193	0.0		
					Wet, light brown, CLAYEY SILT (ML)	311	0.0	0945	OBZ=0.0 ppm
					Wet, light brown, well-graded SAND with SILT and GRAVEL (SW-SM), fine gravel	379	0.0		Groundwater sample DB-3@50 collected from slotted PVC pipe at 0950.
						115	0.0		
						440	0.0		
						380	0.0	1010	
					Wet, grayish brown, CLAYEY GRAVEL (GC), fine to coarse gravel	62.3	0.0	1015	
					Wet, gray, poorly graded GRAVEL with SAND (GP), fine to coarse gravel	780	0.0	1418	
						612	0.0	1120	
65									

ORION_2S_H2O; TESLVMOR.GPJ-DB-03; 9/16/06

Project: Tesoro - Livermore
 Project Location: 1619 First Street
 Project Number: 01LV

Log of Boring DB-3

Sheet 3 of 3

Elevation, feet	SAMPLES				MATERIAL DESCRIPTION	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Water Sampling	Graphic Log					
65		DB-3-66			Wet, gray, poorly graded GRAVEL with SAND (GP) (continued)	696	0.0	1150	
70					Boring was drilled and soil sampled to 66.0 feet. Geoprobe sampler was pushed to 67.0 feet to sample groundwater.				Groundwater sample attempted with Geoprobe sampler at 67 ft; no water produced after 50 minutes.
75									
80									
85									
90									
95									
100									

ORION_2S_H2O; TESLVMOR.GPJ-DB-03; 9/16/06

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring DB-4

Sheet 1 of 2

Date(s) Drilled	1/25/06	Logged By	J. Blair	Checked By	J. Gwinn
Drilling Method	Direct Push	Drill Bit Size/Type	1-1/2-inch-dia. direct push rod	Total Depth of Borehole	63.0 feet
Drill Rig Type	Geoprobe 6600	Drilling Contractor	Vironex	Approximate Surface Elevation	Not available
Groundwater Level and Date Measured	46.5 feet bgs ATD (1/25/06)	Sampling Method	Macrocore continuous sampler with 5-foot-long acetate sleeve (soil); slotted PVC pipe via Geoprobe sampler (groundwater)		
Borehole Completion	Cement slurry to ground surface	Comments	Hand augered to 5 feet. Refer to site plan for boring location.		

Elevation, feet	Depth, feet	SAMPLES		Graphic Log	MATERIAL DESCRIPTION	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number						
0					Concrete 5 inches thick			0800	Hand auger first 5 ft.
5					Moist, light brown, well-graded SAND with GRAVEL (SW), fine to coarse gravel				
10			DB-4-10		Grades with more fine-grained sand, trace silt	0.0	0.0	0855	PID in operator breathing zone (OBZ) = 0.0 ppm
15					Moist, light gray, CLAYEY SAND (SC), trace fine gravel, trace orange-brown silt	0.1	0.0	0858	
20			DB-4-20		Becomes light grayish brown	0.0	0.0	0901	OBZ=0.0 ppm
25					Moist, light brown, SANDY SILT (ML), fine-grained sand, trace clay	0.0	0.0	0910	
					Moist, light brown, SILTY CLAY (CL), trace fine-grained sand	0.8	0.0		
30			DB-4-30		Moist, grayish brown, CLAYEY SAND (SC), trace fine gravel, trace orange-brown silt	10.1	0.0	0920	OBZ=0.0 ppm
						121	0.0		

ORION_2S_H2O: TESLVNOR.GPJ+DB-04: 9/16/06

Project: Tesoro - Livermore
Project Location: 1619 First Street
Project Number: 01LV

Log of Boring DB-4

Sheet 2 of 2

Elevation, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Water Sampling						
30					Moist, grayish brown, CLAYEY SAND (SC), trace fine gravel, trace orange-brown silt (continued)	132	0.0		
	DB-4-32				Grades with more silt and gravel	194	0.0	0925	
						65.1	0.0		
					Moist, light brown, poorly graded GRAVEL with SILT and SAND (GP-GM), fine gravel	8.3	0.0		
35						3.8	0.0	0930	
	DB-4-37				Moist, light brown, SANDY SILT (ML), trace fine gravel	435	0.0	0940	
					Very moist, light brown, SILTY SAND (SM), trace clay	54.5	0.0		
40	DB-4-40					13.5	0.0	0945	OBZ=0.0 ppm
	DB-4-42					520	0.0		
					Moist, light brown, well-graded SAND with SILT and GRAVEL (SW-SM), fine gravel	8.8	0.0	1000	
45						33.4	0.0		
					Becomes wet	0.6	0.0		
						1.8	0.0	1005	
						6.0	0.0		
50	DB-4-50				Wet, light brown, CLAYEY SILT (ML)	7.5	0.0	1025	OBZ=0.0 ppm
					Wet, light brown, well-graded SAND with SILT and GRAVEL (SW-SM), fine gravel	12.6	0.0		Groundwater sample DB-4@50 collected from slotted PVC pipe at 1040.
						18.3	0.0		
55	DB-4-55					327	0.0	1100	
						58.8	0.0		
						1.7	0.0		
60	DB-4-60					20.8	0.0	1150	OBZ=0.0 ppm
						4.0	0.0		
						0.3	0.0	1230	
					Boring was terminated at 63.0 feet (refusal)				
65									

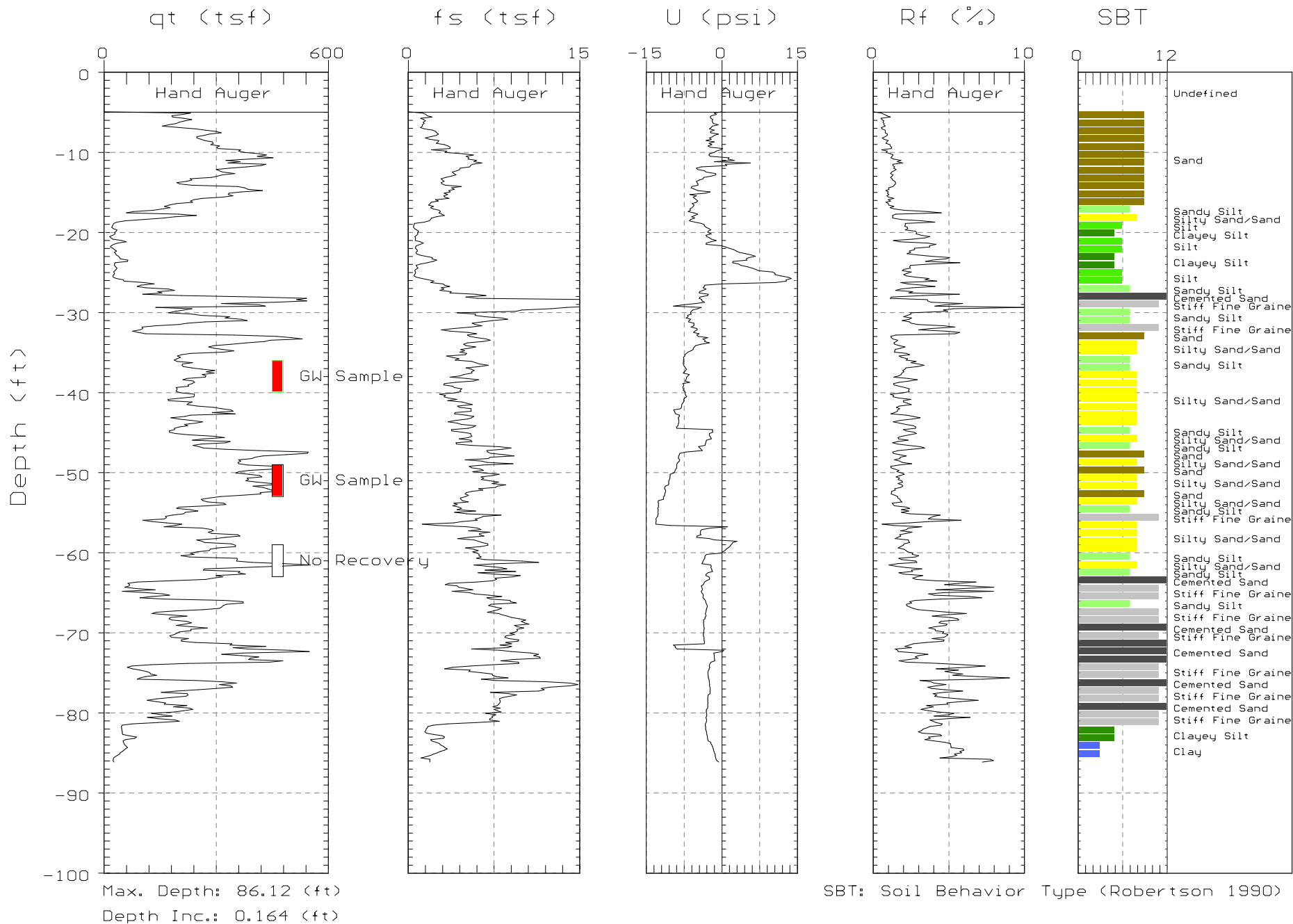
ORION_2S_H2O; TESLMOR.GPJ-DB-04; 9/16/06

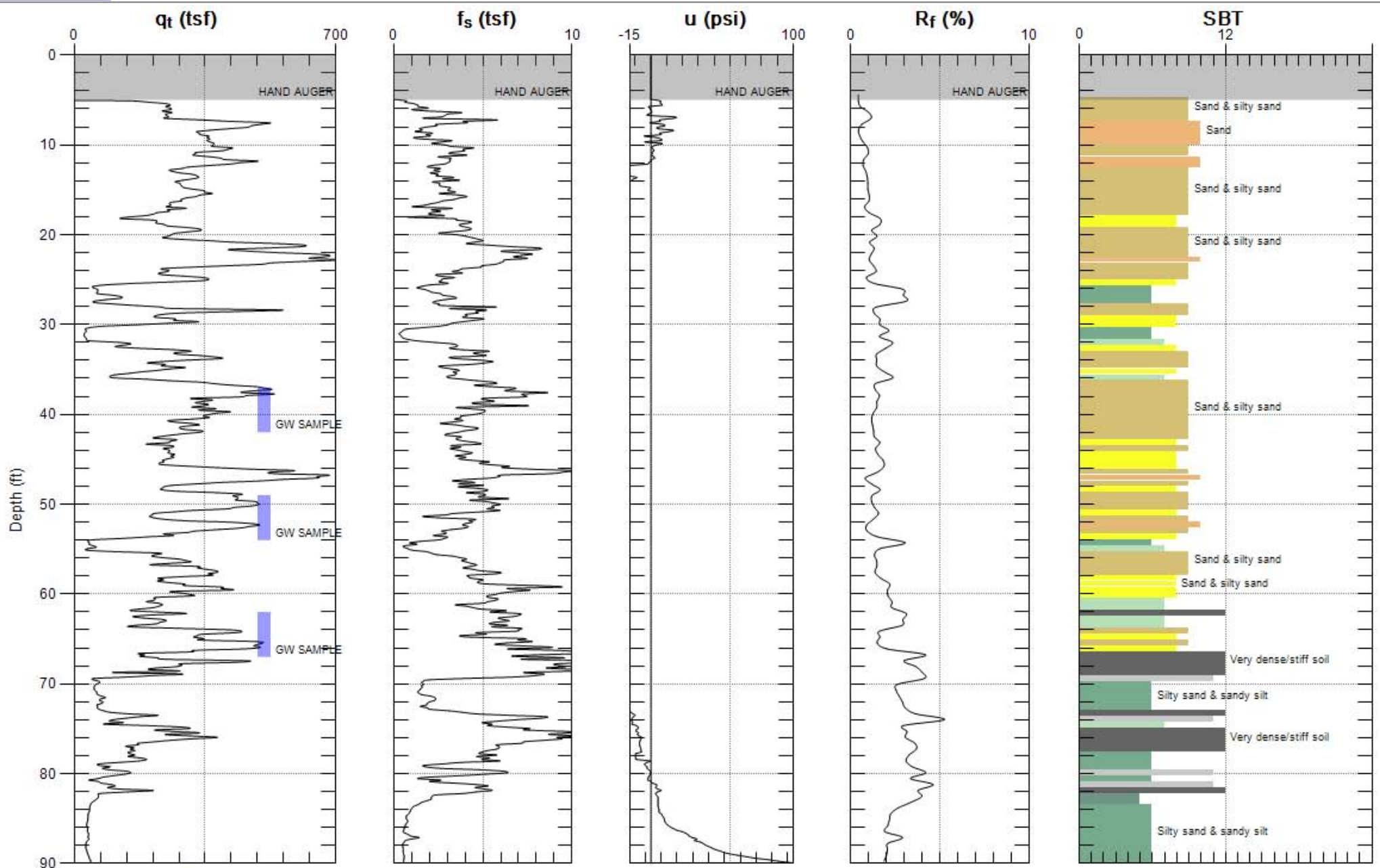


ORION

Site: 1619 FIRST ST.
Location: CPT-DB-6

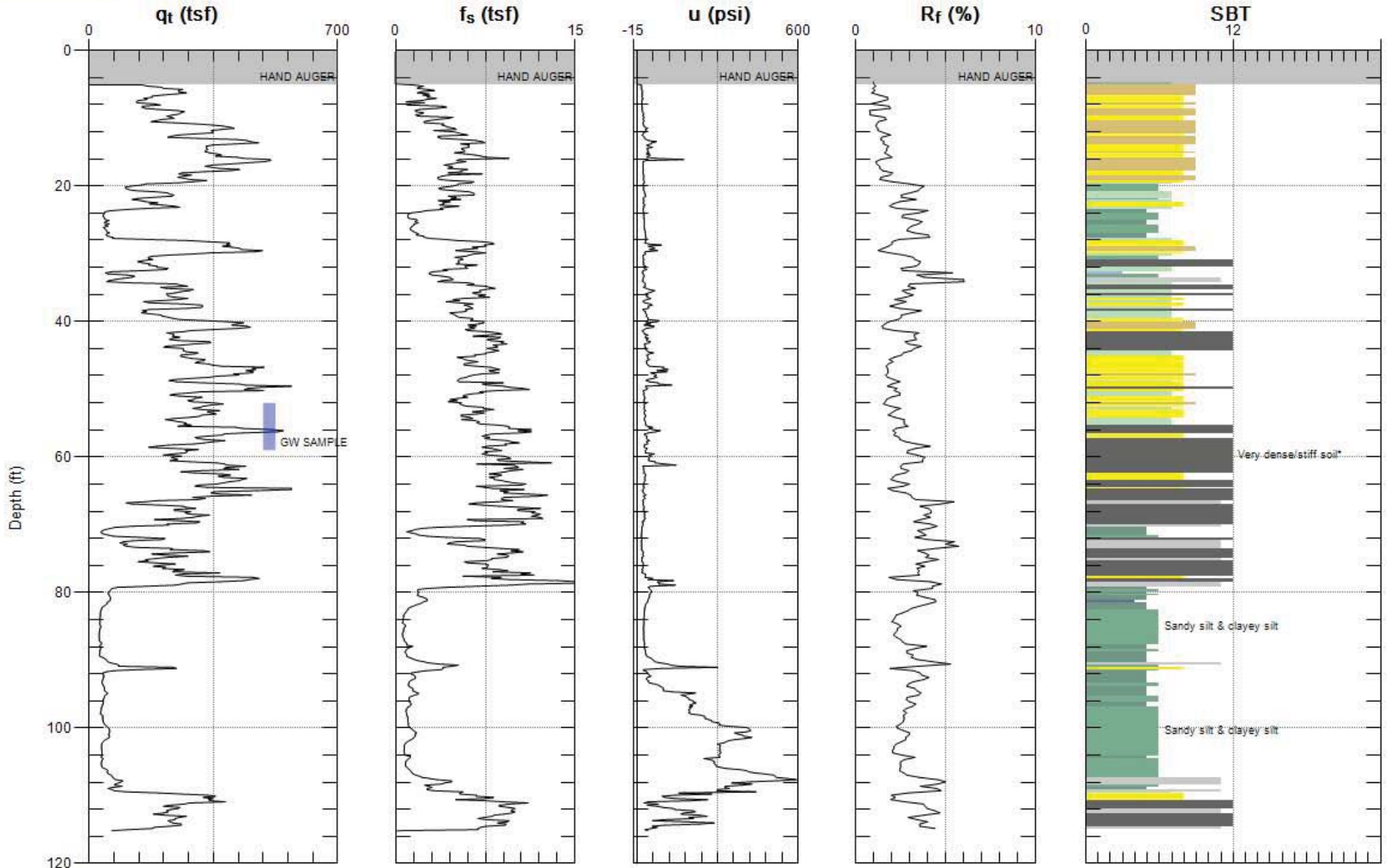
Engineer: M. PURCHASE
Date: 02:03:06 14:11





Max. Depth: 90.060 (ft)
Avg. Interval: 0.656 (ft)

SBT: Soil Behavior Type (Robertson 1990)



Max. Depth: 115.157 (ft)
Avg. Interval: 0.328 (ft)

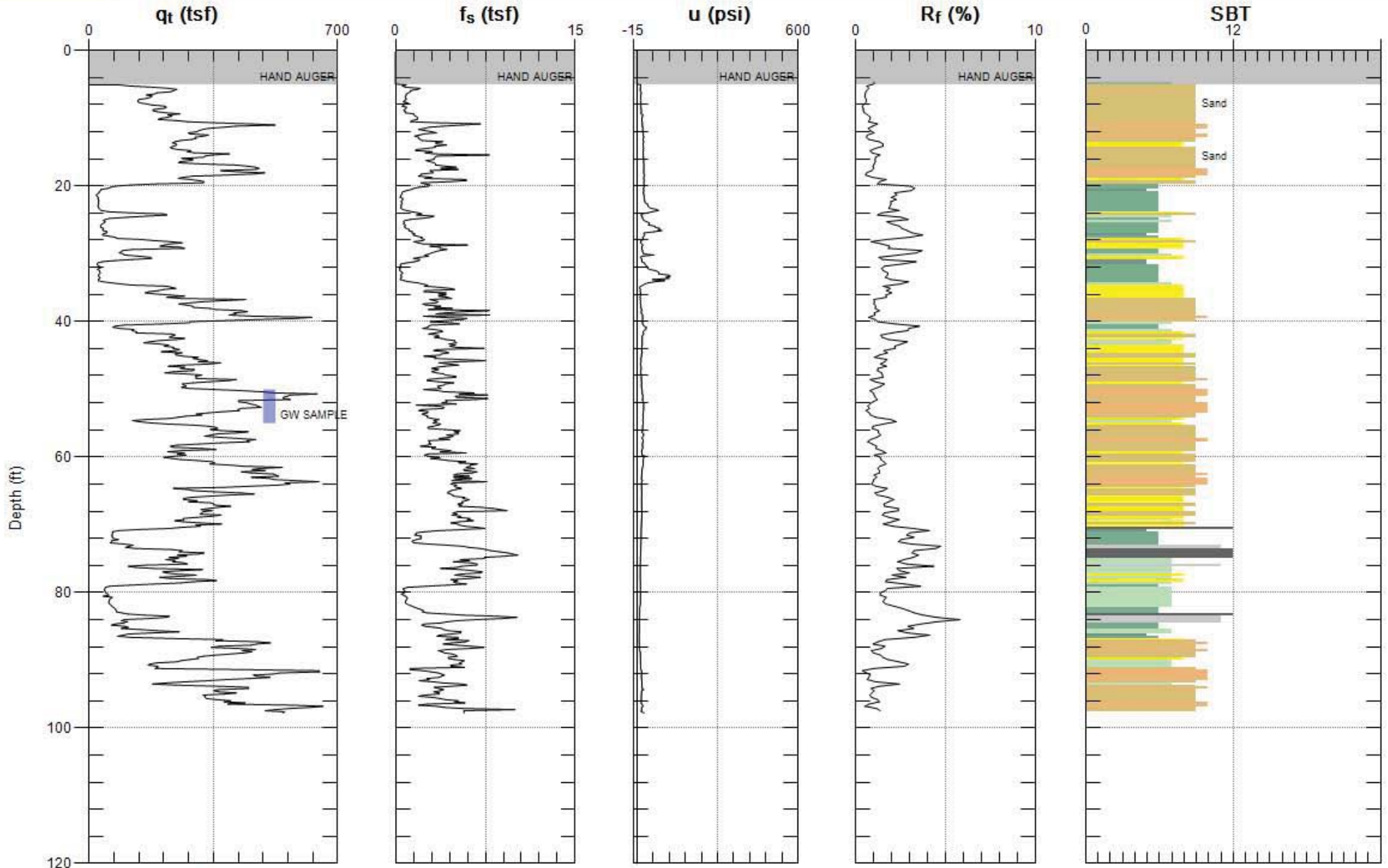
SBT: Soil Behavior Type (Robertson 1990)



ORION ENVIRONMENTAL

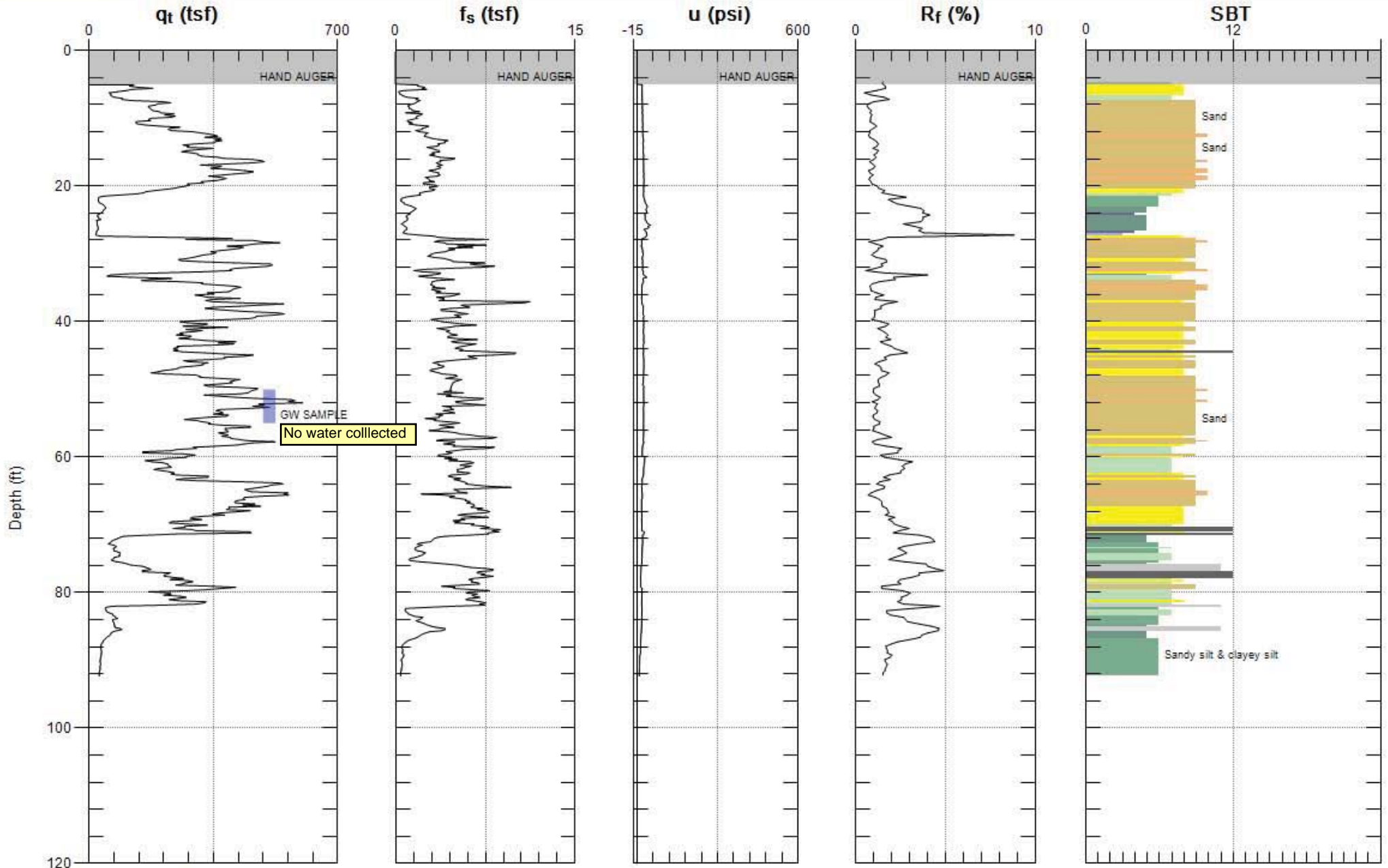
Site: TESORO LIVERMORE
Sounding: DB-09

Engineer: M.PURCHASE
Date: 6/4/2012 01:55



Max. Depth: 97.769 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)



Max. Depth: 92.356 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

APPENDIX B
HISTORICAL SOIL ANALYTICAL RESULTS

TANK REMOVAL REPORT

Beacon Service Station No. 604

1619 West First Street

Livermore, California

Delta Project No. 40-89-095

Page 7

TABLE 1

TANK EXCAVATION
Soil Sample Analytical Results
Concentrations in parts per million (ppm)

<u>Sample</u>	<u>Depth of Sample (ft)</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl-benzene</u>	<u>Xylenes</u>	<u>TPH (gasoline)</u>	<u>Total Lead</u>	<u>pH</u>
Unleaded plus-East	14	<0.005	<0.005	<0.005	<0.005	<0.050	NA	NA
Unleaded plus-West	14	<0.50	<0.50	0.58	17	600	6.5	NA
	16	<0.005	<0.005	<0.005	0.0066	<0.50	NA	NA
Unleaded-East	14	<0.005	<0.005	<0.005	<0.005	<0.50	NA	NA
Unleaded-West	14	<0.50	0.91	18	170	1,800	5.6	NA
	19	<5.0	160	110	700	4,700	NA	NA
Unleaded-SW	27	1.4	22	9.3	70	490	NA	7.1
Premium Unleaded-East	14	<0.005	<0.005	<0.005	<0.005	<0.50	NA	NA
Premium Unleaded-West	14	<0.005	<0.005	<0.005	<0.005	<0.50	NA	NA

NA = Not analyzed.

BQ001713

TABLE 2

PRODUCT LINE
Soil Sample Analytical Results
Concentrations in parts per million (ppm)

<u>Sample</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl- benzene</u>	<u>Xylenes</u>	<u>TPH(g)</u>
Product Line #1	<0.005	<0.005	<0.005	<0.005	<0.50
Product Line #2	<0.005	<0.005	<0.005	<0.005	<0.50
Product Line #3	<0.005	<0.005	<0.005	0.008	<0.50
Product Line #4	<0.005	0.029	0.041	1.2	4.4
Product Line #5	<0.005	<0.005	<0.005	0.10	2.7

TANK REMOVAL REPORT

Beacon Service Station No. 604
1619 West First Street
Livermore, California
Delta Project No. 40-89-095
Page 9

TABLE 3

SEMI-VOLATILE ORGANIC PRIORITY POLLUTANTS
EPA Method 8270
Soil Sample Analytical Results
Concentrations in parts per million (ppm)

Sample Location: Unleaded Tank SW
Depth of Sample: 27 Feet

<u>Parameter</u>	<u>Measured Value</u>
Acenaphthene	< 0.10
Acenaphthylene	< 0.10
Anthracene	< 0.10
Benzo (a) anthracene	< 0.10
Benzo (b) fluoranthene	< 0.10
Benzo (k) fluoranthene	< 0.10
Benzo (a) pyrene	< 0.10
Benzo (ghi) perylene	< 0.10
Benzyl butyl phthalate	< 0.10
bis (2-chloroethyl) ether	< 0.10
bis (2-chloroethoxy) methane	< 0.10
bis (2-ethylhexyl) phthalate	< 0.20
bis (2-chloroisopropyl) ether	< 0.10
4-Bromophenyl phenyl ether	< 0.10
2-Chloronaphthalene	< 0.10
4-Chlorophenyl phenyl ether	< 0.10
Chrysene	< 0.10
Dibenzo (ah) anthracene	< 0.10
Di-n-butyl phthalate	< 0.10
Di-n-octyl phthalate	< 0.10
1,3-Dichlorobenzene	< 0.10
1,2-Dichlorobenzene	< 0.10
1,4-Dichlorobenzene	< 0.10
3,3-Dichlorobenzidine	< 0.10
Diethyl phthalate	< 0.10
Dimethyl phthalate	< 0.10
2,4-Dinitrotoluene	< 0.10
2,6-Dinitrotoluene	< 0.10
Fluoranthene	< 0.10
Fluorene	< 0.10
Hexachlorobenzene	< 0.10
Hexachlorobutadiene	< 0.10
Hexachloroethane	< 0.10
Indeno (123-cd) pyrene	< 0.10
Isophorone	< 0.10

BQ001715

RPT046.TA

TABLE 3-Continued

SEMI-VOLATILE ORGANIC PRIORITY POLLUTANTS
EPA Method 8270
Soil Sample Analytical Results
Concentrations in parts per million (ppm)

Sample Location: Unleaded Tank SW
Depth of Sample: 27 Feet

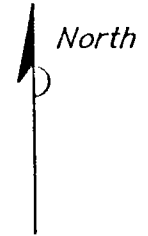
<u>Parameter</u>	<u>Measured Value</u>
Naphthalene	13
Nitrobenzene	<0.10
n-Nitrosodi-n-propylamine	<0.10
Phenanthrene	<0.10
Pyrene	<0.10
1,2,4-Trichlorobenzene	<0.10
Benzidine	<0.10
Hexachlorocyclopentadiene	<0.10
n-Nitrosodimethylamine	<0.10
n-Nitrosodiphenylamine	<0.10
4-Chloro-3-methylphenol	<0.10
2-Chlorophenol	<0.10
2,4-Dichlorophenol	<0.10
2,4-Dimethylphenol	<0.10
2,4-Dinitrophenol	<0.10
2-Methyl-4,6-dinitrophenol	<0.10
2-Nitrophenol	<0.10
4-Nitrophenol	<0.10
Pentachlorophenol	<0.10
Phenol	<0.10
2,4,6-Trichlorophenol	<0.10

TABLE 4
HALOGENATED VOLATILE ORGANICS
 EPA Method 8010
 Soil Sample Analytical Results
 Concentrations in parts per million (ppm)

Sample Location: Unleaded Tank SW
 Depth of Sample: 27 Feet

<u>Parameter</u>	<u>Measured Value</u>
Chloromethane	<0.005
Chloroethane	<0.005
Vinyl Chloride	<0.005
Bromomethane	<0.005
Trichlorofluoromethane	<0.005
1,1-Dichloroethene	<0.001
Dichloromethane	<0.005
t-1,2-Dichloroethene	<0.001
1,1-Dichloroethane	<0.001
Chloroform	<0.001
1,1,1-Trichloroethane	<0.001
1,2-Dichloroethane	<0.001
Carbon Tetrachloride	<0.001
1,2-Dichloropropane	<0.001
Trichloroethene	<0.001
Bromodichloromethane	<0.001
c-1,2-Dichloroethene	<0.001
c-1,3-Dichloropropene	<0.001
t-1,3-Dichloropropene	<0.001
1,1,2-Trichloroethane	<0.001
Tetrachloroethene	<0.001
Dibromochloromethane	<0.001
Chlorobenzene	<0.001
Bromoform	<0.001
1,1,2,2-Tetrachloroethane	<0.001
1,4-Dichlorobenzene	<0.001
1,3-Dichlorobenzene	<0.001
1,2-Dichlorobenzene	<0.001

FIRST STREET

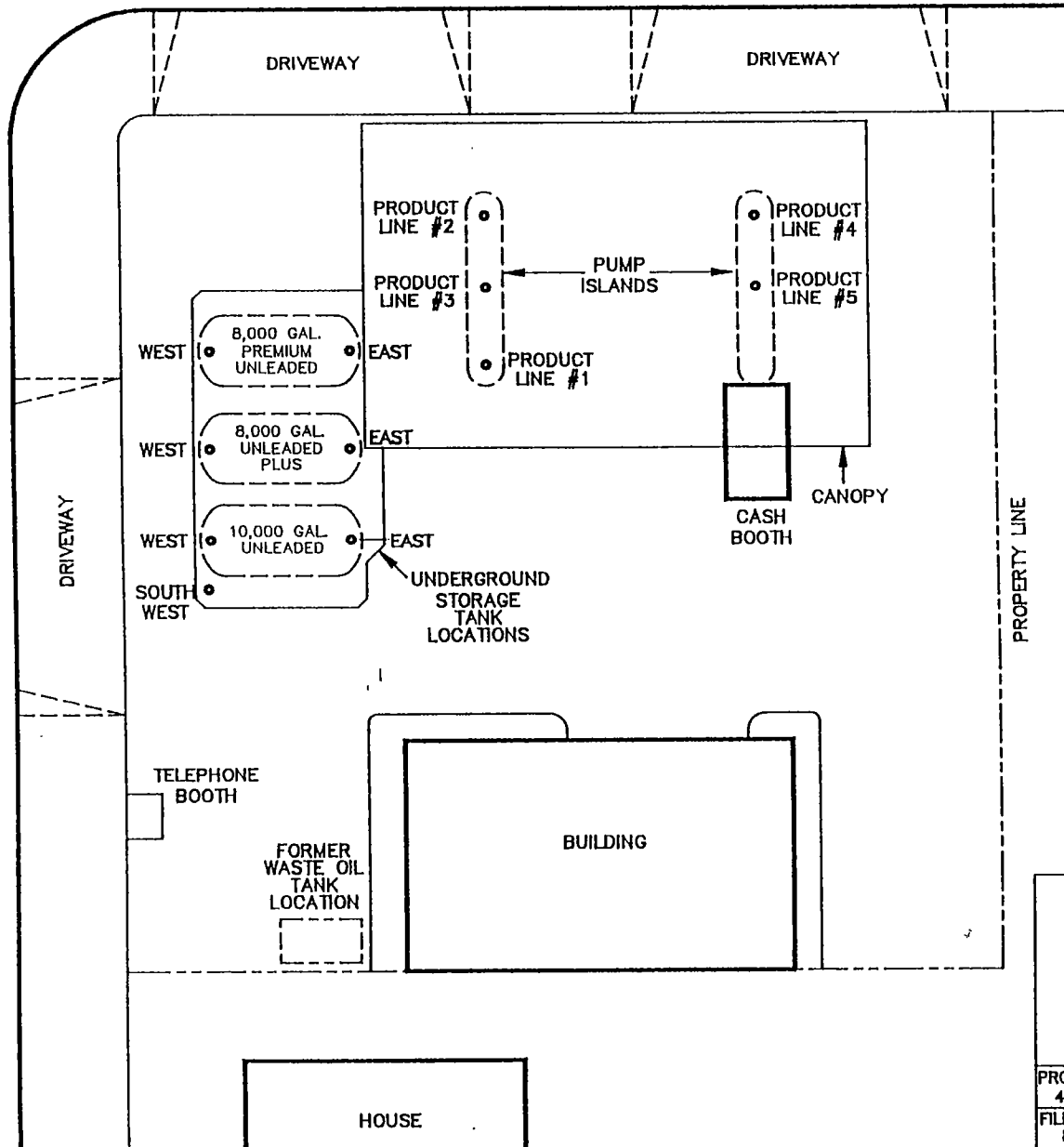


DRIVEWAY

DRIVEWAY

LEGEND:

• SOIL SAMPLE LOCATION



SCALE (APPROX. ONLY)

FIGURE 3
 SOIL SAMPLE LOCATION MAP
 BEACON STATION NO 604
 1619 WEST FIRST STREET
 LIVERMORE, CA.

PROJECT NO. 40-89-095	DRAWN BY I.H. 1/28/93
FILE NO. 89-095-1	PREPARED BY SWG
REVISION NO. 2	REVIEWED BY



Delta Environmental Consultants, Inc.

BQ001724

TABLE 5

SOIL ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Boring	Depth (feet)	Sample Date	TPHg ^(a) (mg/kg)	Benzene ^(b) (µg/kg)	Toluene ^(b) (µg/kg)	Ethylbenzene ^(b) (µg/kg)	Xylenes ^(b) (µg/kg)	MTBE ^(b) (µg/kg)	DIPE ^(b) (µg/kg)	ETBE ^(b) (µg/kg)	TAME ^(b) (µg/kg)	TBA ^(b) (µg/kg)	Methanol ^(b) (µg/kg)	Ethanol ^(b) (µg/kg)	1,2-DCA ^(b) (µg/kg)	EDB ^(b) (µg/kg)	
DB-1	10	01/27/06	ND<1 ^(c)	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<200	ND<10	ND<5	ND<5	
	20	01/27/06	ND<1	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<200	ND<10	ND<5	ND<5	
	27	01/27/06	ND<1	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<200	ND<10	ND<5	ND<5	
	30	01/27/06	ND<1	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<200	ND<10	ND<5	ND<5	
	34	01/27/06	ND<1	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	7.7	ND<200	ND<10	ND<5	ND<5	
	37	01/27/06	ND<1	ND<5	ND<5	ND<5	ND<5	ND<5	17	ND<5	ND<5	ND<5	23	ND<200	ND<10	ND<5	ND<5
	40	01/27/06	18	ND<5	ND<5	7.3	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<15	ND<250	ND<25	ND<5	ND<5
	43	01/27/06	100	27	ND<5	710	1,000	80	ND<5	ND<5	ND<5	50	ND<500	ND<50	ND<5	ND<5	
	45	01/27/06	81	180	67	2,500	5,800	46	ND<5	ND<5	ND<5	30	ND<500	ND<100	ND<5	ND<5	
	48	01/27/06	140	3,100	170	4,800	22,000	52	ND<25	ND<25	ND<25	ND<150	ND<2,500	ND<500	ND<25	ND<25	
	50	01/27/06	12	360	11	240	230	50	ND<5	ND<5	ND<5	ND<15	ND<250	ND<25	ND<5	ND<5	
	52	01/27/06	68	56	ND<25	440	560	110	ND<25	ND<25	ND<25	ND<150	ND<2,500	ND<250	ND<25	ND<25	
	57	01/27/06	9.6	9.9	ND<5	ND<25	34	21	ND<5	ND<5	ND<5	ND<25	ND<500	ND<50	ND<5	ND<5	
DB-2	10	01/26/06	ND<1	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<200	ND<10	ND<5	ND<5	
	20	01/26/06	ND<1	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<200	ND<10	ND<5	ND<5	
	30	01/26/06	31	ND<5	ND<5	100	190	370	ND<5	ND<5	ND<5	200	ND<200	ND<10	ND<5	ND<5	
	32	01/26/06	ND<1	ND<5	ND<5	ND<5	ND<5	240	ND<5	ND<5	ND<5	590	ND<200	ND<10	ND<5	ND<5	
	36	01/26/06	ND<1	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<200	ND<10	ND<5	ND<5	
	40	01/26/06	2.6	7.4	ND<5	44	14	740	ND<5	ND<5	5.2	110 J ^(d)	ND<200	ND<50	ND<5	ND<5	
	43	01/26/06	20	130	55	400	410	1,700	ND<5	ND<5	29	600 J	ND<800	ND<25	ND<5	ND<5	
	45	01/26/06	9.9	12	7.2	59	210	1,200	ND<5	ND<5	10	530	ND<500	ND<80	ND<5	ND<5	
DB-3	10	01/26/06	ND<1	ND<5	ND<5	ND<5	ND<5	5.6	ND<5	ND<5	ND<5	ND<5	ND<200	ND<10	ND<5	ND<5	
	20	01/26/06	ND<1	ND<5	ND<5	ND<5	ND<5	18	ND<5	ND<5	ND<5	ND<5	ND<200	ND<10	ND<5	ND<5	
	30	01/26/06	23	8.2	ND<5	150	770	1,500	ND<5	ND<5	24	1,500	ND<2,500	ND<25	ND<5	ND<5	
	33	01/26/06	13	15	28	100	600	2,900	ND<5	ND<5	19	480 J	ND<2,000	ND<25	ND<5	ND<5	
	37	01/26/06	56	26	6.2	63	69	1,400	ND<5	ND<5	17	580	ND<300	ND<30	ND<5	ND<5	
	40	01/26/06	19	ND<5	ND<5	41	12	620	ND<5	ND<5	ND<5	92 J	ND<250	ND<25	ND<5	ND<5	
	42	01/26/06	3.4	ND<5	ND<5	130	410	1,100	ND<5	ND<5	11	1,700	ND<1,000	ND<50	ND<5	ND<5	
	45	01/26/06	ND<1	ND<5	ND<5	12	11	160	ND<5	ND<5	ND<5	100	ND<200	ND<20	ND<5	ND<5	
	50	01/26/06	ND<1	ND<5	ND<5	ND<5	ND<5	88	ND<5	ND<5	ND<5	15 J	ND<200	ND<10	ND<5	ND<5	
	55	01/26/06	12	9.4	ND<5	60	15	32	ND<5	ND<5	ND<5	ND<15	ND<250	ND<25	ND<5	ND<5	
	58	01/26/06	ND<1	ND<5	ND<5	ND<5	ND<5	14	ND<5	ND<5	ND<5	5.5	ND<200	ND<10	ND<5	ND<5	
	63	01/26/06	38	11	5.4	88	150	1,100	ND<5	ND<5	6.4	300 J	ND<500	ND<50	ND<5	ND<5	
66	01/26/06	120	32	32	660	910	370	ND<25	ND<25	ND<25	ND<150	ND<2,500	ND<250	ND<25	ND<25		

TABLE 5

SOIL ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Boring	Depth (feet)	Sample Date	TPHg ^(a) (mg/kg)	Benzene ^(b) (µg/kg)	Toluene ^(b) (µg/kg)	Ethylbenzene ^(b) (µg/kg)	Xylenes ^(b) (µg/kg)	MTBE ^(b) (µg/kg)	DIPE ^(b) (µg/kg)	ETBE ^(b) (µg/kg)	TAME ^(b) (µg/kg)	TBA ^(b) (µg/kg)	Methanol ^(b) (µg/kg)	Ethanol ^(b) (µg/kg)	1,2-DCA ^(b) (µg/kg)	EDB ^(b) (µg/kg)
DB-4	10	01/25/06	ND<1	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<200	ND<10	ND<5	ND<5
	20	01/25/06	ND<1	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<200	ND<10	ND<5	ND<5
	30	01/25/06	5.2	13	ND<5	44	150	820	ND<5	ND<5	28	870 J	ND<250	ND<25	ND<5	ND<5
	32	01/25/06	ND<1	ND<5	ND<5	ND<5	6.5	150	ND<5	ND<5	ND<5	24 J	ND<200	ND<10	ND<5	ND<5
	37	01/25/06	ND<1	ND<5	ND<5	ND<5	20	980	ND<5	ND<5	17	550 J	ND<250	ND<25	ND<5	ND<5
	40	01/25/06	ND<1	ND<5	ND<5	ND<5	ND<5	49	ND<5	ND<5	ND<5	16	ND<200	ND<10	ND<5	ND<5
	42	01/25/06	20	ND<5	6.3	44	240	1,000	ND<5	ND<5	15	440 J	ND<800	ND<10	ND<5	ND<5
	50	01/25/06	ND<1	ND<5	ND<5	ND<5	ND<5	28	ND<5	ND<5	ND<5	ND<5	ND<200	ND<10	ND<5	ND<5
	55	01/25/06	4.2	ND<5	ND<5	ND<5	ND<5	29	ND<5	ND<5	ND<5	14	ND<200	13	ND<5	ND<5
60	01/25/06	4.1	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<200	ND<10	ND<5	ND<5	
DB-5	90	02/03/06	1.5	17	18	59	220	ND<5	ND<5	ND<5	ND<5	ND<5	ND<200	ND<10	ND<5	ND<5
B-4	20	6/1/93	ND<1	ND<5	ND<5	ND<5	20	-(e)	-	-	-	-	-	-	-	-
	25	6/1/93	16	ND<50	270	180	1,700	-	-	-	-	-	-	-	-	-
	30	6/1/93	ND<1	170	44	13	57	-	-	-	-	-	-	-	-	-
	35	6/1/93	55	73	110	300	650	-	-	-	-	-	-	-	-	-
VW-1	30	5/27/93	280	ND<500	4,300	2,600	17,000	-	-	-	-	-	-	-	-	-
	35	5/27/93	11	200	450	110	560	-	-	-	-	-	-	-	-	-
	40	5/27/93	340	1,800	16,000	5,300	32,000	-	-	-	-	-	-	-	-	-
VW-2	20	5/28/93	200	ND<500	4,000	4,000	25,000	-	-	-	-	-	-	-	-	-
	30	5/28/93	3.5	18	150	44	230	-	-	-	-	-	-	-	-	-
	35	5/28/93	ND<1	21	24	8.6	56	-	-	-	-	-	-	-	-	-
VW-3	20	6/1/93	ND<1	ND<5	ND<5	ND<5	ND<5	-	-	-	-	-	-	-	-	-
	25	6/1/93	ND<1	17	ND<5	ND<5	ND<5	-	-	-	-	-	-	-	-	-
	30	6/1/93	ND<1	ND<5	ND<5	ND<5	ND<5	-	-	-	-	-	-	-	-	-
	35	6/1/93	ND<1	ND<5	ND<5	ND<5	ND<5	-	-	-	-	-	-	-	-	-
MW-1	25	5/27/93	ND<1	ND<5	ND<5	ND<5	ND<5	-	-	-	-	-	-	-	-	-
	30	5/27/93	ND<1	ND<5	ND<5	ND<5	ND<5	-	-	-	-	-	-	-	-	-
	35	5/27/93	ND<1	29	15	5.1	31	-	-	-	-	-	-	-	-	-
MW-2	20	5/27/93	6.4	ND<5	ND<5	ND<5	37	-	-	-	-	-	-	-	-	-
	25	5/27/93	1.5	57	99	26	220	-	-	-	-	-	-	-	-	-
	30	5/27/93	ND<1	40	65	7.0	51	-	-	-	-	-	-	-	-	-
	35	5/27/93	ND<1	ND<5	ND<5	ND<5	ND<5	-	-	-	-	-	-	-	-	-
MW-3	25	5/28/93	ND<1	ND<5	ND<5	ND<5	ND<5	-	-	-	-	-	-	-	-	-
	30	5/28/93	ND<1	ND<5	ND<5	ND<5	ND<5	-	-	-	-	-	-	-	-	-
	35	5/28/93	ND<1	ND<5	ND<5	ND<5	ND<5	-	-	-	-	-	-	-	-	-
MW-4	30	3/30/94	ND<1	ND<5	ND<5	ND<5	ND<5	-	-	-	-	-	-	-	-	-
	35	3/30/94	ND<1	ND<5	ND<5	ND<5	ND<5	-	-	-	-	-	-	-	-	-

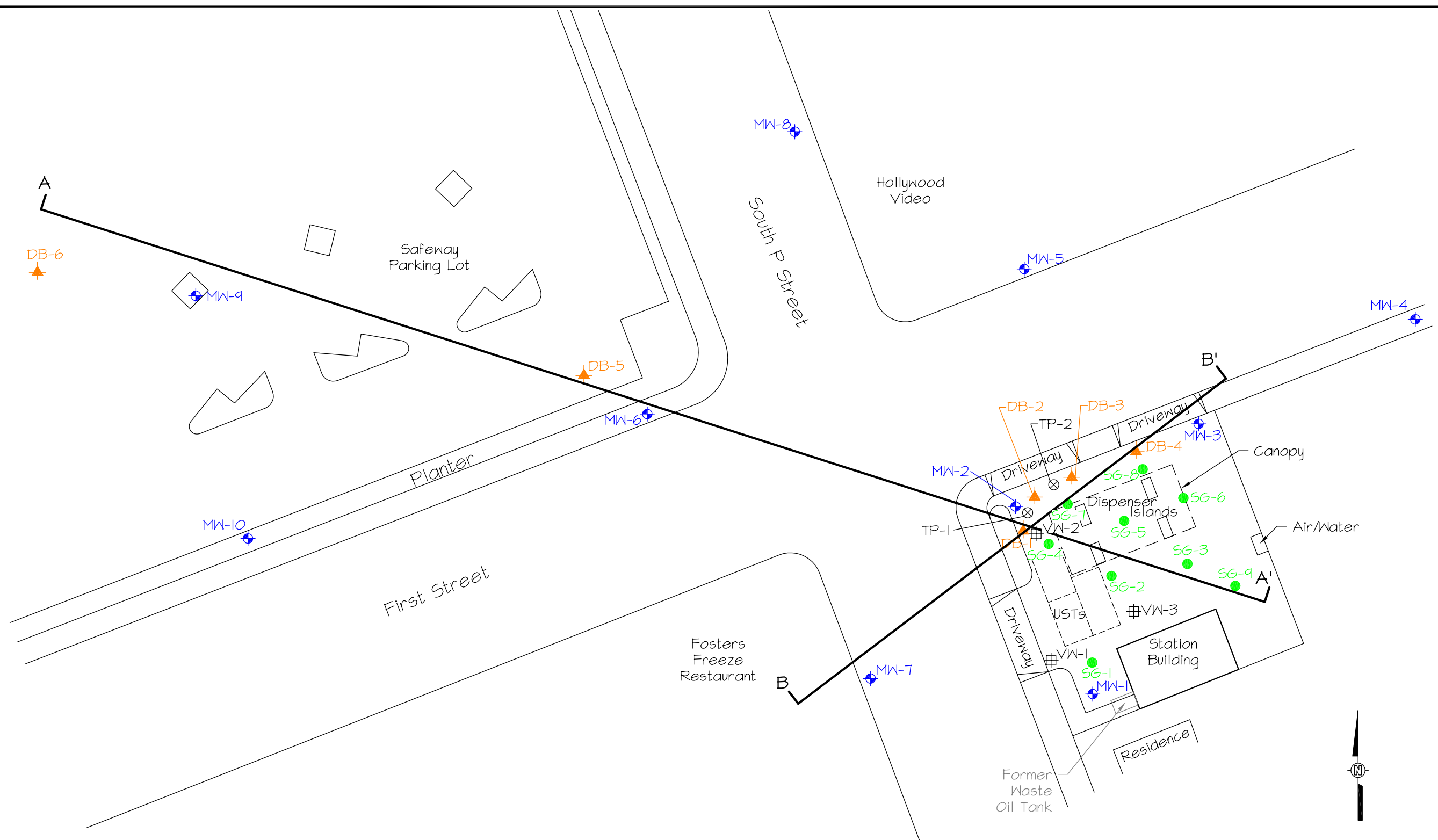
TABLE 5

SOIL ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

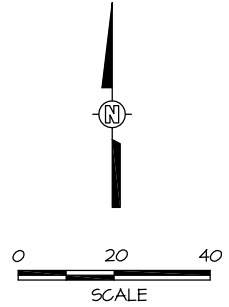
Boring	Depth (feet)	Sample Date	TPHg ^(a) (mg/kg)	Benzene ^(b) (µg/kg)	Toluene ^(b) (µg/kg)	Ethylbenzene ^(b) (µg/kg)	Xylenes ^(b) (µg/kg)	MTBE ^(b) (µg/kg)	DIPE ^(b) (µg/kg)	ETBE ^(b) (µg/kg)	TAME ^(b) (µg/kg)	TBA ^(b) (µg/kg)	Methanol ^(b) (µg/kg)	Ethanol ^(b) (µg/kg)	1,2-DCA ^(b) (µg/kg)	EDB ^(b) (µg/kg)
MW-5	30	3/29/94	ND<1	ND<5	ND<5	ND<5	ND<5	-	-	-	-	-	-	-	-	-
	35	3/29/94	ND<1	ND<5	ND<5	ND<5	ND<5	-	-	-	-	-	-	-	-	-
MW-6	30	3/29/94	42	650	1,700	720	4,600	-	-	-	-	-	-	-	-	-
	35	3/29/94	3.7	61	160	94	550	-	-	-	-	-	-	-	-	-
MW-7	20	3/30/94	ND<1	ND<5	ND<5	ND<5	ND<5	-	-	-	-	-	-	-	-	-
	35	3/30/94	4.9	16	13	25	48	-	-	-	-	-	-	-	-	-
	40	3/30/94	8.8	64	29	65	390	-	-	-	-	-	-	-	-	-
MW-8	6	9/2/03	ND<1	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	-	-	-	-
	30	9/2/03	ND<1	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	-	-	-	-
MW-9	10	9/2/03	ND<1	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	-	-	-	-
	30	9/2/03	ND<1	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	-	-	-	-
MW-10	5	9/2/03	ND<1	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	-	-	-	-
	30	9/2/03	ND<1	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	-	-	-	-
TP-1	10	6/23/05	ND<1	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	-	-	ND<5	ND<5
	20	6/23/05	ND<1	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	-	-	ND<5	ND<5
	30	6/23/05	ND<1	ND<5	ND<5	ND<5	ND<5	12	ND<5	ND<5	ND<5	7.3	-	-	ND<5	ND<5
	40	6/23/05	5,800	35,000	210,000	110,000	480,000	ND<250	ND<250	ND<250	ND<250	ND<7,000	-	-	ND<250	ND<250
TP-2	10	6/23/05	ND<1	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	-	-	ND<5	ND<5
	20	6/23/05	ND<1	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	-	-	ND<5	ND<5
	30	6/23/05	15	54	23	220	420	2,200	ND<5	ND<5	39	1,000 ^(e)	-	-	ND<5	ND<5
	35	6/23/05	9.8	200	ND<25	250	320	4,200	ND<25	ND<25	ND<25	440 ^(e)	-	-	ND<25	ND<25
ESL			100	44	2,900	3,300	2,300	23	NE	NE	NE	73	NE	45,000	4.5	0.33

- (a) Total petroleum hydrocarbons as gasoline (TPHg) analyzed by EPA Method 8260; reported in milligrams per kilogram (mg/kg).
- (b) Benzene, toluene, ethylbenzene, xylenes, methyl tert-butyl ether (MTBE), di-isopropyl ether (DIPE), ethyl tert-butyl ether (ETBE), tert-amyl methyl ether (TAME), tert-butyl alcohol (TBA), 1,2-dichloroethane (1,2-DCA), 1,2-dibromoethane (EDB), methanol, and ethanol analyzed by EPA Method 8260; reported in micrograms per kilogram (µg/kg).
- (c) ND - Not detected at detection limit listed.
- (d) TBA results may be biased slightly high. A fraction of MTBE (typically less than 5 percent) converts to TBA during the analysis of water samples. This conversion effect is considered to be mathematically significant in samples that contain MTBE/TBA ratios of over 3:1.
- (e) "-" Not analyzed.

5/5/2006 1:15 PM 01LVB30401.dwg



- Legend
- SG-1 ● Soil Gas Sampling Location
 - DB-1 ▲ Soil Boring and Grab Groundwater Sampling Location
 - MW-7 ◆ Groundwater Monitoring Well
 - VW-2 ⊞ Vapor Extraction Well
 - TP-2 ⊗ Temporary Monitoring Well
 - A A' Geologic Cross Section



REVISION	REVISIONS			
	NO.	BY	DATE	DESCRIPTION
1	0	MY	9/8/05	Site Investigation Work Plan
	1	MY	4/28/06	Investigation Report

ARCTOS ENVIRONMENTAL			
TESORO - LIVERMORE			
SITE PLAN			
PROJECT NO. OILV	DRAWN BY MY	CHECKED BY MP	APPROVED BY JPG
FILE NO. OILVB30401.DWG	FIGURE 2		

APPENDIX C
HISTORICAL WELL AND GROUNDWATER ELEVATIONS

TABLE C-1

**HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076**

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation^(a) (feet MSL)	Water Table Elevation^(b) (feet MSL)
MW-1	6/1/93	37.50	474.29	436.79
	6/22/93	38.46		435.83
	10/6/93	42.22		432.07
	1/13/94	34.52		439.77
	3/30/94	31.93		442.36
	4/25/94	33.49		440.80
	8/12/94	41.03		433.26
	12/14/94	38.63		435.66
	2/10/95	30.80		443.49
	6/15/95	25.46		448.83
	9/26/95	31.05		443.24
	12/15/95	28.11		446.18
	3/21/96	17.67		456.62
	6/13/96	22.86		451.43
	9/16/96	30.04		444.25
	12/2/96	26.74		447.55
	3/7/97	20.84		453.45
	6/12/97	28.71		445.58
	9/29/97	33.91		440.38
	12/1/97	34.88		439.41
	3/19/98	19.83		454.46
	5/29/98	21.57		452.72
	9/15/98	31.68		442.61
	11/30/98	36.80		437.49
	1/17/99	30.02		444.27
	6/10/99	29.30		444.99
	9/7/99	31.41		442.88
	12/13/99	32.95		441.34
	3/13/00	25.74		448.55
	6/12/00	28.24		446.05
11/10/00	30.56	443.73		
12/31/00	31.71	442.58		
3/27/01	30.43	443.86		
6/30/01	36.61	437.68		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
MW-1 (cont.)	9/26/01	45.10	474.29	429.19
	12/18/01	39.39		434.90
	3/18/02	38.24		436.05
	8/21/02	36.71		437.58
	12/3/02	36.85		437.44
	3/4/03	33.72		440.57
	6/10/03	31.31		442.98
	9/9/03	35.05		439.24
	12/23/03	30.15		444.14
	3/23/04	26.61		447.68
	5/10/04	30.31		443.98
	8/4/04	34.77		439.52
	11/4/04	33.93		440.36
	1/12/05	27.82		446.47
	5/2/05	24.87		449.42
	7/19/05	29.26		445.03
	11/21/05	31.15		443.14
	2/9/06	26.24		448.05
	5/16/06	24.87		449.42
	8/9/06	31.64		442.65
	11/8/06	31.16		443.13
	2/14/07	30.00		444.29
	5/17/07	33.75		440.54
	8/2/07	40.00		434.29
	11/12/07	48.55		425.74
	2/14/08	34.74		439.55
	5/8/08	36.15		438.14
	7/23/08	45.76		428.53
10/13/08	51.00	423.29		
2/11/09	48.69	425.60		
4/27/09	41.90	432.39		
8/4/09	51.44	422.85		
12/8/09	39.87	434.42		
2/11/10	35.20	439.09		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
MW-1 (cont.)	5/3/10	31.23	474.29	443.06
	8/2/10	34.56	474.21 ^(c)	439.65
	11/2/10	37.04		437.17
	2/1/11	32.51		441.70
	4/25/11	27.73		446.48
	8/3/11	31.57		442.64
	10/10/11	33.12		441.09
	1/31/12	36.11		438.10
	5/7/12	36.14		438.07
	8/6/12	37.40		436.81
	11/12/12	37.10		437.11
	2/12/13	30.98		443.23
	4/22/13	33.11		441.10
	8/21/13	35.40		438.81
	11/7/13	34.36		439.85
	1/21/14	33.23		440.98
	6/10/14	41.40		432.81
	8/13/14	48.64		425.57
	11/12/14	52.80		421.41
	1/20/15	41.10		433.11
5/19/15	47.54	426.67		
7/23/15	48.23	425.98		
11/10/15	51.27	422.94		
3/2/16	45.59	428.62		
5/2/16	38.37	435.84		
MW-2	6/1/93	38.02	472.98	434.96
	6/22/93	39.07		433.91
	10/6/93	43.72		429.26
	1/13/94	35.85		437.13
	3/30/94	32.82		440.16
	4/25/94	34.76		438.22
	8/12/94	44.33		428.65
	12/14/94	40.00		432.98
	2/10/95	32.16		440.82

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
MW-2 (cont.)	6/15/95	25.93	472.98	447.05
	9/26/95	32.42		440.56
	12/15/95	29.41		443.57
	3/21/96	17.47		455.51
	6/13/96	23.69		449.29
	9/16/96	31.24		441.74
	12/2/96	26.90		446.08
	3/7/97	21.33		451.65
	6/12/97	29.94		443.04
	9/29/97	34.22		438.76
	12/1/97	35.94		437.04
	3/19/98	20.34		452.64
	5/29/98	22.63		450.35
	9/15/98	32.30		440.68
	11/30/98	36.90		436.08
	1/17/99	30.17		442.81
	6/10/99	29.98		443.00
	9/7/99	31.85		441.13
	12/13/99	33.72		439.26
	3/13/00	26.54		446.44
	6/12/00	28.44		444.54
	11/10/00	31.31		441.67
	12/31/00	32.68		440.30
	3/27/01	30.81		442.17
	6/30/01	37.58		435.40
	9/26/01	44.97		428.01
	12/18/01	40.67		432.31
	3/18/02	38.94		434.04
	6/5/02	36.45		436.53
	8/21/02	37.15		435.83
12/3/02	36.76	436.22		
3/4/03	33.60	439.38		
6/10/03	32.89	440.09		
9/9/03	35.45	437.53		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
MW-2 (cont.)	12/23/03	31.79	472.98	441.19
	3/23/04	28.25		444.73
	5/10/04	30.91		442.07
	8/4/04	35.36		437.62
	11/4/04	34.92		438.06
	1/12/05	29.46		443.52
	5/2/05	25.61		447.37
	7/19/05	30.11		442.87
	11/21/05	32.04		440.94
	2/9/06	27.11		445.87
	5/17/06	25.18		447.80
	8/9/06	32.69		440.29
	11/8/06	33.21		439.77
	2/14/07	31.27		441.71
	5/17/07	34.40		438.58
	8/2/07	41.23		431.75
	11/12/07	48.22		424.76
	2/14/08	36.31		436.67
	5/8/08	36.70		436.28
	7/23/08	45.78		427.20
	10/13/08	51.30		421.68
	2/11/09	48.90		424.08
	4/27/09	42.62		430.36
	8/4/09	51.83		421.15
	12/8/09	40.82		432.16
	2/11/10	36.54		436.44
	5/3/10	32.44		440.54
8/2/10	35.34	437.64		
11/2/10	38.15	434.83		
2/1/11	33.40	439.58		
4/25/11	28.49	444.49		
8/3/11	32.40	440.58		
10/10/11	33.51	439.47		
1/31/12	39.52	433.46		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
MW-2 (cont.)	5/7/12	36.89	472.98	436.09
	8/6/12	40.95		432.03
	11/12/12	39.03		433.95
	2/12/13	32.13		440.85
	4/22/13	34.15		438.83
	6/24/13	35.05		437.93
	8/21/13	36.05		436.93
	11/7/13	35.09		437.89
	1/21/14	33.81		439.17
	6/10/14	41.65		431.33
	8/13/14	50.12		422.86
	11/12/14	Dry ^(d)		Dry
	1/20/15	42.66		430.32
	5/19/15	47.74		425.24
	7/23/15	50.62		422.36
	11/10/15	Dry		Dry
	3/2/16	46.00		426.98
5/2/16	38.74	434.24		
MW-3	6/1/93	36.18	473.37	437.19
	6/22/93	37.11		436.26
	10/6/93	41.15		432.22
	1/13/94	33.95		439.42
	3/30/94	30.97		442.40
	4/25/94	32.46		440.91
	8/12/94	41.72		431.65
	12/14/94	37.62		435.75
	2/10/95	29.96		443.41
	6/15/95	23.66		449.71
	9/26/95	29.62		443.75
	12/15/95	27.10		446.27
	3/21/96	15.85		457.52
	6/13/96	21.31		452.06
	9/16/96	28.62		444.75
12/2/96	25.55	447.82		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
MW-3 (cont.)	3/7/97	19.77	473.37	453.60
	6/12/97	27.67		445.70
	9/29/97	29.60		443.77
	12/1/97	33.37		440.00
	3/19/98	18.76		454.61
	5/29/98	20.64		452.73
	9/15/98	30.70		442.67
	11/30/98	34.96		438.41
	1/17/99	28.81		444.56
	6/10/99	28.10		445.27
	9/7/99	30.38		442.99
	12/13/99	31.46		441.91
	3/13/00	24.28		449.09
	6/12/00	26.80		446.57
	11/10/00	29.47		443.90
	12/31/00	31.38		441.99
	3/27/01	29.94		443.43
	6/30/01	37.54		435.83
	9/26/01	45.17		428.20
	12/18/01	39.41		433.96
	3/18/02	37.73		435.64
	6/5/02	35.35		438.02
	8/21/02	36.21		437.16
	12/3/02	35.62		437.75
	3/4/03	32.75		440.62
	6/10/03	31.26		442.11
	9/9/03	34.72		438.65
	12/23/03	30.47		442.90
	3/23/04	26.67		446.70
	5/10/04	30.25		443.12
8/4/04	34.70	438.67		
11/4/04	33.94	439.43		
1/12/05	28.21	445.16		
5/2/05	24.56	448.81		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
MW-3	7/19/05	29.39	473.37	443.98
(cont.)	11/21/05	31.30		442.07
	2/9/06	26.21		447.16
	5/16/06	24.36		449.01
	8/9/06	31.90		441.47
	11/8/06	31.30		442.07
	2/14/07	30.20		443.17
	5/17/07	33.64		439.73
	8/2/07	41.74		431.63
	11/12/07	47.41		425.96
	2/14/08	34.73		438.64
	5/8/08	35.60		437.77
	7/23/08	45.00		428.37
	10/13/08	50.70		422.67
	2/11/09	47.81		425.56
	4/27/09	41.18		432.19
	8/4/09	51.89		421.48
	12/8/09	39.50		433.87
	2/11/10	35.19		438.18
	5/3/10	31.39		441.98
	8/2/10	34.61		438.76
	11/2/10	37.20		436.17
	2/1/11	32.59		440.78
	4/25/11	27.60		445.77
	8/3/11	31.69		441.68
	10/10/11	33.96		439.41
	1/31/12	39.05		434.32
	5/7/12	36.03		437.34
	8/6/12	40.52	432.85	
	11/12/12	39.24	434.13	
	2/12/13	31.34	442.03	
	4/22/13	33.51	439.86	
	8/21/13	35.71	437.66	
	11/7/13	34.60	438.77	

TABLE C-1

**HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076**

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation^(a) (feet MSL)	Water Table Elevation^(b) (feet MSL)
MW-3 (cont.)	1/21/14	33.49	473.37	439.88
	6/10/14	41.62		431.75
	8/13/14	50.67		422.70
	11/12/14	Dry		Dry
	1/20/15	42.22		431.15
	5/19/15	47.11		426.26
	7/23/15	50.99		422.38
	11/10/15	Dry		Dry
	3/2/16	44.95		428.42
	5/2/16	37.72		435.65
MW-4	3/30/94	31.56	473.64	442.08
	4/25/94	32.73		440.91
	8/12/94	41.61		432.03
	12/14/94	38.11		435.53
	2/10/95	30.50		443.14
	6/15/95	23.63		450.01
	9/26/95	29.70		443.94
	12/15/95	27.56		446.08
	3/21/96	15.63		458.01
	6/13/96	21.07		452.57
	9/16/96	28.99		444.65
	12/2/96	26.04		447.60
	3/7/97	19.69		453.95
	6/12/97	28.04		445.60
	9/29/97	29.91		443.73
	12/1/97	33.88		439.76
	3/19/98	18.67		454.97
	5/29/98	20.16		453.48
	9/15/98	30.46		443.18
	11/30/98	34.50		439.14
1/17/99	28.30	445.34		
6/10/99	27.60	446.04		
9/7/99	30.79	442.85		
12/13/99	31.60	442.04		

TABLE C-1

**HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076**

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation^(a) (feet MSL)	Water Table Elevation^(b) (feet MSL)
MW-4 (cont.)	3/13/00	24.35	473.64	449.29
	6/12/00	26.91		446.73
	11/10/00	29.71		443.93
	12/31/00	31.79		441.85
	3/27/01	29.98		443.66
	6/30/01	36.88		436.76
	9/26/01	43.87		429.77
	12/18/01	39.30		434.34
	3/18/02	37.75		435.89
	6/5/02	35.68		437.96
	8/21/02	36.58		437.06
	12/3/02	35.90		437.74
	3/4/03	32.73		440.91
	6/10/03	31.20		442.44
	9/9/03	34.64		439.00
	12/23/03	31.30		442.34
	3/23/04	26.71		446.93
	5/10/04	30.33		443.31
	8/4/04	34.87		438.77
	11/4/04	34.28		439.36
	1/12/05	28.67		444.97
	5/2/05	24.46		449.18
	7/19/05	29.36		444.28
	11/21/05	31.80		441.84
	2/9/06	26.34		447.30
	5/16/06	24.30		449.34
	8/9/06	32.05		441.59
	11/8/06	32.85		440.79
	2/14/07	30.46		443.18
	5/17/07	33.92		439.72
8/2/07	40.68	432.96		
11/12/07	Dry	Dry		
2/14/08	34.53	439.11		
5/8/08	35.55	438.09		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
MW-4 (cont.)	7/23/08	43.87	473.64	429.77
	10/13/08	Dry		Dry
	2/11/09	Dry		Dry
	4/27/09	40.64		433.00
	8/4/09	Dry		Dry
	12/8/09	39.46		434.18
	2/11/10	35.31		438.33
	5/3/10	31.55		442.09
	8/2/10	35.15		438.49
	11/2/10	37.55		436.09
	2/1/11	32.86		440.78
	4/25/11	28.69		444.95
	8/3/11	32.01		441.63
	10/10/11	34.49		439.15
	1/31/12	38.91		434.73
	5/7/12	36.24		437.40
	8/6/12	40.69		432.95
	11/12/12	39.65		433.99
	2/12/13	31.56		442.08
	4/22/13	33.80		439.84
	8/21/13	36.10		437.54
	11/7/13	35.18		438.46
	1/21/14	34.07		439.57
6/10/14	42.10	431.54		
8/13/14	Dry	Dry		
11/12/14	Dry	Dry		
1/20/15	41.89	431.75		
5/19/15	45.92	427.72		
7/23/15	Dry	Dry		
11/10/15	Dry	Dry		
3/2/16	44.48	429.16		
5/2/16	37.50	436.14		
MW-5	3/30/94	32.07	472.67	440.60
	4/25/94	33.65		439.02

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
MW-5 (cont.)	8/12/94	42.73	472.67	429.94
	12/14/94	38.89		433.78
	2/10/95	31.44		441.23
	6/15/95	24.99		447.68
	9/26/95	30.20		442.47
	12/15/95	28.56		444.11
	3/21/96	16.82		455.85
	6/13/96	22.61		450.06
	9/16/96	29.78		442.89
	12/2/96	26.51		446.16
	3/7/97	21.91		450.76
	9/29/97	31.74		440.93
	12/1/97	34.05		438.62
	3/19/98	20.93		451.74
	5/29/98	21.30		451.37
	9/15/98	31.32		441.35
	11/30/98	35.44		437.23
	1/17/99	29.59		443.08
	6/10/99	28.05		444.62
	9/7/99	31.11		441.56
	12/13/99	32.66		440.01
	3/13/00	25.87		446.80
	6/12/00	28.15		444.52
	11/10/00	30.05		442.62
	12/31/00	31.81		440.86
	3/27/01	30.57		442.10
	6/30/01	37.24		435.43
	9/26/01	44.53		428.14
	12/18/01	40.65		432.02
	3/18/02	38.75		433.92
6/5/02	36.21	436.46		
8/21/02	36.76	435.91		
12/3/02	36.12	436.55		
3/4/03	32.90	439.77		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
MW-5 (cont.)	6/10/03	33.04	472.67	439.63
	9/9/03	34.20		438.47
	12/23/03	31.38		441.29
	3/23/04	27.51		445.16
	5/10/04	31.12		441.55
	8/4/04	35.09		437.58
	11/4/04	34.34		438.33
	1/12/05	29.19		443.48
	5/2/05	25.31		447.36
	7/19/05	30.49		442.18
	11/21/05	32.35		440.32
	2/9/06	27.19		445.48
	5/16/06	25.30		447.37
	8/9/06	32.68		439.99
	11/8/06	32.22		440.45
	2/14/07	34.00		438.67
	5/17/07	34.29		438.38
	8/2/07	41.72		430.95
	11/12/07	Dry		Dry
	2/14/08	35.66		437.01
	5/8/08	36.60		436.07
	7/23/08	Dry		Dry
	10/13/08	Dry		Dry
	2/11/09	Dry		Dry
	4/27/09	42.50		430.17
	8/4/09	Dry		Dry
	12/8/09	39.92		432.75
	2/11/10	36.62		436.05
	5/3/10	32.89		439.78
	8/2/10	36.16		436.51
11/2/10	38.75	433.92		
2/1/11	32.77	439.90		
4/25/11	29.03	443.64		
8/3/11	33.18	439.49		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
MW-5 (cont.)	10/10/11	35.58	472.67	437.09
	1/31/12	39.80		432.87
	5/7/12	37.29		435.38
	8/6/12	NM ^(e)		NM
	11/12/12	40.72		431.95
	2/12/13	32.68		439.99
	4/22/13	35.09		437.58
	8/21/13	37.00		435.67
	11/7/13	35.94		436.73
	1/21/14	34.65		438.02
	6/10/14	42.40		430.27
	8/13/14	Dry		Dry
	11/12/14	Dry		Dry
	1/20/15	43.24		429.43
	5/19/15	Dry		Dry
	7/23/15	Dry		Dry
	11/10/15	Dry		Dry
	3/2/16	Dry		Dry
5/2/16	38.97	433.70		
MW-6	3/30/94	33.38	471.93	438.55
	4/25/94	35.49		436.44
	8/12/94	45.14		426.79
	12/14/94	40.99		430.94
	2/10/95	33.34		438.59
	6/15/95	26.88		445.05
	9/26/95	33.55		438.38
	12/15/95	30.32		441.61
	3/21/96	18.89		453.04
	6/13/96	24.62		447.31
	9/16/96	32.64		439.29
	12/2/96	27.42		444.51
	3/7/97	22.13		449.80
	6/12/97	31.02		440.91
	9/29/97	35.77		436.16

TABLE C-1

**HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076**

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation^(a) (feet MSL)	Water Table Elevation^(b) (feet MSL)
MW-6 (cont.)	12/1/97	37.14	471.93	434.79
	3/19/98	21.10		450.83
	5/29/98	23.26		448.67
	9/15/98	33.50		438.43
	11/30/98	38.73		433.20
	1/17/99	32.05		439.88
	6/10/99	31.44		440.49
	9/7/99	33.94		437.99
	12/13/99	35.84		436.09
	3/13/00	28.45		443.48
	6/12/00	30.52		441.41
	11/10/00	32.99		438.94
	12/31/00	34.95		436.98
	3/27/01	32.72		439.21
	6/30/01	39.86		432.07
	9/26/01	Dry		Dry
	12/18/01	43.36		428.57
	3/18/02	41.29		430.64
	6/5/02	38.85		433.08
	8/21/02	39.02		432.91
	12/3/02	38.76		433.17
	3/4/03	35.13		436.80
	6/10/03	34.15		437.78
	9/9/03	37.66		434.27
	12/23/03	33.43		438.50
	3/23/04	29.96		441.97
	5/10/04	32.98		438.95
	8/4/04	37.02		434.91
	11/4/04	37.03		434.90
	1/12/05	32.01		439.92
5/2/05	27.30	444.63		
7/19/05	32.27	439.66		
11/21/05	33.23	438.70		
2/9/06	29.07	442.86		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
MW-6 (cont.)	5/17/06	27.23	471.93	444.70
	8/9/06	35.22		436.71
	11/8/06	33.41		438.52
	2/14/07	33.43		438.50
	5/17/07	36.50		435.43
	8/2/07	42.24		429.69
	11/12/07	Dry		Dry
	2/14/08	38.67		433.26
	5/8/08	38.50		433.43
	7/23/08	Dry		Dry
	10/13/08	Dry		Dry
	2/11/09	Dry		Dry
	4/27/09	44.87		427.06
	8/4/09	Dry		Dry
	12/8/09	43.02		428.91
	2/11/10	38.89		433.04
	5/3/10	34.56		437.37
	8/2/10	37.87		434.06
	11/2/10	40.45		431.48
	2/1/11	35.73		436.20
	4/25/11	30.72		441.21
	8/3/11	34.95		436.98
	10/10/11	37.45		434.48
	1/31/12	42.15		429.78
	5/7/12	39.11		432.82
	8/6/12	43.66		428.27
	11/12/12	42.20		429.73
	2/12/13	34.24		437.69
	4/22/13	36.78		435.15
	6/25/13	37.15		434.78
8/21/13	37.98	433.95		
11/7/13	39.82	432.11		
1/21/14	35.42	436.51		
6/10/14	42.36	429.57		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
MW-6 (cont.)	8/13/14	Dry	471.93	Dry
	11/12/14	Dry		Dry
	1/20/15	Dry		Dry
	5/19/15	Dry		Dry
	7/23/15	Dry		Dry
	11/10/15	Dry		Dry
	3/2/16	Dry		Dry
	5/2/16	39.88		432.05
MW-7	3/30/94	31.98	472.33	440.35
	4/25/94	33.56		438.77
	8/12/94	43.35		428.98
	12/14/94	39.34		432.99
	2/10/95	32.11		440.22
	6/15/95	25.51		446.82
	9/26/95	31.43		440.90
	12/15/95	28.97		443.36
	3/21/96	17.36		454.97
	6/13/96	23.47		448.86
	9/16/96	31.35		440.98
	12/2/96	27.11		445.22
	3/7/97	21.33		451.00
	6/12/97	29.90		442.43
	9/29/97	34.37		437.96
	12/1/97	36.46		435.87
	3/19/98	20.33		452.00
	5/29/98	22.30		450.03
	9/15/98	32.54		439.79
	11/30/98	37.96		434.37
1/17/99	31.04	441.29		
6/10/99	29.89	442.44		
9/7/99	32.38	439.95		
12/13/99	33.98	438.35		
3/13/00	27.09	445.24		
6/12/00	28.76	443.57		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
MW-7 (cont.)	11/10/00	31.54	472.33	440.79
	12/31/00	32.76		439.57
	3/27/01	30.97		441.36
	6/30/01	37.50		434.83
	9/26/01	45.11		427.22
	12/18/01	41.13		431.20
	1/22/02	NM		Dry
	3/18/02	39.22		433.11
	6/5/02	36.55		435.78
	8/21/02	36.81		435.52
	12/3/02	36.52		435.81
	3/4/03	32.60		439.73
	6/10/03	31.33		441.00
	9/9/03	34.71		437.62
	12/23/03	30.80		441.53
	3/23/04	26.41		445.92
	5/10/04	29.86		442.47
	8/4/04	34.06		438.27
	11/4/04	34.12		438.21
	1/12/05	28.83		443.50
	5/2/05	24.66		447.67
	7/19/05	29.07		443.26
	11/21/05	30.42		441.91
	2/9/06	26.15		446.18
	5/16/06	24.44		447.89
	8/9/06	31.77		440.56
	11/8/06	31.14		441.19
	2/14/07	30.39		441.94
	5/17/07	33.31		439.02
	8/2/07	37.09		435.24
11/12/07	Dry	Dry		
2/14/08	36.51	435.82		
5/8/08	36.00	436.33		
7/23/08	44.42	427.91		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
MW-7 (cont.)	10/13/08	Dry	472.33	Dry
	2/11/09	Dry		Dry
	4/27/09	41.80		430.53
	8/4/09	Dry		Dry
	12/17/09	39.26		433.07
	2/11/10	36.18		436.15
	5/3/10	31.80		440.53
	8/2/10	34.31		438.02
	11/2/10	36.68		435.65
	2/1/11	32.66		439.67
	4/25/11	27.75		444.58
	8/3/11	31.36		440.97
	10/10/11	33.63		438.70
	1/31/12	38.74		433.59
	5/7/12	35.97		436.36
	8/6/12	39.85		432.48
	11/12/12	38.73		433.60
	2/12/13	31.46		440.87
	4/22/13	33.19		439.14
	6/24/13	34.10		438.23
	8/21/13	36.90		435.43
	11/7/13	34.06		438.27
	1/21/14	33.11		439.22
	6/10/14	40.50		431.83
	8/13/14	Dry		Dry
	11/12/14	Dry		Dry
1/20/15	43.33	429.00		
5/19/15	Dry	Dry		
7/23/15	Dry	Dry		
11/10/15	Dry	Dry		
3/2/16	Dry	Dry		
5/2/16	38.03	434.30		
MW-8	12/23/03	32.01	471.18	439.17
	3/23/04	28.50		442.68

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
MW-8 (cont.)	5/10/04	31.44	471.18	439.74
	8/4/04	35.11		436.07
	11/4/04	34.77		436.41
	1/12/05	29.66		441.52
	5/2/05	25.91		445.27
	7/19/05	30.56		440.62
	11/21/05	32.48		438.70
	2/9/06	27.40		443.78
	5/16/06	25.60		445.58
	8/9/06	32.77		438.41
	11/8/06	32.10		439.08
	2/14/07	30.94		440.24
	5/17/07	34.14		437.04
	8/2/07	41.24		429.94
	11/12/07	Dry		Dry
	2/14/08	35.55		435.63
	5/8/08	36.64		434.54
	7/23/08	Dry		Dry
	10/13/08	Dry		Dry
	2/11/09	Dry		Dry
	4/27/09	Dry		Dry
	8/4/09	Dry		Dry
	12/17/09	39.92		431.26
	2/11/10	36.72		434.46
	5/3/10	32.81		438.37
	8/2/10	36.08		435.10
	11/2/10	38.44		432.74
	2/1/11	34.11		437.07
	4/25/11	28.72		442.46
	8/3/11	33.09		438.09
10/10/11	35.69	435.49		
1/31/12	40.08	431.10		
5/7/12	37.38	433.80		
8/6/12	41.94	429.24		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
MW-8 (cont.)	11/12/12	40.87	471.18	430.31
	2/12/13	32.81		438.37
	4/22/13	35.00		436.18
	6/25/13	36.40		434.78
	8/21/13	37.20		433.98
	11/7/13	35.95		435.23
	1/21/14	34.63		436.55
	6/10/14	43.17		428.01
	8/13/14	Dry		Dry
	11/12/14	Dry		Dry
	1/20/15	Dry		Dry
	5/19/15	Dry		Dry
	7/23/15	Dry		Dry
	11/10/15	Dry		Dry
	3/2/16	Dry		Dry
	5/2/16	38.84		432.34
MW-9	12/23/03	34.03	470.78	436.75
	3/23/04	30.01		440.77
	5/10/04	33.61		437.17
	8/4/04	37.47		433.31
	11/4/04	37.44		433.34
	5/2/05	27.73		443.05
	7/19/05	32.90		437.88
	11/21/05	34.15		436.63
	2/9/06	29.44		441.34
	5/16/06	27.50		443.28
	8/9/06	35.85		434.93
	11/8/06	34.18		436.60
	2/14/07	34.00		436.78
	5/17/07	36.88		433.90
	8/2/07	44.11		426.67
	11/12/07	Dry		Dry
	2/14/08	39.32		431.46
5/8/08	38.90	431.88		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
MW-9 (cont.)	7/23/08	Dry	470.78	Dry
	10/13/08	Dry		Dry
	2/11/09	Dry		Dry
	4/27/09	43.79		426.99
	8/4/09	Dry		Dry
	12/8/09	43.61		427.17
	2/11/10	39.48		431.30
	5/3/10	34.96		435.82
	8/2/10	38.00		432.78
	11/2/10	40.30		430.48
	2/1/11	35.97		434.81
	4/25/11	30.64		440.14
	8/3/11	35.17		435.61
	10/10/11	37.64		433.14
	1/31/12	42.06		428.72
	5/7/12	39.43		431.35
	8/6/12	43.51		427.27
	11/12/12	42.66		428.12
	2/12/13	34.70		436.08
	4/22/13	37.01		433.77
	6/25/13	37.82		432.96
	8/21/13	39.02		431.76
	11/7/13	37.87		432.91
	1/21/14	36.31		434.47
	6/10/14	43.15		427.63
	8/13/14	Dry		Dry
	11/12/14	Dry		Dry
	1/20/15	Dry		Dry
5/19/15	Dry	Dry		
7/23/15	Dry	Dry		
11/10/15	Dry	Dry		
3/2/16	Dry	Dry		
5/2/16	41.27	429.51		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
MW-10	12/23/03	33.80	471.63	437.83
	3/23/04	28.68		442.95
	5/10/04	32.15		439.48
	8/4/04	36.40		435.23
	11/4/04	36.21		435.42
	1/12/05	31.64		439.99
	5/2/05	27.01		444.62
	7/19/05	31.59		440.04
	11/21/05	32.96		438.67
	2/9/06	28.56		443.07
	5/16/06	26.83		444.80
	8/9/06	34.37		437.26
	11/8/06	33.41		438.22
	2/14/07	32.81		438.82
	5/17/07	35.85		435.78
	8/2/07	43.46		428.17
	11/12/07	Dry		Dry
	2/14/08	39.71		431.92
	5/8/08	37.55		434.08
	7/23/08	Dry		Dry
	10/13/08	Dry		Dry
	2/11/09	Dry		Dry
	4/27/09	45.10		426.53
	8/4/09	44.52		427.11
	12/8/09	42.80		428.83
	2/11/10	39.74		431.89
	5/3/10	33.97		437.66
	8/2/10	36.12		435.51
	11/2/10	38.30		433.33
	2/1/11	34.63		437.00
4/25/11	29.63	442.00		
8/3/11	33.26	438.37		
10/10/11	35.62	436.01		
1/31/12	39.67	431.96		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
MW-10 (cont.)	5/7/12	38.14	471.63	433.49
	8/6/12	40.65		430.98
	11/12/12	40.53		431.10
	2/12/13	33.19		438.44
	4/22/13	34.99		436.64
	6/25/13	36.25		435.38
	8/21/13	37.11		434.52
	11/7/13	36.05		435.58
	1/21/14	34.55		437.08
	6/10/14	40.18		431.45
	8/13/14	Dry		Dry
	11/12/14	Dry		Dry
	1/20/15	Dry		Dry
	5/19/15	Dry		Dry
	7/23/15	Dry		Dry
	11/10/15	Dry		Dry
	3/2/16	Dry		Dry
5/2/16	42.51	429.12		
MW-11	12/16/08	Dry	473.26	Dry
	2/11/09	Dry		Dry
	4/27/09	Dry		Dry
	8/4/09	Dry		Dry
	12/8/09	40.25		433.01
	2/11/10	NM		Dry
	5/3/10	31.36		441.90
	8/2/10	31.94	472.96 ^(c)	441.02
	11/2/10	36.98		435.98
	2/1/11	32.30		440.66
	4/25/11	27.31		445.65
	8/3/11	31.11		441.85
	10/10/11	33.27		439.69
	1/31/12	34.36		438.60
	5/7/12	31.61		441.35
	8/6/12	35.20		437.76

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
MW-11 (cont.)	11/12/12	35.34	472.96 ^(c)	437.62
	2/12/13	30.64		442.32
	4/22/13	32.74		440.22
	6/24/13	33.62		439.34
	8/21/13	34.74		438.22
	11/7/13	33.75		439.21
	1/21/14	32.43		440.53
	6/10/14	38.62		434.34
	8/13/14	Dry		Dry
	11/12/14	Dry		Dry
	1/20/15	Dry		Dry
	5/19/15	Dry		Dry
	7/23/15	Dry		Dry
	11/10/15	Dry		Dry
	3/2/16	Dry		Dry
5/2/16	38.50	434.46		
MW-12	6/14/12	40.62	469.77	429.15
	8/6/12	43.22		426.55
	11/12/12	41.85		427.92
	2/12/13	34.10		435.67
	4/22/13	36.18		433.59
	6/25/13	37.80		431.97
	8/21/13	38.80		430.97
	11/7/13	37.40		432.37
	1/21/14	35.94		433.83
	6/10/14	42.76		427.01
	8/13/14	Dry		Dry
	11/12/14	Dry		Dry
	1/20/15	Dry		Dry
	5/19/15	Dry		Dry
	7/23/15	Dry		Dry
11/10/15	Dry	Dry		
3/2/16	Dry	Dry		
5/2/16	40.10	429.67		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
VW-2	8/4/04	34.13	473.28	439.15
	11/4/04	34.75		438.53
	1/12/05	29.35		443.93
	5/2/05	25.34		447.94
	7/19/05	29.76		443.52
	11/21/05	31.81		441.47
	2/9/06	27.21		446.07
	5/17/06	25.26		448.02
	8/9/06	31.74		441.54
	11/8/06	33.52		439.76
	2/14/07	30.77		442.51
	5/17/07	33.17		440.11
	8/2/07	36.33		436.95
	11/12/07	Dry		Dry
	2/14/08	35.55		437.73
	5/8/08	35.31		437.97
	7/23/08	Dry		Dry
	10/13/08	Dry		Dry
	2/11/09	Dry		Dry
	4/27/09	Dry		Dry
	8/4/09	Dry	Dry	
	12/8/09	Dry	Dry	
	2/11/10	NM	Dry	
	5/3/10	31.84	441.44	
	8/2/10	33.15	472.57 ^(c)	439.42
	11/2/10	Dry		Dry
	2/1/11	32.80		439.77
	4/25/11	25.43		447.14
	8/3/11	26.82		445.75
	10/10/11	33.29		439.28
1/31/12	32.19	440.38		
5/7/12	31.50	441.07		
8/6/12	32.64	439.93		
11/12/12	33.90	438.67		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
VW-2 (cont.)	2/12/13	31.60	472.57 ^(c)	440.97
	4/22/13	33.51		439.06
	8/21/13	Dry		Dry
	11/7/13	Dry		Dry
	1/21/14	33.16		439.41
	6/10/14	Dry		Dry
	8/13/14	Dry		Dry
	11/12/14	Dry		Dry
	1/20/15	Dry		Dry
	5/19/15	Dry		Dry
	7/23/15	Dry		Dry
	11/10/15	Dry		Dry
	3/2/16	Dry		Dry
	5/2/16	Dry		Dry
VW-3	8/4/04	32.89	474.38	441.49
	11/4/04	34.78		439.60
	1/12/05	29.51		444.87
	5/2/05	24.79		449.59
	7/19/05	28.91		445.47
	11/21/05	31.07		443.31
	2/9/06	26.60		447.78
	5/16/06	24.19		450.19
	8/9/06	30.53		443.85
	11/8/06	31.62		442.76
	2/14/07	30.48		443.90
	5/17/07	31.70		442.68
	8/2/07	35.55		438.83
	11/12/07	Dry		Dry
	2/14/08	Dry		Dry
	5/8/08	34.80		439.58
	7/23/08	Dry		Dry
	10/13/08	Dry		Dry
2/11/09	Dry	Dry		
4/27/09	Dry	Dry		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
VW-3 (cont.)	8/4/09	Dry	474.38	Dry
	12/8/09	Dry		Dry
	2/11/10	Dry		Dry
	5/3/10	31.85		442.53
	8/2/10	34.72		439.66
	11/2/10	Dry		Dry
	2/1/11	32.56		441.82
	4/25/11	27.81		446.57
	8/3/11	28.93		445.45
	10/10/11	33.66		440.72
	1/31/12	Dry		Dry
	5/7/12	Dry		Dry
	8/6/12	Dry		Dry
	11/12/12	Dry		Dry
	2/12/13	31.70		442.68
	4/22/13	33.49		440.89
	8/21/13	35.46		438.92
	11/7/13	35.07		439.31
	1/21/14	33.80		440.58
	6/10/14	Dry		Dry
	8/13/14	Dry		Dry
	11/12/14	Dry		Dry
	1/20/15	Dry		Dry
5/19/15	Dry	Dry		
7/23/15	Dry	Dry		
11/10/15	Dry	Dry		
3/2/16	Dry	Dry		
5/2/16	Dry	Dry		
TP-1	7/19/05	29.91	472.82	442.91
	11/21/05	32.28		440.54
	2/9/06	28.02		444.80
	5/17/06	25.18		447.64
	8/9/06	32.81		440.01
	11/8/06	32.02		440.80

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
TP-1 (cont.)	2/14/07	33.59	472.82	439.23
	5/17/07	33.52		439.30
	8/2/07	40.30		432.52
	11/12/07	Dry		Dry
	2/14/08	36.17		436.65
	5/8/08	36.17		436.65
	7/23/08	Dry		Dry
	10/13/08	Dry		Dry
	2/11/09	Dry		Dry
	4/27/09	Dry		Dry
	8/4/09	Dry		Dry
	12/8/09	41.39		431.43
	2/11/10	NM		Dry
	5/3/10	32.32		440.50
	8/2/10	33.96		438.68
	11/2/10	37.46		435.18
	2/1/11	33.01		439.63
	4/25/11	28.23		444.41
	8/3/11	31.85		440.79
	10/10/11	31.60		441.04
	1/31/12	35.43		437.21
	5/7/12	34.70		437.94
	8/6/12	36.59		436.05
	11/12/12	37.00		435.64
	2/12/13	31.96		440.68
	4/22/13	33.71		438.93
	8/21/13	35.86		436.78
	11/7/13	34.65		437.99
	1/21/14	33.38		472.64 ^(c)
	6/10/14	Dry	Dry	
8/13/14	Dry	Dry		
11/12/14	Dry	Dry		
1/20/15	Dry	Dry		
5/19/15	Dry	Dry		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
TP-1 (cont.)	7/23/15	Dry	472.64 ^(c)	Dry
	11/10/15	Dry		Dry
	3/2/16	Dry		Dry
	5/2/16	38.30		434.34
TP-2	7/19/05	29.67	472.93	443.26
	11/21/05	31.43		441.50
	2/9/06	27.27		445.66
	5/17/06	25.00		447.93
	8/9/06	31.74		441.19
	11/8/06	32.80		440.13
	2/14/07	30.32		442.61
	5/17/07	33.28		439.65
	8/2/07	39.35		433.58
	11/12/07	Dry		Dry
	2/14/08	35.62		437.31
	5/8/08	36.62		436.31
	7/23/08	Dry		Dry
	10/13/08	Dry		Dry
	2/11/09	Dry		Dry
	4/27/09	Dry		Dry
	8/4/09	Dry		Dry
	12/8/09	40.08		432.85
	2/11/10	NM	Dry	
	5/3/10	31.85	441.08	
	8/2/10	33.57	472.78 ^(c)	439.21
	11/2/10	37.35		435.43
	2/1/11	32.79		439.99
	4/25/11	28.30		444.48
	8/3/11	31.59		441.19
	10/10/11	32.14		440.64
1/31/12	34.32	438.46		
5/7/12	34.41	438.37		
8/6/12	36.00	436.78		
11/12/12	36.25	436.53		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
TP-2 (cont.)	2/12/13	31.81	472.78 ^(c)	440.97
	4/22/13	33.70		439.08
	8/21/13	35.43		437.35
	11/7/13	34.50		438.28
	1/21/14	33.25		439.53
	6/10/14	Dry		Dry
	8/13/14	Dry		Dry
	11/12/14	Dry		Dry
	1/20/15	Dry		Dry
	5/19/15	Dry		Dry
	7/23/15	Dry		Dry
	11/10/15	Dry		Dry
	3/2/16	Dry		Dry
	5/2/16	38.34		434.44
DW-1	5/22/08	37.30	472.85	435.55
	7/23/08	45.55		427.30
	10/13/08	51.40		421.45
	2/11/09	48.28		424.57
	4/27/09	41.74		431.11
	8/4/09	52.22		420.63
	12/8/09	39.79		433.06
	2/11/10	35.57		437.28
	5/3/10	31.70		441.15
	8/2/10	34.76		438.09
	11/2/10	37.49		435.36
	2/1/11	32.83		440.02
	4/25/11	27.96		444.89
	8/3/11	31.96		440.89
	10/10/11	34.40		438.45
	1/31/12	39.39		433.46
	5/7/12	36.35		436.50
	8/6/12	40.60		432.25
11/12/12	39.29	433.56		
2/12/13	31.63	441.22		

TABLE C-1

**HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076**

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation^(a) (feet MSL)	Water Table Elevation^(b) (feet MSL)
DW-1 (cont.)	4/22/13	33.72	472.85	439.13
	6/24/13	35.08		437.77
	8/21/13	35.90		436.95
	11/7/13	34.79		438.06
	1/21/14	33.57		439.28
	6/10/14	41.71		431.14
	8/13/14	51.02		421.83
	11/12/14	56.47		416.38
	1/20/15	42.71		430.14
	5/19/15	47.52		425.33
	7/23/15	51.51		421.34
	11/10/15	57.96		414.89
	3/2/16	45.62		427.23
	5/2/16	38.31		434.54
DW-2	5/22/08	39.80	471.61	431.81
	7/23/08	48.25		423.36
	10/13/08	53.40		418.21
	2/11/09	51.50		420.11
	4/27/09	44.71		426.90
	8/4/09	54.67		416.94
	12/8/09	42.88		428.73
	2/11/10	38.63		432.98
	5/3/10	34.46		437.15
	8/2/10	37.72		433.89
	11/2/10	40.50		431.11
	2/1/11	35.66		435.95
	4/25/11	30.69		440.92
	8/3/11	35.00		436.61
	10/10/11	37.44		434.17
	1/31/12	42.19		429.42
	5/7/12	39.10		432.51
	8/6/12	43.90		427.71
11/12/12	42.25	429.36		
2/12/13	34.35	437.26		

TABLE C-1

**HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076**

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation^(a) (feet MSL)	Water Table Elevation^(b) (feet MSL)
DW-2 (cont.)	4/22/13	36.70	471.61	434.91
	6/25/13	36.94		434.67
	8/21/13	37.85		433.76
	11/7/13	36.94		434.67
	1/21/14	35.59		436.02
	6/10/14	43.35		428.26
	8/13/14	52.02		419.59
	11/12/14	56.52		415.09
	1/20/15	48.87		422.74
	5/19/15	50.06		421.55
	7/23/15	53.22		418.39
	11/10/15	58.12		413.49
	3/2/16	47.35		424.26
	5/2/16	39.94		431.67
DW-3	5/22/08	40.20	470.33	430.13
	7/23/08	49.09		421.24
	10/13/08	54.62		415.71
	2/11/09	51.96		418.37
	4/27/09	45.17		425.16
	8/4/09	56.32		414.01
	12/8/09	42.92		427.41
	2/11/10	38.75		431.58
	5/3/10	34.51		435.82
	8/2/10	35.59		434.74
	11/2/10	40.00		430.33
	2/1/11	35.50		434.83
	4/25/11	30.45		439.88
	8/3/11	34.71		435.62
	10/10/11	37.00		433.33
	1/31/12	42.10		428.23
	5/7/12	38.70		431.63
	8/6/12	43.26		427.07
11/12/12	41.48	428.85		
2/12/13	33.87	436.46		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
DW-3 (cont.)	4/22/13	36.10	470.33	434.23
	6/25/13	37.39		432.94
	8/21/13	38.38		431.95
	11/7/13	36.85		433.48
	1/21/14	35.32		435.01
	6/10/14	44.03		426.30
	8/13/14	54.13		416.20
	11/12/14	58.59		411.74
	1/20/15	49.60		420.73
	5/19/15	51.24		419.09
	7/23/15	55.03		415.30
	11/10/15	Dry		Dry
	3/2/16	48.57		421.76
	5/2/16	41.11		429.22
DW-4	5/22/08	40.20	468.48	428.28
	7/23/08	49.50		418.98
	10/13/08	54.90		413.58
	2/11/09	51.71		416.77
	4/27/09	45.10		423.38
	8/4/09	56.46		412.02
	12/8/09	42.26		426.22
	2/11/10	37.98		430.50
	5/3/10	34.04		434.44
	8/2/10	36.94		431.54
	11/2/10	39.50		428.98
	2/1/11	35.11		433.37
	4/25/11	30.12		438.36
	8/3/11	34.54		433.94
	10/10/11	36.60		431.88
	1/31/12	42.10		426.38
	5/7/12	38.26		430.22
	8/6/12	42.80		425.68
11/12/12	40.86	427.62		
2/12/13	33.29	435.19		

TABLE C-1

**HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076**

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation^(a) (feet MSL)	Water Table Elevation^(b) (feet MSL)
DW-4 (cont.)	4/22/13	35.90	468.48	432.58
	8/21/13	38.30		430.18
	11/7/13	36.45		432.03
	1/21/14	35.99		432.49
	6/10/14	44.63		423.85
	8/13/14	54.37		414.11
	11/12/14	58.86		409.62
	1/20/15	49.20		419.28
	5/19/15	51.26		417.22
	7/23/15	55.24		413.24
	11/10/15	60.72		407.76
	3/2/16	48.24		420.24
	5/2/16	41.14		427.34
DW-5	12/8/09	43.05	471.86	428.81
	2/11/10	38.93		432.93
	5/3/10	34.55		437.31
	8/2/10	37.56		434.30
	11/2/10	40.00		431.86
	2/1/11	35.57		436.29
	4/25/11	30.59		441.27
	8/3/11	34.64		437.22
	10/10/11	37.00		434.86
	1/31/12	42.31		429.55
	5/7/12	38.98		432.88
	8/6/12	46.32		425.54
	11/12/12	41.65		430.21
	2/12/13	34.10		437.76
	4/22/13	36.52		435.34
	6/25/13	37.42		434.44
	8/21/13	38.35		433.51
	11/7/13	36.97		434.89
	1/21/14	34.45		437.41
	6/10/14	43.51		428.35
8/13/14	51.13	420.73		

TABLE C-1

**HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076**

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation^(a) (feet MSL)	Water Table Elevation^(b) (feet MSL)
DW-5 (cont.)	11/13/14	56.40	471.86	415.46
	1/20/15	45.75		426.11
	5/19/15	50.75		421.11
	7/23/15	54.03		417.83
	11/10/15	59.59		412.27
	3/2/16	48.34		423.52
	5/2/16	40.48		431.38
DW-6	12/8/09	43.50	471.77	428.27
	2/11/10	39.22		432.55
	5/3/10	35.15		436.62
	8/2/10	38.35		433.42
	11/2/10	40.09		431.68
	2/1/11	36.35		435.42
	4/25/11	31.32		440.45
	8/3/11	35.63		436.14
	10/10/11	38.09		433.68
	1/31/12	42.69		429.08
	5/7/12	39.82		431.95
	8/6/12	44.50		427.27
	11/12/12	42.95		428.82
	2/12/13	34.96		436.81
	4/22/13	37.29		434.48
	6/25/13	38.55		433.22
	8/21/13	39.55		432.22
	11/7/13	38.24		433.53
	1/21/14	37.03		434.74
	6/10/14	44.40		427.37
8/13/14	52.71	419.06		
11/12/14	57.14	414.63		
1/20/15	49.51	422.26		
5/19/15	50.84	420.93		
7/23/15	53.90	417.87		
11/10/15	58.68	413.09		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
DW-6 (cont.)	3/2/16	48.27	471.77	423.50
	5/2/16	40.92		430.85
DW-7	12/8/09	43.01	470.07	427.06
	2/11/10	38.70		431.37
	5/3/10	34.64		435.43
	8/2/10	37.82		432.25
	11/2/10	40.42		429.65
	2/1/11	35.76		434.31
	4/25/11	30.82		439.25
	8/3/11	35.19		434.88
	10/10/11	37.55		432.52
	1/31/12	42.35		427.72
	5/7/12	39.30		430.77
	8/6/12	44.02		426.05
	11/12/12	42.43		427.64
	2/12/13	34.54		435.53
	4/22/13	36.80		433.27
	6/25/13	38.44		431.63
	8/21/13	39.91		430.16
	11/7/13	38.25		431.82
	1/21/14	36.70		433.37
	6/10/14	44.67		425.40
8/13/14	53.47	416.60		
11/12/14	57.99	412.08		
1/20/15	49.45	420.62		
5/19/15	51.02	419.05		
7/23/15	54.46	415.61		
11/10/15	59.89	410.18		
3/2/16	48.27	421.80		
5/2/16	41.02	429.05		
DW-8	4/25/11	27.23	472.31	445.08
	8/3/11	31.14		441.17
	10/10/11	33.41		438.90
	1/31/12	38.69		433.62

TABLE C-1

**HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076**

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation^(a) (feet MSL)	Water Table Elevation^(b) (feet MSL)
DW-8 (cont.)	5/7/12	35.52	472.31	436.79
	8/6/12	39.61		432.70
	11/12/12	38.00		434.31
	2/12/13	30.46		441.85
	4/22/13	32.66		439.65
	6/24/13	33.87		438.44
	8/21/13	34.43		437.88
	11/7/13	33.54		438.77
	1/21/14	33.03		439.28
	6/10/14	40.60		431.71
	8/13/14	50.56		421.75
	11/12/14	55.87		416.44
	1/20/15	42.31	473.21	430.00
	5/19/15	46.87		425.44
	7/23/15	50.88		421.43
	11/10/15	57.24		415.07
	3/2/16	45.05		427.26
	5/2/16	37.74		434.57
DW-9	6/14/12	40.85	469.80	428.95
	8/6/12	43.65		426.15
	11/12/12	42.05		427.75
	2/12/13	34.25		435.55
	4/22/13	36.39		433.41
	6/25/13	38.46		431.34
	8/21/13	39.32		430.48
	11/7/13	37.76		432.04
	1/21/14	36.26		433.54
	6/10/14	44.05		425.75
	8/13/14	52.61		417.19
	11/12/14	56.94		412.86
	1/20/15	48.79		421.01
	5/19/15	50.36		419.44
	7/23/15	53.59		416.21
11/10/15	58.60	411.20		

TABLE C-1

**HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076**

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation^(a) (feet MSL)	Water Table Elevation^(b) (feet MSL)
DW-9 (cont.)	3/2/16	47.63	469.80	422.17
	5/2/16	40.38		429.42
MW-A	1/17/99	30.13	NM	Dry
MW-B	1/17/99	30.29	NM	Dry
MW-C	1/17/99	30.60	NM	Dry
MW-D	1/17/99	31.32	NM	Dry
MW-E	1/17/99	31.36	NM	Dry
MW-W	1/17/99	30.91	NM	Dry
IP-1	7/23/08	45.49	473.16	427.67
	10/13/08	51.30		421.86
	5/3/10 ^(f)	33.80		439.36
	4/25/11	27.97	473.06 ^(c)	445.09
	1/31/12	39.26		433.80
	5/7/12	36.18		436.88
	8/6/12	40.23		432.83
	11/12/12	38.76		434.30
	2/12/13	31.25		441.81
	4/22/13	33.28		439.78
	6/24/13	34.85		438.21
	8/21/13	36.10		436.96
	11/7/13	35.07		437.99
	1/21/14	33.57		439.49
	6/10/14	40.90		432.16
	8/13/14	49.05		424.01
	11/12/14	53.97		419.09
	1/20/15	43.03		430.03
	5/19/15	47.51		425.55
	7/23/15	51.15		421.91
11/10/15	56.48	416.58		
3/2/16	NM	NM		
5/2/16	38.52	434.54		
IP-2	7/23/08	46.83	473.21	426.38
	10/13/08	51.40		421.81
	5/3/10 ^(f)	32.00		441.21

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
IP-2 (cont.)	4/25/11	28.04	473.06 ^(c)	445.02
	5/7/12	37.21		435.85
	8/6/12	40.78		432.28
	11/12/12	39.79		433.27
	2/12/13	NM		Dry
	4/22/13	33.86		439.20
	8/21/13	NM		Dry
	11/7/13	NM		Dry
	1/21/14	NM		Dry
	6/10/14	42.39		430.67
	8/13/14	50.26		422.80
	11/12/14	55.48		417.58
	1/20/15	NM		Dry
	5/19/15	47.67		425.39
	7/23/15	52.84		420.22
	11/10/15	60.64		412.42
	3/2/16	NM		NM
5/2/16	38.37	434.69		
IP-3	7/23/08	45.47	472.97	427.50
	10/13/08	51.11		421.86
	5/3/10 ^(f)	31.68		441.29
	4/25/11	28.07	473.05 ^(c)	444.98
	5/7/12	36.41		436.64
	8/6/12	40.70		432.35
	11/12/12	39.41		433.64
	2/12/13	NM		Dry
	4/22/13	34.12		438.93
	8/21/13	NM		Dry
	11/7/13	NM		Dry
	1/21/14	NM		Dry
	6/10/14	42.35		430.70
	8/13/14	50.90		422.15
	11/12/14	56.05		417.00
1/20/15	NM	Dry		

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
IP-3 (cont.)	5/19/15	47.78	473.05 ^(c)	425.27
	7/23/15	52.70		420.35
	11/10/15	58.50		414.55
	3/2/16	NM		NM
	5/2/16	38.30		434.75
IP-4	7/23/08	44.55	473.02	428.47
	10/13/08	50.89		422.13
	5/3/10 ^(f)	31.61		441.41
	4/25/11	27.93	473.10 ^(c)	445.17
	5/7/12	36.30		436.80
	8/6/12	40.67		432.43
	11/12/12	39.15		433.95
	2/12/13	NM		Dry
	4/22/13	33.76		439.34
	8/21/13	NM		Dry
	11/7/13	NM		Dry
	1/21/14	NM		Dry
	6/10/14	41.83		431.27
	8/13/14	51.08		422.02
	11/12/14	56.56		416.54
	1/20/15	NM		Dry
	5/19/15	47.51		425.59
	7/23/15	51.37		421.73
	11/10/15	58.08		415.02
	3/2/16	NM		NM
5/2/16	38.26	434.84		
IP-5	7/23/08	44.70	473.06	428.36
	10/13/08	51.06		422.00
	5/3/10 ^(f)	31.60		441.46
	4/25/11	27.80	473.05 ^(c)	445.25
	5/7/12	36.90		436.15
	8/6/12	40.65		432.40
	11/12/12	39.16		433.89
	2/12/13	NM		Dry

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
IP-5 (cont.)	4/22/13	33.78	473.05 ^(c)	439.27
	6/24/13	35.08		437.97
	8/21/13	NM		Dry
	11/7/13	34.68		438.37
	1/21/14	33.14		439.91
	6/10/14	41.75		431.30
	8/13/14	50.95		422.10
	11/12/14	56.48		416.57
	1/20/15	42.46		430.59
	5/19/15	47.38		425.67
	7/23/15	51.23		421.82
	11/10/15	57.96		415.09
	3/2/16	NM		NM
	5/2/16	38.04		435.01
IP-6	7/23/08	49.91	472.73	422.82
	10/13/08	55.63		417.10
	5/3/10 ^(f)	34.98		437.75
	4/25/11	30.60		441.83
	5/7/12	39.70		432.73
	8/6/12	44.44		427.99
	11/12/12	42.67		429.76
	2/12/13	NM		Dry
	4/22/13	37.05		435.38
	8/21/13	NM		Dry
	11/7/13	NM		Dry
	1/21/14	NM		Dry
	6/10/14	45.71	472.43 ^(c)	426.72
	8/13/14	55.68		416.75
	11/12/14	61.42		411.01
	1/20/15	NM		Dry
	5/19/15	51.95		420.48
	7/23/15	56.23		416.20
11/10/15	63.06	409.37		

TABLE C-1

**HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076**

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation^(a) (feet MSL)	Water Table Elevation^(b) (feet MSL)
IP-6 (cont.)	3/2/16	NM	472.43 ^(c)	NM
	5/2/16	41.98		430.45
IP-7	7/23/08	51.45	472.86	421.41
	10/13/08	57.23		415.63
	5/3/10 ^(f)	35.75		437.11
	4/25/11	31.51	472.43 ^(c)	440.92
	5/7/12	41.87		430.56
	8/6/12	45.63		426.80
	11/12/12	43.87		428.56
	2/12/13	NM		Dry
	4/22/13	38.34		434.09
	8/21/13	NM		Dry
	11/7/13	NM		Dry
	1/21/14	NM		Dry
	6/10/14	46.70		425.73
	8/13/14	57.10		415.33
	11/12/14	63.13		409.30
	1/20/15	NM		Dry
	5/19/15	53.25		419.18
	7/23/15	57.94		414.49
11/10/15	64.68	407.75		
3/2/16	NM	NM		
5/2/16	43.03	429.40		
IP-8	12/16/08	50.48	473.13	422.65
	5/3/10 ^(f)	33.34		439.79
	4/25/11	28.07	473.22 ^(c)	445.15
	1/31/12	39.45		433.77
	5/7/12	36.25		436.97
	8/6/12	40.32		432.90
	11/12/12	39.10		434.12
	2/12/13	31.59		441.63
	4/22/13	33.75		439.47
	8/21/13	36.69		436.53
	11/7/13	34.58		438.64

TABLE C-1

HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation ^(a) (feet MSL)	Water Table Elevation ^(b) (feet MSL)
IP-8 (cont.)	1/21/14	33.42	473.22 ^(c)	439.80
	6/10/14	41.72		431.50
	8/13/14	51.10		422.12
	11/12/14	56.52		416.70
	1/20/15	43.10		430.12
	5/19/15	47.84		425.38
	7/23/15	51.67		421.55
	11/10/15	61.83		411.39
	3/2/16	NM		NM
	5/2/16	38.52		434.70
IP-9	12/16/08	52.51	473.47	420.96
	5/3/10 ^(f)	31.79	473.35 ^(c)	441.68
	4/25/11	27.84		445.51
	1/31/12	39.37		433.98
	5/7/12	37.03		436.32
	8/6/12	40.30		433.05
	11/12/12	38.77		434.58
	2/12/13	31.25		442.10
	4/22/13	33.85		439.50
	8/21/13	35.50		437.85
	11/7/13	33.96		439.39
	1/21/14	32.78		440.57
	6/10/14	40.65		432.70
	8/13/14	50.45		422.90
	11/12/14	56.42		416.93
	1/20/15	46.60		426.75
	5/19/15	47.64		425.71
	7/23/15	51.10		422.25
	11/10/15	58.35		415.00
	3/2/16	NM		NM
5/2/16	38.32	435.03		
IP-10	2/11/09	48.77	473.78	425.01
	5/3/10 ^(f)	32.23	473.88 ^(c)	441.55
	4/25/11	27.79		446.09

TABLE C-1

**HISTORICAL WELL AND GROUNDWATER ELEVATIONS
TESORO - LIVERMORE, 67076**

Well No.	Date of Measurement	Depth to Water (feet below casing)	PVC Casing Elevation^(a) (feet MSL)	Water Table Elevation^(b) (feet MSL)
IP-10 (cont.)	1/31/12	39.24	473.88 ^(c)	434.64
	5/7/12	36.24		437.64
	8/6/12	40.36		433.52
	11/12/12	38.99		434.89
	2/12/13	31.18		442.70
	4/22/13	33.40		440.48
	6/24/13	34.87		439.01
	8/21/13	35.55		438.33
	11/7/13	34.41		439.47
	1/21/14	33.11		440.77
	6/10/14	42.15		431.73
	8/13/14	51.80		422.08
	11/12/14	57.45		416.43
	1/20/15	42.94		430.94
	5/19/15	47.88		426.00
	7/23/15	53.74		420.14
	11/10/15	58.83		415.05
	3/2/16	NM		NM
	5/2/16	38.44		435.44

- (a) Elevation of PVC well casing (north edge) surveyed relative to mean sea level (MSL). Wells were surveyed by Cross Land Surveying, Inc., per AB 2886 requirements. Benchmark K2-741, elevation is 467.835 feet above MSL.
- (b) Water Table Elevation = (Casing Elevation - Depth to Water).
- (c) Wells were resurveyed by Cross Land Surveying, Inc., per AB 2886 requirements, on 19 October 2010 after remediation system construction. Benchmark K2-741, elevation is 467.835 feet above MSL.
- (d) Depth of groundwater assumed to be below screened interval; well had 6 inches or less of water.
- (e) NM - Not measured.
- (f) Baseline remediation system values.

APPENDIX D
HISTORICAL GROUND WATER ANALYTICAL RESULTS

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
MW-1	6/1/93	27,000	2,200	400	ND<0.5 ^(c)	4,900	-- ^(d)	--	--	--	--	--	--	--	--
	6/22/93	87,000	8,000	10,000	260	10,000	--	--	--	--	--	--	--	--	--
	10/6/93	40,000	4,700	6,500	740	5,300	--	--	--	--	--	--	--	--	--
	1/13/94	9,400	1,300	9,500	110	850	--	--	--	--	--	--	--	--	--
	3/30/94	NS ^(e)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/25/94	11,000	1,500	1,800	290	1,700	--	--	--	--	--	--	--	--	--
	8/12/94	11,000	550	330	260	1,400	--	--	--	--	--	--	--	--	--
	12/14/94	11,000	1,000	1,200	320	1,500	--	--	--	--	--	--	--	--	--
	2/10/95	9,300	1,200	1,500	280	1,500	--	--	--	--	--	--	--	--	--
	6/15/95	140	5.6	ND<0.5	ND<0.5	ND<0.5	--	--	--	--	--	--	--	--	--
	9/26/95	410	140	ND<0.5	ND<0.5	43	--	--	--	--	--	--	--	--	--
	12/15/95	740	250	ND<1.3	ND<1.3	87	--	--	--	--	--	--	--	--	--
	3/21/96	ND<50	0.52	ND<0.5	ND<0.5	0.51	--	--	--	--	--	--	--	--	--
	6/13/96	240	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--	--	--	--	--	--	--	--	--
	9/16/96	720	70	ND<0.5	1.0	5.1	ND<5	--	--	--	--	--	--	--	--
	12/2/96	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--
	3/7/97	600	6.7	ND<0.5	1.2	1.8	ND<5	--	--	--	--	--	--	--	--
	6/12/97	18,000	180	800	410	1,800	ND<5	--	--	--	--	--	--	--	--
	9/29/97	350	120	1.5	ND<0.5	12	ND<5	--	--	--	--	--	--	--	--
	12/1/97	ND<50	7.0	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--
3/19/98	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--	
5/29/98	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--	
9/15/98	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--	
11/30/98	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
MW-1 (cont.)	1/17/99	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--
	6/10/99	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--
	9/7/99	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--
	12/13/99	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--
	3/13/00	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--
	6/12/00	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--
	11/10/00	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--	--	--	--	--	--	--	--
	12/31/00	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--	--	--	--	--	--	--	--
	3/27/01	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--	--	--	--	--	--	--	--
	6/30/01	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--	--	--	--	--	--	--	--
	9/26/01	90	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--	--	--	--	--	--	--	--
	12/18/01	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--	--	--	--	--	--	--	--
	11/4/04	4,500	2.5	5.8	79	140	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	1/12/05	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/2/05	78	0.80	0.70	0.86	2.4	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<40	ND<5	ND<0.5	ND<0.5
	7/19/05	290	ND<0.5	ND<0.5	4.0	4.1	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/21/05	370	ND<0.5	ND<0.5	0.75	1.3	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/9/06	140	ND<0.5	ND<0.5	0.67	1.0	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/16/06	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/9/06	100	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
11/8/06	400	ND<0.5	ND<0.5	1.7	1.9	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
2/14/07	410	ND<0.5	ND<0.5	2.2	2.2	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
5/17/07	2,300	ND<0.5	0.66	17	21	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<8	--	--	
8/2/07	580	5.7	0.64	6.8	12	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
MW-1 (cont.)	11/12/07	750	0.85	2.7	4.2	9.3	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<20	ND<0.5	ND<0.5
	2/14/08	1,700	3.3	17	38	83	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/8/08	620	1.8	ND<0.5	12	12	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	7/23/08	270	0.52	ND<0.5	3.9	1.8	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<80	ND<5	ND<0.5	ND<0.5
	10/13/08	730	ND<0.5	ND<0.5	0.68	0.80	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<10	ND<0.5	ND<0.5
	2/11/09	2,100	4.1	8.1	18	36	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<50	ND<0.5	ND<0.5
	4/27/09	2,800	9.9	34	94	170	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<8	ND<0.5	ND<0.5
	8/4/09	890	ND<0.5	ND<0.5	1.7	1.4	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<8	ND<0.5	ND<0.5
	12/8/09	3,200	16	18	81	110	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<80	ND<20	ND<0.5	ND<0.5
	2/11/10	1,300	3.7	1.7	13	6.7	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<20	ND<0.5	ND<0.5
	5/5/10	710	2.2	0.92	5.9	2.8	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/3/10	1,200	2.4	3.7	22	23	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/3/10	1,100	7.3	34	18	67	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/1/11	200	ND<0.5	ND<0.5	0.81	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	4/25/11	130	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/3/11	1,500	2.0	15	44	86	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	10/11/11	2,300	6.0	30	15	64	ND<0.5	ND<0.5	ND<0.5	ND<0.5	10	ND<50	ND<8	ND<0.5	ND<0.5
	1/31/12	1,700	1.6	11	26	89	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<100	ND<0.5	ND<0.5
	5/9/12	3,300	2.2	5.5	52	89	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<100	ND<5	ND<0.5	ND<0.5
	8/8/12	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
11/12/12	110	ND<0.5	ND<0.5	1.1	3.7	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
2/12/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
4/22/13	240	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
8/21/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
MW-1 (cont.)	11/7/13	4,300	0.82	2.9	76	160	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	1/21/14	9,600	2.5	5.2	130	250	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<15	ND<0.5	ND<0.5
	6/11/14	2,500	ND<0.5	1.6	27	58	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<10	ND<0.5	ND<0.5
	8/13/14	1,300	2.9	3.6	9.3	25	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<20	ND<0.5	ND<0.5
	11/12/14	5,400	33	48	39	530	ND<0.5	ND<0.5	ND<0.5	ND<0.5	8.4	ND<50	ND<8	ND<0.5	ND<0.5
	1/21/15	1,500	4.7	4.0	16	37	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/19/15	1,021	6.2	2.4	16	22	ND<0.5	ND<0.5	ND<0.5	ND<0.5	8.2	97	ND<5	ND<0.5	ND<0.5
	7/23/15	478	1.0	ND<0.5	ND<0.5	ND<1	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	62	ND<5	ND<0.5	ND<0.5
	11/10/15	2,710	8.5	20	3.5	256	ND<0.5	ND<0.5	ND<0.5	ND<0.5	47	ND<2,500	359	ND<0.5	ND<0.5
	3/4/16	980	8.0	8.5	54	145	ND<0.72	ND<0.64	ND<0.53	ND<0.4	19	--	--	ND<0.47	ND<0.28
5/3/16	239	ND<0.5	ND<0.5	5.5	4.2	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	ND<0.5	ND<0.5	
MW-2	6/1/93	170,000	20,000	21,000	3,300	18,000	--	--	--	--	--	--	--	--	--
	6/22/93	160,000	19,000	22,000	3,500	18,000	--	--	--	--	--	--	--	--	--
	10/6/93	110,000	17,000	17,000	3,000	15,000	--	--	--	--	--	--	--	--	--
	1/13/94	93,000	20,000	19,000	2,300	14,000	--	--	--	--	--	--	--	--	--
	3/30/94	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/25/94	41,000	9,600	7,300	840	7,800	--	--	--	--	--	--	--	--	--
	8/12/94	59,000	11,000	11,000	2,300	11,000	--	--	--	--	--	--	--	--	--
	12/14/94	63,000	13,000	13,000	2,200	12,000	--	--	--	--	--	--	--	--	--
	2/10/95	63,000	12,000	12,000	2,200	11,000	--	--	--	--	--	--	--	--	--
	6/15/95	61,000	11,000	12,000	1,900	11,000	--	--	--	--	--	--	--	--	--
	9/26/95	61,000	9,400	11,000	2,300	12,000	--	--	--	--	--	--	--	--	--
	12/15/95	48,000	8,000	8,300	2,200	12,000	--	--	--	--	--	--	--	--	--
3/21/96	48,000	8,000	7,700	2,400	12,000	--	--	--	--	--	--	--	--	--	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)	
MW-2 (cont.)	6/13/96	33,000	7,300	8,800	1,900	12,000	ND<250	--	--	--	--	--	--	--	--	
	9/16/96	8,600	510	640	180	1,300	ND<250	--	--	--	--	--	--	--	--	
	12/2/96	29,000	4,400	4,000	1,300	6,100	ND<130	--	--	--	--	--	--	--	--	
	3/7/97	13,000	1,800	1,100	270	2,000	ND<250	--	--	--	--	--	--	--	--	
	6/12/97	68,000	7,800	6,600	2,300	11,000	ND<500	--	--	--	--	--	--	--	--	
	9/29/97	15,000	1,500	97	740	1,800	ND<250	--	--	--	--	--	--	--	--	--
	12/1/97	13,000	900	37	860	2,400	ND<250	--	--	--	--	--	--	--	--	--
	3/19/98	42,000	5,000	3,600	2,000	8,300	ND<250	--	--	--	--	--	--	--	--	--
	5/29/98	68,000	5,600	4,700	2,400	11,000	ND<250	--	--	--	--	--	--	--	--	--
	9/15/98	36,000	3,900	1,200	1,400	7,800	ND<250	--	--	--	--	--	--	--	--	--
	11/30/98	16,000	2,200	59	1,200	1,500	ND<250	--	--	--	--	--	--	--	--	--
	1/17/99	30,000	4,000	2,200	2,100	9,500	ND<250	--	--	--	--	--	--	--	--	--
	6/10/99	70,000	6,300	1,800	3,600	14,000	ND<500	--	--	--	--	--	--	--	--	--
	9/7/99	42,000	3,800	840	1,900	8,000	150	--	--	--	--	--	--	--	--	--
	12/13/99	14,000	1,400	87	690	110	34	--	--	--	--	--	--	--	--	--
	3/13/00	38,000	2,400	2,300	1,600	6,400	2,400	--	--	--	--	--	--	--	--	--
	6/12/00	56,000	4,000	950	2,300	7,200	ND<50	--	--	--	--	--	--	--	--	--
	11/10/00	35,000	5,100	850	1,500	3,200	230	--	--	--	--	--	--	--	--	--
	12/31/00	21,000	3,200	420	1,300	1,200	440	--	--	--	--	--	--	--	--	--
	3/27/01	3,500	420	64	16	280	120	--	--	--	--	--	--	--	--	--
6/30/01	1,200	88	4.5	65	37	29	--	--	--	--	--	--	--	--	--	
9/26/01	53,000	8,500	1,500	2,400	4,600	270	--	--	--	--	--	--	--	--	--	
12/18/01	26,000	5,400	900	1,500	2,200	430	--	--	--	--	--	--	--	--	--	
1/22/02	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
MW-2 (cont.)	3/18/02	4,200	240	7.3	200	53	89	--	--	--	--	--	--	--	--
	6/5/02	25,000	3,500	390	1,400	2,400	550	--	--	--	--	--	--	--	--
	8/21/02	10,000	1,200	32	620	300	160	--	--	--	--	--	--	--	--
	12/3/02	3,700	110	2.5	130	11	29	--	--	--	--	--	--	--	--
	3/4/03	8,700	1,100	77	350	540	230	ND<0.5	ND<0.5	ND<10	21	ND<150	ND<5	ND<0.5	ND<0.5
	6/10/03	6,300	660	35	190	120	410	ND<2.5	ND<2.5	ND<5	ND<25	ND<250	ND<25	ND<2.5	ND<2.5
	9/9/03	6,900	500	ND<20	360	29	9,500	ND<20	ND<20	60	ND<200	ND<2,000	ND<200	ND<20	ND<20
	12/23/03	22,000	4,900	1,300	720	2,300	1,700	ND<20	ND<20	21	ND<200	ND<2,000	ND<200	ND<20	ND<20
	3/23/04	45,000	5,200	1,500	1,800	5,000	750	ND<20	ND<20	34	ND<200	ND<2,000	ND<200	ND<20	ND<20
	5/10/04	7,300	1,000	51	240	290	1,800	ND<5	ND<5	14	ND<50	ND<500	ND<50	ND<5	ND<5
	8/4/04	45,000	7,200	1,900	1,800	5,100	2,500	ND<25	ND<25	31	ND<250	ND<2,500	ND<250	ND<25	ND<25
	11/4/04	27,000	4,400	1,100	840	2,200	3,500	ND<9	ND<9	29	ND<50	ND<900	ND<90	ND<9	ND<9
	1/12/05	16,000	1,900	640	570	1,500	1,900	ND<4	ND<4	19	28 ^(f)	ND<400	ND<40	ND<4	ND<4
	5/2/05	44,000	5,200	1,100	1,800	4,800	2,200	ND<20	ND<20	30	ND<200	ND<2,000	ND<200	ND<20	ND<20
	7/20/05	21,000	3,000	500	1,000	1,500	4,400	ND<7	ND<7	32	74 ^(f)	ND<700	ND<70	ND<7	ND<7
	11/22/05	33,000	4,400	880	1,200	2,600	2,200	ND<9	ND<9	19	480	ND<900	ND<90	ND<9	ND<9
	2/9/06	25,000	3,300	720	1,300	2,200	2,500	ND<7	ND<7	27	490	ND<700	ND<70	ND<7	ND<7
	5/17/06	22,000	3,200	240	1,200	2,100	4,600	ND<7	ND<7	46	1,000	ND<700	ND<70	ND<7	ND<7
	8/9/06	34,000	4,200	830	1,300	2,400	2,900	ND<9	ND<9	25	1,600	ND<900	ND<90	ND<9	ND<9
	11/8/06	27,000	3,600	300	1,200	1,800	1,500	ND<9	ND<9	15	1,100	ND<900	ND<90	ND<9	ND<9
2/14/07	36,000	4,600	740	1,600	2,100	1,800	ND<5	ND<5	20	910	ND<700	ND<50	ND<5	ND<5	
5/17/07	37,000	7,400	680	1,900	2,400	3,000	ND<9	ND<9	24	2,600	ND<4,000	ND<90	--	--	
8/2/07	37,000	4,200	500	1,800	2,200	1,300	ND<9	ND<9	18	1,200	ND<2,000	ND<90	ND<9	ND<9	
11/12/07	25,000	5,900	120	1,700	820	1,400	ND<15	ND<15	16	720	ND<1,500	ND<150	ND<15	ND<15	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
MW-2 (cont.)	2/14/08	31,000	5,400	450	1,900	2,000	1,200	ND<15	ND<15	16	410	ND<1,500	ND<150	ND<15	ND<15
	5/8/08	29,000	3,200	620	1,400	1,700	580	ND<5	ND<5	10	210	ND<1,000	ND<50	ND<5	ND<5
	7/23/08	25,000	3,800	220	1,600	1,000	780	ND<5	ND<5	14	470	ND<900	ND<50	ND<5	ND<5
	10/13/08	31,000	7,600	160	1,800	440	1,600	ND<9	ND<9	20	710	ND<1,500	ND<90	ND<9	ND<9
	2/11/09	22,000	4,400	120	1,500	430	650	ND<9	ND<9	12	330	ND<3,000	ND<90	ND<9	ND<9
	4/28/09	28,000	3,400	600	1,500	1,700	380	ND<8	ND<8	8.1	150	ND<1,000	ND<80	ND<8	ND<8
	8/4/09	30,000	5,800	170	1,500	370	1,400	ND<9	ND<9	18	670	ND<3,000	ND<90	ND<9	ND<9
	12/8/09	24,000	3,100	200	1,200	830	520	ND<7	ND<7	8.0	250	ND<700	ND<70	ND<7	ND<7
	2/12/10	19,000	2,900	440	940	1,300	820	ND<7	ND<7	9.5	400	ND<700	ND<70	ND<7	ND<7
	5/3/10	26,000	3,100	870	1,100	2,200	530	ND<7	ND<7	8.0	370	ND<700	ND<70	ND<7	ND<7
	8/3/10	19,000	2,000	150	840	730	280	ND<4	ND<4	4.4	200	ND<400	ND<40	ND<4	ND<4
	11/4/10	13,000	2,000	160	420	390	540	ND<4	ND<4	5.7	510	ND<400	ND<40	ND<4	ND<4
	2/2/11	10,000	1,600	130	320	410	410	ND<4	ND<4	4.2	410	ND<400	ND<40	ND<4	ND<4
	4/28/11	13,000	1,400	100	470	670	450	ND<2.5	ND<2.5	4.6	200	ND<250	ND<50	ND<2.5	ND<2.5
	8/4/11	16,000	1,900	200	430	820	660	ND<3	ND<3	5.7	420	ND<1,500	ND<30	ND<3	ND<3
	10/11/11	7,000	810	110	200	430	370	ND<1.5	ND<1.5	3.3	170	ND<250	ND<15	ND<1.5	ND<1.5
	2/1/12	14,000	1,200	130	440	650	340	ND<2.5	ND<2.5	5.4	170	ND<800	ND<25	ND<2.5	ND<2.5
	5/11/12	14,000	1,200	140	490	1,000	220	ND<2.5	ND<2.5	2.7	120	ND<250	ND<25	ND<2.5	ND<2.5
	8/8/12	15,000	720	120	460	580	140	ND<2.5	ND<2.5	2.6	70	ND<250	ND<25	ND<2.5	ND<2.5
	11/14/12	5,700	480	30	96	300	200	ND<0.9	ND<0.9	1.8	110	ND<200	ND<9	ND<0.9	ND<0.9
2/13/13	270	29	4.4	8.9	19	7.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
4/23/13	430	10	2.2	3.8	8.5	13	ND<0.5	ND<0.5	ND<0.5	6.6	ND<50	ND<8	ND<0.5	ND<0.5	
6/24/13	1,700	7.2	0.91	12	16	9.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
8/21/13	11,000	560	30	430	440	88	ND<0.5	ND<0.5	1.0	48	ND<50	ND<8	ND<0.5	ND<0.5	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)	
MW-2 (cont.)	11/7/13	4,700	140	7.5	160	170	28	ND<0.9	ND<0.9	ND<0.9	22	ND<90	ND<9	ND<0.9	ND<0.9	
	1/22/14	3,000	140	9.0	68	92	43	ND<0.5	ND<0.5	ND<0.5	36	ND<50	ND<5	ND<0.5	ND<0.5	
	6/11/14	6,900	520	40	300	320	120	ND<0.5	ND<0.5	1.4	100	ND<80	ND<25	ND<0.5	ND<0.5	
	8/14/14	10,000	1,500	41	380	300	240	ND<0.5	ND<0.5	2.6	160	ND<300	ND<20	ND<0.5	ND<0.5	
	11/12/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	1/21/15	14,000	340	31	230	440	80	ND<2.5	ND<2.5	ND<2.5	93	ND<250	ND<25	ND<2.5	ND<2.5	
	5/20/15	9,310	178	14	109	203	52	ND<1.2	ND<1.2	ND<1.2	101	2,540	44	ND<1.2	ND<1.2	
	7/23/15	10,000	158	16	82	259	185	ND<0.84	ND<0.84	1.7	275	2,460	6.5	ND<0.84	ND<0.84	
	11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/4/16	1,400	13	ND<2.1	19	17	4.4	ND<2.1	ND<2.1	ND<2.1	ND<21	--	--	ND<2.1	ND<2.1	
5/4/16	2,220	12	1.3	35	24	2.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	ND<0.5	ND<0.5		
MW-3	6/1/93	270	4.6	ND<0.5	ND<0.5	1.9	--	--	--	--	--	--	--	--	--	
	6/22/93	160	8.2	ND<0.5	ND<0.5	0.72	--	--	--	--	--	--	--	--	--	
	10/6/93	740	57	110	24	120	--	--	--	--	--	--	--	--	--	
	1/13/94	83	2.6	0.67	0.78	4.2	--	--	--	--	--	--	--	--	--	
	3/30/94	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	4/25/94	60	0.75	3.2	0.50	3.6	--	--	--	--	--	--	--	--	--	
	8/12/94	310	7.3	14	2.6	13	--	--	--	--	--	--	--	--	--	
	12/14/94	75	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--	--	--	--	--	--	--	--	--	
	2/10/95	96	1.4	ND<0.5	ND<0.5	1.8	--	--	--	--	--	--	--	--	--	
	6/15/95	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--	--	--	--	--	--	--	--	--	
	9/26/95	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--	--	--	--	--	--	--	--	--	
	12/15/95	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--	--	--	--	--	--	--	--	--	
11/4/04	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	6.4	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5		

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
MW-3 (cont.)	1/12/05	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	4.4	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/2/05	140	ND<0.5	ND<0.5	ND<0.5	0.81	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	7/19/05	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	1.6	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/21/05	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	3.4	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/9/06	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	2.9	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/16/06	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/9/06	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	1.4	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/8/06	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	0.71	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/14/07	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	1.4	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/17/07	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	0.54	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	--	--
	8/2/07	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/12/07	190	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/14/08	240	ND<0.5	ND<0.5	ND<0.5	ND<0.5	0.83	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/8/08	57	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	7/23/08	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	10/13/08	280	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	61	ND<5	ND<0.5	ND<0.5
	2/11/09	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	4/27/09	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	0.64	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/4/09	190	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	12/8/09	150	3.6	1.1	2.4	2.6	0.82	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<50	ND<0.5	ND<0.5
2/11/10	61	ND<0.5	ND<0.5	ND<0.5	ND<0.5	0.52	ND<0.5	ND<0.5	ND<0.5	ND<5	53	ND<5	ND<0.5	ND<0.5	
5/6/10	ND<50	ND<0.5	1.0	ND<0.5	0.95	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
8/3/10	74	2.4	5.5	0.96	8.8	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
11/3/10	ND<50	ND<0.5	2.5	ND<0.5	3.8	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)	
MW-3 (cont.)	2/1/11	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	4/25/11	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/4/11	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	10/10/11	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	1/31/12	ND<50	ND<0.5	0.67	7.1	3.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	5/7/12	74	ND<0.5	0.56	1.9	7.7	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/6/12	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	11/12/12	170	ND<0.5	0.83	4.1	15	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	2/12/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	4/22/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/22/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	11/7/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	1/22/14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	6/11/14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/13/14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	11/12/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	1/20/15	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/19/15	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<1	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	54	ND<5	ND<0.5	ND<0.5
	7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
3/4/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
5/3/16	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	ND<0.5	ND<0.5	
MW-4	3/30/94	120	4.2	15	2.5	26	--	--	--	--	--	--	--	--	--	
	4/25/94	65	ND<0.5	1.8	ND<0.5	2.1	--	--	--	--	--	--	--	--	--	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)	
MW-4 (cont.)	8/12/94	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--	--	--	--	--	--	--	--	--	
	12/14/94	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--	--	--	--	--	--	--	--	--	
	2/10/95	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--	--	--	--	--	--	--	--	--	
	6/15/95	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--	--	--	--	--	--	--	--	--	
	9/26/95	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--	--	--	--	--	--	--	--	--	
	12/15/95	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--	--	--	--	--	--	--	--	--	
	11/4/04	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	1/12/05	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	5/2/05	ND<50	1.8	1.1	1.4	4.4	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	7/19/05	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	11/21/05	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	2/9/06	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	5/16/06	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/9/06	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	11/8/06	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	2/14/07	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	5/17/07	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	--	--	
	8/2/07	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	11/12/07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/14/08	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
5/8/08	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5		
7/23/08	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5		
10/13/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
2/11/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	

TABLE D-1

**HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076**

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)	
MW-4 (cont.)	4/27/09	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/4/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	12/8/09	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	2/11/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	5/4/10	ND<50	2.4	1.8	2.3	4.8	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/3/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/3/10	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/1/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/26/11	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/4/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/11/11	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	1/31/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/7/12	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/6/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/12	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	2/12/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/22/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/21/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/7/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	1/21/14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
6/11/14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5		
8/13/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
11/12/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
1/20/15	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
MW-4 (cont.)	5/19/15	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<1	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/4/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/2/16	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	ND<0.5	ND<0.5
MW-5	3/30/94	7,500	1,300	20	ND<13	160	--	--	--	--	--	--	--	--	--
	4/25/94	6,500	1,100	41	130	740	--	--	--	--	--	--	--	--	--
	8/12/94	4,000	420	2.9	41	98	--	--	--	--	--	--	--	--	--
	12/14/94	4,800	660	ND<2.5	33	13	--	--	--	--	--	--	--	--	--
	2/10/95	5,200	490	ND<13	23	19	--	--	--	--	--	--	--	--	--
	6/15/95	460	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--	--	--	--	--	--	--	--	--
	9/26/95	1,400	61	ND<0.5	3.1	ND<0.5	--	--	--	--	--	--	--	--	--
	12/15/95	2,100	77	1.5	10	1.5	--	--	--	--	--	--	--	--	--
	3/21/96	930	35	2.0	2.0	18	--	--	--	--	--	--	--	--	--
	6/13/96	610	38	0.72	1.9	2.0	ND<5	--	--	--	--	--	--	--	--
	9/16/96	380	29	ND<0.5	0.95	ND<0.5	ND<5	--	--	--	--	--	--	--	--
	12/2/96	200	1.1	0.64	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--
	3/7/97	520	74	ND<0.5	0.58	1.5	ND<5	--	--	--	--	--	--	--	--
	6/12/97	140	5.3	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--
	9/29/97	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--
	12/1/97	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--
	3/19/98	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--
5/29/98	540	4.1	ND<0.5	ND<0.5	0.52	ND<5	--	--	--	--	--	--	--	--	
9/15/98	67	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
MW-5 (cont.)	11/30/98	430	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--
	1/17/99	500	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--
	6/10/99	66	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--
	9/7/99	820	46	1.7	10	21	ND<5	--	--	--	--	--	--	--	--
	12/13/99	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--
	3/13/00	270	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--
	6/12/00	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	--	--	--	--
	11/10/00	2,200	42	1.1	25	30	8.6	--	--	--	--	--	--	--	--
	12/31/00	1,300	21	ND<0.5	4.3	2.6	10	--	--	--	--	--	--	--	--
	3/27/01	1,200	11	ND<0.5	2.6	ND<0.5	21	--	--	--	--	--	--	--	--
	6/30/01	1,400	4.8	ND<0.5	1.5	0.56	14	--	--	--	--	--	--	--	--
	9/26/01	660	ND<0.5	ND<0.5	ND<0.5	ND<0.5	3.0	--	--	--	--	--	--	--	--
	12/18/01	240	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--	--	--	--	--	--	--	--
	1/22/02	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/18/02	890	0.65	ND<0.5	ND<0.5	ND<0.5	3.1	--	--	--	--	--	--	--	--
	6/5/02	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	8/21/02	2,100	20	ND<0.5	63	4.0	7.0	--	--	--	--	--	--	--	--
	12/3/02	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/4/03	490	10	ND<0.5	2.2	ND<0.5	1.0	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	6/10/03	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
9/9/03	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
12/23/03	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
3/23/04	440	2.3	ND<0.5	1.0	5.9	2.4	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
5/10/04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)	
MW-5 (cont.)	8/4/04	160	ND<0.5	ND<0.5	ND<0.5	0.71	0.94	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	11/4/04	290	0.74	ND<0.5	0.58	1.3	0.61	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	1/12/05	300	ND<0.5	ND<0.5	0.51	1.6	0.73	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	5/2/05	120	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	7/20/05	330	ND<0.5	ND<0.5	ND<0.5	ND<0.5	1.1	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	11/21/05	210	ND<0.5	ND<0.5	ND<0.5	ND<0.5	1.2	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	2/9/06	ND<50	ND<0.5	ND<0.5	0.63	1.0	1.0	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	5/16/06	140	ND<0.5	ND<0.5	ND<0.5	ND<0.5	0.79	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/9/06	220	ND<0.5	ND<0.5	ND<0.5	ND<0.5	7.8	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	11/8/06	120	ND<0.5	ND<0.5	ND<0.5	ND<0.5	2.4	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	2/14/07	200	ND<0.5	ND<0.5	ND<0.5	1.1	2.1	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	5/17/07	140	ND<0.5	ND<0.5	ND<0.5	ND<0.5	1.4	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	--	--	
	8/2/07	85	ND<0.5	ND<0.5	ND<0.5	ND<0.5	1.9	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	11/12/07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/14/08	980	ND<0.5	ND<0.5	2.1	ND<0.5	1.0	ND<0.5	ND<0.5	ND<0.5	34	ND<50	ND<5	ND<0.5	ND<0.5	
	5/8/08	580	ND<0.5	ND<0.5	1.8	ND<0.5	0.60	ND<0.5	ND<0.5	ND<0.5	6.1	ND<50	ND<5	ND<0.5	ND<0.5	
	7/23/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/13/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/11/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/27/09	250	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
8/4/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
12/9/09	140	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5		
2/11/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
5/6/10	220	ND<0.5	ND<0.5	2.2	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5		

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
MW-5 (cont.)	8/3/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/3/10	100	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/2/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/25/11	190	ND<0.5	ND<0.5	0.80	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/4/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/10/11	160	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	1/31/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/8/12	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/6/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/12	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/12/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/22/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/21/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/7/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	1/21/14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	6/11/14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/13/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	1/20/15	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/19/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
3/4/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
5/3/16	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	ND<0.5	ND<0.5

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)	
MW-6	3/30/94	63,000	21,000	8,600	1,700	12,000	--	--	--	--	--	--	--	--	--	
	4/25/94	77,000	22,000	12,000	2,300	16,000	--	--	--	--	--	--	--	--	--	
	8/12/94	65,000	12,000	8,100	2,200	16,000	--	--	--	--	--	--	--	--	--	
	12/14/94	65,000	18,000	9,500	2,200	14,000	--	--	--	--	--	--	--	--	--	
	2/10/95	63,000	21,000	8,400	2,000	14,000	--	--	--	--	--	--	--	--	--	
	6/15/95	75,000	20,000	11,000	2,100	15,000	--	--	--	--	--	--	--	--	--	
	9/26/95	62,000	15,000	9,600	1,700	12,000	--	--	--	--	--	--	--	--	--	
	12/15/95	61,000	15,000	9,000	2,300	15,000	--	--	--	--	--	--	--	--	--	
	3/21/96	65,000	18,000	9,800	2,400	16,000	--	--	--	--	--	--	--	--	--	
	6/13/96	29,000	8,600	3,300	2,200	12,000	ND<250	--	--	--	--	--	--	--	--	--
	9/16/96	42,000	6,400	1,800	2,100	11,000	ND<250	--	--	--	--	--	--	--	--	--
	12/2/96	28,000	3,000	1,100	970	8,300	ND<500	--	--	--	--	--	--	--	--	--
	3/7/97	12,000	2,000	190	520	2,300	ND<250	--	--	--	--	--	--	--	--	--
	6/12/97	37,000	3,900	470	1,600	6,200	ND<100	--	--	--	--	--	--	--	--	--
	9/29/97	34,000	3,500	370	1,600	5,200	ND<100	--	--	--	--	--	--	--	--	--
	12/1/97	20,000	2,100	ND<10	1,200	2,200	ND<100	--	--	--	--	--	--	--	--	--
	3/19/98	24,000	2,900	460	1,100	3,400	ND<100	--	--	--	--	--	--	--	--	--
	5/29/98	38,000	3,500	700	1,800	5,200	ND<100	--	--	--	--	--	--	--	--	--
	9/15/98	22,000	1,900	110	1,400	3,000	ND<100	--	--	--	--	--	--	--	--	--
	11/30/98	9,900	770	16	820	710	ND<100	--	--	--	--	--	--	--	--	--
1/17/99	14,000	2,200	160	1,700	3,600	ND<100	--	--	--	--	--	--	--	--	--	
6/10/99	22,000	1,600	160	1,400	2,900	5.5	--	--	--	--	--	--	--	--	--	
9/7/99	17,000	1,400	33	1,300	1,800	ND<50	--	--	--	--	--	--	--	--	--	
12/13/99	16,000	790	9.2	840	780	ND<25	--	--	--	--	--	--	--	--	--	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
MW-6 (cont.)	3/13/00	16,000	790	85	780	1,600	ND<25	--	--	--	--	--	--	--	--
	6/12/00	24,000	1,100	150	1,300	2,300	5,600	--	--	--	--	--	--	--	--
	11/10/00	13,000	440	7.0	760	350	1,000	--	--	--	--	--	--	--	--
	12/31/00	12,000	680	8.0	820	190	1,400	--	--	--	--	--	--	--	--
	3/27/01	14,000	330	17	940	670	380	--	--	--	--	--	--	--	--
	6/30/01	750	45	0.93	47	14	54	--	--	--	--	--	--	--	--
	9/26/01	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	12/18/01	43,000	3,800	350	1,900	3,000	900	--	--	--	--	--	--	--	--
	1/22/02	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/18/02	33,000	2,600	120	1,800	2,800	740	--	--	--	--	--	--	--	--
	6/5/02	10,000	1,100	16	700	180	600	--	--	--	--	--	--	--	--
	8/21/02	10,000	1,200	23	710	290	370	--	--	--	--	--	--	--	--
	12/3/02	16,000	1,700	63	970	630	1,500	--	--	--	--	--	--	--	--
	3/4/03	16,000	1,700	25	1,200	40	7,700	ND<20	ND<20	ND<70	ND<200	ND<2,000	ND<200	ND<20	ND<20
	6/10/03	9,500	860	15	380	47	2,600	ND<5	ND<5	18	ND<50	ND<500	ND<50	ND<5	ND<5
	9/9/03	11,000	1,000	16	630	120	2,500	ND<5	ND<5	20	52	ND<500	ND<50	ND<5	ND<5
	12/23/03	18,000	2,100	41	1,100	390	4,900	ND<10	ND<10	42	ND<100	ND<1,000	ND<100	ND<10	ND<10
	3/23/04	24,000	1,400	71	1,500	2,000	7,500	ND<20	ND<20	66	ND<200	ND<2,000	ND<200	ND<20	ND<20
	5/10/04	6,500	550	ND<10	71	43	3,700	ND<10	ND<10	31	ND<100	ND<1,000	ND<100	ND<10	ND<10
	8/4/04	8,200	990	19	300	120	3,300	ND<5	ND<5	23	ND<50	ND<500	ND<50	ND<5	ND<5
11/4/04	9,600	1,100	30	320	160	2,200	ND<4	ND<4	18	22	ND<400	ND<40	ND<4	ND<4	
1/12/05	12,000	1,100	34	600	500	3,600	ND<4	ND<4	31	30	ND<400	ND<40	ND<4	ND<4	
5/2/05	14,000	630	22	610	920	4,000	ND<10	ND<10	32	120	ND<3,000	ND<100	ND<10	ND<10	
7/20/05	9,800	1,200	21	340	150	1,800	ND<2.5	ND<2.5	14	140	ND<500	ND<25	ND<2.5	ND<2.5	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)	
MW-6 (cont.)	11/21/05	6,600	150	26	580	640	100	ND<1	ND<1	ND<1	13	ND<100	ND<10	ND<1	ND<1	
	2/9/06	7,100	340	11	370	360	910	ND<2	ND<2	9.3	120	ND<200	ND<20	ND<2	ND<2	
	5/17/06	7,100	270	5.1	320	290	930	ND<2	ND<2	8.4	260	ND<200	ND<20	ND<2	ND<2	
	8/9/06	5,800	440	7.5	120	45	670	ND<2	ND<2	7.3	380	ND<2,000	ND<50	ND<2	ND<2	
	11/8/06	9,200	990	37	390	140	310	ND<2	ND<2	3.2	110	ND<200	ND<20	ND<2	ND<2	
	2/14/07	5,900	480	10	73	23	1,600	ND<2	ND<2	14	1,100	ND<500	ND<20	ND<2	ND<2	
	5/17/07	3,700	240	3.4	30	10	770	ND<0.5	ND<0.5	9.2	800	ND<2,000	ND<5	--	--	
	8/2/07	15,000	1,800	120	980	510	310	ND<2.5	ND<2.5	3.0	180	ND<250	ND<25	ND<2.5	ND<2.5	
	11/12/07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/14/08	14,000	2,000	63	750	190	810	ND<2.5	ND<2.5	7.7	600	ND<250	ND<25	ND<2.5	ND<2.5	
	5/8/08	15,000	1,700	59	700	130	540	ND<2.5	ND<2.5	5.9	410	ND<2,000	ND<25	ND<2.5	ND<2.5	
	7/23/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/13/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/11/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/28/09	16,000	2,200	160	860	230	320	ND<2.5	ND<2.5	3.8	580	ND<1,000	ND<25	ND<2.5	ND<2.5	
	8/4/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	12/9/09	15,000	2,100	96	800	160	340	ND<5	ND<5	ND<5	460	ND<2,000	ND<50	ND<5	ND<5	
	2/12/10	21,000	2,500	140	1,000	240	540	ND<5	ND<5	6.0	460	ND<500	ND<50	ND<5	ND<5	
	5/4/10	17,000	2,100	120	780	260	820	ND<5	ND<5	8.6	450	ND<500	ND<50	ND<5	ND<5	
	8/3/10	21,000	2,700	120	690	250	730	ND<5	ND<5	7.4	480	ND<500	ND<50	ND<5	ND<5	
11/2/10	12,000	1,600	57	410	120	240	ND<2.5	ND<2.5	2.7	160	ND<250	ND<25	ND<2.5	ND<2.5		
2/2/11	15,000	1,600	89	460	150	350	ND<2.5	ND<2.5	3.7	310	ND<250	ND<25	ND<2.5	ND<2.5		
4/27/11	8,500	870	28	180	67	1,200	ND<2.5	ND<2.5	10	1,100	ND<250	ND<25	ND<2.5	ND<2.5		
8/4/11	6,300	600	17	58	16	650	ND<1.5	ND<1.5	7.8	1,000	ND<600	ND<15	ND<1.5	ND<1.5		

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)	
MW-6 (cont.)	10/11/11	10,000	1,000	60	160	66	370	ND<2.5	ND<2.5	3.1	860	ND<250	ND<25	ND<2.5	ND<2.5	
	1/31/12	5,200	370	6.7	5.1	12	84	ND<0.9	ND<0.9	ND<0.9	1,500	ND<90	ND<10	ND<0.9	ND<0.9	
	5/10/12	11,000	1,200	60	140	69	150	ND<0.9	ND<0.9	ND<2	290	ND<250	ND<9	ND<0.9	ND<0.9	
	8/8/12	12,000	1,200	31	69	47	170	ND<2.5	ND<2.5	ND<2.5	440	ND<250	ND<25	ND<2.5	ND<2.5	
	11/14/12	17,000	1,600	68	120	96	190	ND<2.5	ND<2.5	ND<2.5	86	ND<500	ND<25	ND<2.5	ND<2.5	
	2/14/13	12,000	1,400	42	230	56	200	ND<2.5	ND<2.5	2.5	100	ND<250	ND<25	ND<2.5	ND<2.5	
	4/24/13	8,600	880	22	89	25	190	ND<1.5	ND<1.5	2.7	700	ND<400	ND<15	ND<1.5	ND<1.5	
	6/25/13	6,800	350	7.0	26	9.3	81	ND<0.9	ND<0.9	1.0	280	ND<800	ND<9	ND<0.9	ND<0.9	
	8/22/13	14,000	1,500	59	290	150	110	ND<1.5	ND<1.5	ND<1.5	93	ND<400	ND<15	ND<1.5	ND<1.5	
	11/7/13	12,000	1,200	62	190	81	100	ND<2.5	ND<2.5	ND<2.5	66	ND<250	ND<25	ND<2.5	ND<2.5	
	1/22/14	15,000	1,100	37	120	52	110	ND<2.5	ND<2.5	ND<2.5	190	ND<250	ND<25	ND<2.5	ND<2.5	
	6/10/14	11,000	860	20	50	20	120	ND<1.5	ND<1.5	ND<1.5	280	ND<150	ND<15	ND<1.5	ND<1.5	
	8/13/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	1/20/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/19/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
3/4/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
5/2/16	1,340	120	3.2	47	11	36	ND<1.1	ND<1.1	ND<1.1	30	--	--	ND<1.1	ND<1.1		
MW-7	3/30/94	43,000	7,200	2,400	1,600	11,000	--	--	--	--	--	--	--	--	--	
	4/25/94	30,000	3,900	1,000	940	6,900	--	--	--	--	--	--	--	--	--	
	8/12/94	30,000	3,800	1,400	1,300	7,500	--	--	--	--	--	--	--	--	--	
	12/14/94	31,000	3,600	1,200	900	6,400	--	--	--	--	--	--	--	--	--	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)	
MW-7 (cont.)	2/10/95	27,000	4,000	900	890	5,100	--	--	--	--	--	--	--	--	--	
	6/15/95	17,000	920	680	740	4,100	--	--	--	--	--	--	--	--	--	
	9/26/95	7,000	200	150	170	810	--	--	--	--	--	--	--	--	--	
	12/15/95	11,000	350	170	540	1,900	--	--	--	--	--	--	--	--	--	
	3/21/96	12,000	320	100	730	2,500	--	--	--	--	--	--	--	--	--	
	6/13/96	5,900	98	19	370	620	ND<50	--	--	--	--	--	--	--	--	--
	9/16/96	7,800	140	43	440	590	ND<25	--	--	--	--	--	--	--	--	--
	12/2/96	6,300	87	29	290	430	ND<50	--	--	--	--	--	--	--	--	--
	3/7/97	4,500	35	19	360	470	ND<25	--	--	--	--	--	--	--	--	--
	6/12/97	3,900	29	5.2	170	48	ND<5	--	--	--	--	--	--	--	--	--
	9/29/97	6,100	56	9.0	340	190	ND<25	--	--	--	--	--	--	--	--	--
	12/1/97	6,500	24	ND<2.5	400	250	ND<25	--	--	--	--	--	--	--	--	--
	3/19/98	2,000	20	ND<2.5	73	79	ND<25	--	--	--	--	--	--	--	--	--
	5/29/98	5,700	22	7.3	290	350	ND<25	--	--	--	--	--	--	--	--	--
	9/15/98	1,700	15	ND<2.5	44	5.1	ND<25	--	--	--	--	--	--	--	--	--
	11/30/98	4,800	42	12	270	640	ND<25	--	--	--	--	--	--	--	--	--
	1/17/99	3,400	33	ND<5	200	190	ND<50	--	--	--	--	--	--	--	--	--
	6/10/99	1,700	7.8	1.5	23	4.1	ND<5	--	--	--	--	--	--	--	--	--
	9/7/99	1,900	9.7	2.1	70	2.9	ND<5	--	--	--	--	--	--	--	--	--
	12/13/99	1,900	8.0	1.1	10	1.1	ND<5	--	--	--	--	--	--	--	--	--
3/13/00	1,500	7.5	ND<0.5	6.7	2.9	ND<5	--	--	--	--	--	--	--	--	--	
6/12/00	1,200	5.4	ND<0.5	5.2	1.0	ND<5	--	--	--	--	--	--	--	--	--	
11/10/00	1,000	3.9	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--	--	--	--	--	--	--	--	--	
12/31/00	620	1.8	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--	--	--	--	--	--	--	--	--	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
MW-7 (cont.)	3/27/01	1,200	4.8	ND<0.5	6.7	0.94	ND<0.5	--	--	--	--	--	--	--	--
	6/30/01	2,800	10	1.7	75	170	ND<0.5	--	--	--	--	--	--	--	--
	9/26/01	1,900	16	0.89	2.3	25	ND<0.5	--	--	--	--	--	--	--	--
	12/18/01	3,000	13	0.88	3.4	3.4	ND<0.5	--	--	--	--	--	--	--	--
	1/22/02	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/18/02	3,100	7.3	1.5	38	110	ND<0.5	--	--	--	--	--	--	--	--
	6/5/02	1,800	7.6	1.0	39	20	ND<0.5	--	--	--	--	--	--	--	--
	8/21/02	3,300	7.6	0.70	85	36	ND<0.5	--	--	--	--	--	--	--	--
	12/3/02	1,700	5.4	ND<0.5	15	5.5	ND<0.5	--	--	--	--	--	--	--	--
	3/4/03	440	1.8	ND<0.5	0.54	2.9	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	6/10/03	550	0.80	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	9/9/03	120	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	12/23/03	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	3/23/04	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/10/04	67	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/4/04	2,600	2.5	ND<0.5	36	31	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/4/04	1,600	2.0	ND<0.5	16	16	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	1/12/05	830	1.6	ND<0.5	15	12	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/2/05	710	ND<0.5	ND<0.5	0.75	0.52	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	7/20/05	1,400	1.1	ND<0.5	9.2	8.6	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
11/21/05	1,100	0.56	ND<0.5	3.4	23	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
2/9/06	270	ND<0.5	ND<0.5	1.2	0.98	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
5/16/06	930	0.84	ND<0.5	10	7.9	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
8/9/06	650	ND<0.5	ND<0.5	1.2	1.0	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
MW-7 (cont.)	11/8/06	800	ND<0.5	ND<0.5	1.0	0.62	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/14/07	800	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/17/07	700	ND<0.5	ND<0.5	ND<0.5	0.71	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	--	--
	8/2/07	3,200	1.3	ND<0.5	50	120	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/12/07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/14/08	1,600	1.2	ND<0.5	4.5	1.0	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/8/08	1,400	2.2	0.74	2.8	0.93	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	7/23/08	2,300	3.9	1.4	8.9	5.4	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	10/13/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/11/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/28/09	4,500	7.4	3.8	33	7.3	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/4/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	12/17/09	4,500	6.7	3.4	27	8.8	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<80	ND<8	ND<0.5	ND<0.5
	2/11/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/6/10	3,600	7.9	3.6	14	6.4	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<8	ND<0.5	ND<0.5
	8/3/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/3/10	2,100	4.6	1.3	16	3.3	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/2/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/26/11	1,200	3.3	0.59	1.6	1.3	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/4/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
10/10/11	1,900	3.5	1.2	0.79	1.6	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
1/31/12	1,700	1.5	0.55	6.0	1.1	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
5/9/12	1,600	1.4	0.79	1.4	0.95	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
8/7/12	1,500	1.0	ND<0.5	0.51	0.65	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)	
MW-7 (cont.)	11/13/12	690	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	2/12/13	860	1.0	ND<0.5	2.3	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	4/23/13	720	0.65	0.61	1.0	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	6/24/13	1,700	1.3	ND<0.5	2.7	2.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/21/13	880	0.54	ND<0.5	1.7	0.82	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	11/7/13	330	ND<0.5	ND<0.5	0.51	0.73	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	1/22/14	1,000	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	6/10/14	1,000	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<80	ND<5	ND<0.5	ND<0.5	
	8/13/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	1/20/15	100	0.50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	5/19/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/4/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
5/3/16	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	ND<0.5	1.5	
MW-8	9/5/03	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	
	12/23/03	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	7.3	ND<0.5	ND<0.5	
	3/23/04	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	5/10/04	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/4/04	ND<50	ND<0.5	ND<0.5	ND<0.5	0.86	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	11/4/04	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	1/12/05	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	5/2/05	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	

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HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
MW-8 (cont.)	7/19/05	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/21/05	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/9/06	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	0.57	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/16/06	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/9/06	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/8/06	ND<50	1.2	1.9	ND<0.5	0.66	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/14/07	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/17/07	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	--	--
	8/2/07	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/12/07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/14/08	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/8/08	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	7/23/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/13/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/11/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/27/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	8/4/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	12/17/09	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/11/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/6/10	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
8/3/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
11/3/10	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
2/2/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
4/25/11	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	

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HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
MW-8 (cont.)	8/4/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/10/11	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	1/31/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/7/12	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/6/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/12	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/12/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/23/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	6/25/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/22/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/7/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	1/22/14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	6/11/14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	80	ND<5	ND<0.5	ND<0.5
	8/13/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	1/20/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/19/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
3/4/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
5/3/16	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	ND<0.5	ND<0.5
MW-9	9/5/03	3,400	23	1.5	110	10	10	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--
	12/23/03	1,100	2.4	ND<0.5	0.80	0.80	2.1	ND<0.5	ND<0.5	ND<0.5	5.9	ND<50	ND<5	ND<0.5	ND<0.5
	3/23/04	760	8.5	ND<0.5	4.9	0.95	18	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5

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HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
MW-9 (cont.)	5/10/04	1,100	4.4	ND<0.5	1.3	0.67	11	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/4/04	1,200	3.4	0.59	16	7.6	6.1	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/4/04	610	0.52	ND<0.5	1.3	ND<0.5	2.0	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	1/12/05	1,400	1.6	0.55	5.5	1.1	2.4	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/2/05	1,500	10	0.55	6.7	1.1	27	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	7/20/05	1,800	5.5	0.69	12	1.6	10	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/21/05	1,200	0.94	ND<0.5	1.4	ND<0.5	3.3	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/9/06	1,200	2.8	0.51	6.4	0.84	4.4	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/16/06	1,600	3.8	0.57	12	1.8	4.9	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/9/06	760	ND<0.5	ND<0.5	1.0	ND<0.5	2.6	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/8/06	1,700	1.7	0.53	6.7	1.4	1.7	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/14/07	1,000	ND<0.5	ND<0.5	0.51	ND<0.5	0.51	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/17/07	870	ND<0.5	ND<0.5	0.54	ND<0.5	0.93	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	--	--
	8/2/07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/14/08	3,300	68	2.1	110	7.8	16	ND<0.5	ND<0.5	ND<0.5	13	ND<50	ND<5	ND<0.5	ND<0.5
	5/8/08	1,200	8.2	0.52	4.0	0.74	5.9	ND<0.5	ND<0.5	ND<0.5	5.4	ND<50	ND<5	ND<0.5	ND<0.5
	7/23/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/13/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/11/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
4/27/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
8/4/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
12/9/09	1,200	ND<0.5	ND<0.5	ND<0.5	ND<0.5	1.4	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
2/11/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	

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Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)	
MW-9 (cont.)	5/4/10	2,700	120	7.0	35	14	44	ND<0.5	ND<0.5	0.52	31	ND<200	ND<5	ND<0.5	ND<0.5	
	8/3/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	11/3/10	430	1.1	ND<0.5	ND<0.5	ND<0.5	4.4	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	2/2/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	4/26/11	1,300	14	ND<0.5	2.8	0.71	23	ND<0.5	ND<0.5	ND<0.5	26	ND<50	ND<5	ND<0.5	ND<0.5	
	8/4/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/11/11	470	ND<0.5	ND<0.5	ND<0.5	ND<0.5	3.0	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	1/31/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/8/12	2,500	12	1.1	9.0	3.0	7.4	ND<0.5	ND<0.5	ND<0.5	8.8	ND<50	ND<5	ND<0.5	ND<0.5	
	8/6/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/13/12	740	ND<0.5	ND<0.5	ND<0.5	ND<0.5	4.2	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	2/12/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/23/13	1,900	4.5	0.75	1.7	1.0	3.4	ND<0.5	ND<0.5	ND<0.5	5.0	ND<50	ND<5	ND<0.5	ND<0.5	
	6/25/13	2,800	20	0.91	3.8	2.7	6.0	ND<0.5	ND<0.5	ND<0.5	29	ND<50	ND<5	ND<0.5	ND<0.5	
	8/22/13	1,500	20	0.70	1.7	0.84	9.0	ND<0.5	ND<0.5	ND<0.5	40	ND<50	ND<5	ND<0.5	ND<0.5	
	11/7/13	1,400	3.1	ND<0.5	0.7	0.58	4.2	ND<0.5	ND<0.5	ND<0.5	12	ND<50	ND<5	ND<0.5	ND<0.5	
	1/22/14	2,000	2.4	ND<0.5	0.81	0.79	2.7	ND<0.5	ND<0.5	ND<0.5	7.6	ND<50	ND<5	ND<0.5	ND<0.5	
	6/11/14	780	ND<0.5	ND<0.5	ND<0.5	ND<0.5	2.9	ND<0.5	ND<0.5	ND<0.5	5.4	ND<50	ND<5	ND<0.5	ND<0.5	
	8/13/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
1/20/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
5/19/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)	
MW-9	3/4/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
(cont.)	5/3/16	240	ND<0.5	ND<0.5	ND<0.5	ND<1.5	1.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	ND<0.5	ND<0.5	
MW-10	9/5/03	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	--	--	
	12/23/03	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	3/23/04	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	5/10/04	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/4/04	ND<50	ND<0.5	ND<0.5	ND<0.5	0.61	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	11/4/04	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	1/12/05	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	5/2/05	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	7/19/05	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	11/21/05	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	2/9/06	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	5/16/06	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/9/06	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	11/8/06	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	2/14/07	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	5/17/07	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	--	--	
	8/2/07	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	11/12/07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/14/08	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
5/8/08	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5		
7/23/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
10/13/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
MW-10 (cont.)	2/11/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/27/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	8/4/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	12/9/09	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/11/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/6/10	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/3/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/2/10	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/2/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/25/11	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/4/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/10/11	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	1/31/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/7/12	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/6/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/12	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/12/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/22/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	6/25/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/21/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
11/7/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
1/21/14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
6/10/14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
8/13/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
MW-10 (cont.)	11/12/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	1/20/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/19/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/4/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/3/16	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	ND<0.5	1.5
MW-11	12/16/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/11/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/27/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	8/4/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	12/8/09	100,000	6,100	9,000	3,100	20,000	3.3	ND<0.5	ND<0.5	ND<0.5	25	ND<200	ND<20	ND<0.5	ND<0.5
	2/11/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/3/10	62,000	3,600	5,900	2,600	12,000	ND<15	ND<15	ND<15	ND<15	ND<70	ND<1,500	ND<150	ND<15	ND<15
	8/3/10	53,000	2,800	3,800	2,100	10,000	ND<15	ND<15	ND<15	ND<15	ND<70	ND<1,500	ND<150	ND<15	ND<15
	11/4/10	59,000	2,100	5,400	1,400	12,000	ND<15	ND<15	ND<15	ND<15	ND<70	ND<1,500	ND<150	ND<15	ND<15
	2/2/11	20,000	210	610	560	3,600	ND<5	ND<5	ND<5	ND<5	38	ND<500	ND<50	ND<5	ND<5
	4/28/11	20,000	300	920	450	4,300	ND<5	ND<5	ND<5	ND<5	ND<25	ND<500	ND<50	ND<5	ND<5
	8/4/11	15,000	96	370	240	2,800	ND<4	ND<4	ND<4	ND<4	ND<20	ND<400	ND<40	ND<4	ND<4
	10/25/11	18,000	130	500	319	2,900	ND<0.5	ND<0.5	ND<0.5	ND<0.5	18	ND<50	ND<10	ND<0.5	ND<0.5
	2/1/12	13,000	380	710	83	2,400	ND<2.5	ND<2.5	ND<2.5	ND<2.5	ND<15	ND<250	ND<50	ND<2.5	ND<2.5
	5/11/12	1,100	3.8	15	6.7	150	0.52	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<8	ND<0.5	ND<0.5
8/7/12	10,000	54	83	270	1,400	2.3	ND<0.5	ND<0.5	ND<0.5	10	ND<50	ND<5	ND<0.5	ND<0.5	
11/13/12	1,100	5.7	4.1	15	86	1.6	ND<0.5	ND<0.5	ND<0.5	6.1	ND<50	ND<5	ND<0.5	ND<0.5	

TABLE D-1

**HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076**

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)	
MW-11 (cont.)	2/13/13	6,400	28	72	160	860	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<8	ND<0.5	ND<0.5	
	4/24/13	5,800	16	18	140	640	ND<0.9	ND<0.9	ND<0.9	ND<0.9	ND<5	ND<90	ND<9	ND<0.9	ND<0.9	
	6/24/13	8,000	24	34	190	830	ND<0.9	ND<0.9	ND<0.9	ND<0.9	5.8	ND<90	ND<9	ND<0.9	ND<0.9	
	8/22/13	9,600	26	32	260	940	ND<0.9	ND<0.9	ND<0.9	ND<0.9	8.6	ND<200	ND<20	ND<0.9	ND<0.9	
	11/7/13	8,800	50	54	380	1,000	ND<1.5	ND<1.5	ND<1.5	ND<1.5	12	ND<150	ND<15	ND<1.5	ND<1.5	
	1/22/14	15,000	44	45	390	910	ND<1.5	ND<1.5	ND<1.5	ND<1.5	7.7	ND<150	ND<15	ND<1.5	ND<1.5	
	6/10/14	660	3.7	1.2	7.0	5.6	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/13/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	1/20/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/19/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	7/23/15 ^(g)	3,480	ND<0.5	ND<0.5	ND<0.5	5.3	ND<0.5	ND<0.5	ND<0.5	ND<0.5	28	ND<50	ND<5	ND<0.5	ND<0.5	
	11/10/15 ^(g)	74	ND<0.5	ND<0.5	ND<0.5	ND<1	ND<0.5	ND<0.5	ND<0.5	ND<0.5	18	ND<2,500	526	ND<0.5	ND<0.5	
	3/4/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
5/3/16	2,110	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	ND<0.5	ND<0.5		
MW-12	6/14/12	6,900	8.5	2.2	96	22	ND<0.9	ND<0.9	ND<0.9	ND<0.9	ND<5	ND<90	ND<9	ND<0.9	ND<0.9	
	8/8/12	6,000	10	2.2	100	12	ND<0.9	ND<0.9	ND<0.9	ND<0.9	ND<5	ND<90	ND<9	ND<0.9	ND<0.9	
	11/14/12	5,500	6.8	2.0	67	13	ND<0.9	ND<0.9	ND<0.9	ND<0.9	ND<5	ND<90	ND<9	ND<0.9	ND<0.9	
	2/13/13	2,500	7.6	1.3	26	3.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	4/24/13	1,400	2.2	0.78	7.7	1.1	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<100	ND<20	ND<0.5	ND<0.5	
	6/25/13	4,400	8.8	5.2	26	13	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/22/13	4,500	15	2.4	33	6.4	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	11/7/13	4,600	15	2.4	47	13	0.50	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	1/22/14	3,400	4.3	1.5	12	2.6	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
MW-12 (cont.)	6/10/14	4,500	10	2.9	67	13	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/13/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	1/20/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/19/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/4/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/4/16	1,350	2.8	ND<0.5	41	18	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	ND<0.5	ND<0.5
VW-2	8/4/04	5,700	480	ND<20	600	ND<20	12,000	ND<20	ND<20	110	ND<90	ND<2,000	ND<200	ND<20	ND<20
	11/4/04	5,800	340	ND<20	38	ND<20	10,000	ND<20	ND<20	120	ND<90	ND<2,000	ND<200	ND<20	ND<20
	1/12/05	3,800	210	ND<5	90	54	2,900	ND<5	ND<5	33	26 ^(f)	ND<500	ND<50	ND<5	ND<5
	5/2/05	2,600	84	ND<2	13	7.0	960	ND<2	ND<2	12	57	ND<500	ND<20	ND<2	ND<2
	7/20/05	6,200	240	13	290	480	6,600	ND<2	ND<2	56	59 ^(f)	ND<2,000	ND<20	ND<2	ND<2
	11/21/05	3,100	100	ND<9	22	10	5,300	ND<9	ND<9	54	76 ^(f)	ND<900	ND<90	ND<9	ND<9
	2/9/06	3,500	140	ND<25	130	36	12,000	ND<25	ND<25	65	2,800	ND<2,500	ND<250	ND<25	ND<25
	5/17/06	1,800	90	2.6	39	11	1,200	ND<2.5	ND<2.5	12	700	ND<250	ND<25	ND<2.5	ND<2.5
	8/9/06	4,300	86	3.5	200	16	2,500	ND<2.5	ND<2.5	28	2,800	ND<5,000	ND<25	ND<2.5	ND<2.5
	11/8/06	3,200	46	3.1	10	4.8	1,500	ND<3	ND<3	11	7,100	ND<800	ND<30	ND<3	ND<3
	2/14/07	3,300	75	4.6	50	82	580	ND<2	ND<2	7.0	4,100	ND<500	ND<20	ND<2	ND<2
	5/17/07	3,500	51	7.3	17	24	100	ND<2.5	ND<2.5	ND<2.5	7,100	ND<250	ND<25	--	--
	8/2/07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/14/08	5,700	180	14	150	120	530	ND<2.5	ND<2.5	4.1	5,000	ND<250	ND<25	ND<2.5	ND<2.5

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
VW-2 (cont.)	5/8/08	3,000	40	3.8	32	34	270	ND<1.5	ND<1.5	2.7	4,500	ND<250	ND<15	ND<1.5	ND<1.5
	7/23/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/13/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/11/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/27/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	8/4/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	12/9/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/11/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/5/10	2,800	130	6.1	170	130	1,300	ND<2.5	ND<2.5	12	1,700	ND<250	ND<25	ND<2.5	ND<2.5
	8/3/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/4/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/2/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/28/11	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/4/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/10/11	ND<50	ND<0.5	ND<0.5	ND<0.5	0.51	0.79	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	1/31/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/7/12	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	0.83	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/6/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/12	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/12/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
4/24/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
8/21/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
11/7/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
1/22/14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
VW-2 (cont.)	6/10/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	8/13/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	1/20/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/19/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/4/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/2/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
VW-3	8/4/04	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/4/04	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	1/12/05	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/2/05	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	7/20/05	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/21/05	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/9/06	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/16/06	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/9/06	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/8/06	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	1,100
	2/14/07	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/17/07	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	--	--
	8/2/07	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/12/07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/14/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
VW-3 (cont.)	5/8/08	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	7/23/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/13/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/11/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/27/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	8/4/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	12/9/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/11/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/6/10	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/3/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/4/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/2/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/25/11	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/4/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/10/11	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	1/31/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/7/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	8/6/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/12/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
4/22/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
8/21/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
11/7/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
1/22/14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
VW-3 (cont.)	6/10/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	8/13/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	1/20/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/19/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/4/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/2/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TP-1	7/20/05	42,000	2,800	1,100	1,700	4,800	12,000	ND<20	ND<20	92	130	ND<2,000	ND<200	ND<20	ND<20
	11/22/05	36,000	2,100	290	1,400	2,600	11,000	ND<20	ND<20	70	810	ND<2,000	ND<200	ND<20	ND<20
	2/9/06	19,000	1,400	230	990	1,700	8,900	ND<15	ND<15	72	2,200	ND<1,500	ND<150	ND<15	ND<15
	5/17/06	20,000	1,400	200	920	1,800	9,200	ND<20	ND<20	37	2,500	ND<10,000	ND<200	ND<20	ND<20
	8/9/06	28,000	1,600	150	1,200	2,200	13,000	ND<15	ND<15	84	4,900	ND<2,500	ND<150	ND<15	ND<15
	11/8/06	20,000	1,100	78	990	1,600	6,800	ND<15	ND<15	47	4,400	ND<8,000	ND<150	ND<15	ND<15
	2/14/07	15,000	820	37	810	1,000	8,300	ND<15	ND<15	58	8,500	ND<4,000	ND<150	ND<15	ND<15
	5/17/07	16,000	850	35	810	1,200	6,700	ND<10	ND<10	42	12,000	ND<2,000	ND<100	--	--
	8/2/07	15,000	2,000	100	970	630	3,400	ND<7	ND<7	25	4,000	ND<700	ND<70	ND<7	ND<7
	11/12/07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/14/08	18,000	1,100	49	1,200	910	7,000	ND<15	ND<15	58	4,200	ND<1,500	ND<150	ND<15	ND<15
	5/8/08	12,000	890	54	770	380	2,500	ND<5	ND<5	22	3,400	ND<2,500	ND<50	ND<5	ND<5
	7/23/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/13/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/11/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)	
TP-1 (cont.)	4/27/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	8/4/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	12/17/09	10,000	690	19	700	45	1,000	ND<2.5	ND<2.5	8.8	2,900	ND<250	ND<25	ND<2.5	ND<2.5	
	2/11/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	5/5/10	15,000	2,100	360	1,100	620	3,400	ND<8	ND<8	27	4,500	ND<800	ND<80	ND<8	ND<8	
	8/3/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/3/10	14,000	1,000	270	280	1,600	4,500	ND<8	ND<8	28	4,800	ND<800	ND<80	ND<8	ND<8	
	2/2/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/28/11	6,600	350	64	170	730	2,600	ND<5	ND<5	15	1,400	ND<500	ND<50	ND<5	ND<5	
	8/4/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/11/11	2,000	32	4.3	49	220	1,500	ND<3	ND<3	9.7	1,000	ND<800	ND<30	ND<3	ND<3	
	1/31/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/8/12	590	1.6	ND<0.5	7.1	22	28	ND<0.5	ND<0.5	ND<0.5	27	ND<80	ND<5	ND<0.5	ND<0.5	
	8/7/12	2,800	24	3.7	74	68	110	ND<0.5	ND<0.5	0.94	62	ND<400	ND<5	ND<0.5	ND<0.5	
	11/13/12	180	2.3	0.63	4.7	2.3	17	ND<0.5	ND<0.5	ND<0.5	9.6	ND<50	ND<5	ND<0.5	ND<0.5	
	2/12/13	160	ND<0.5	ND<0.5	3.6	6.0	3.3	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	4/24/13	2,000	35	21	22	180	76	ND<0.5	ND<0.5	0.70	33	ND<50	ND<5	ND<0.5	ND<0.5	
	8/22/13	3,500	28	3.8	35	11	100	ND<0.5	ND<0.5	0.98	42	ND<50	ND<5	ND<0.5	ND<0.5	
	11/7/13	2,800	14	1.8	19	7.3	43	ND<0.5	ND<0.5	ND<0.5	25	ND<50	ND<5	ND<0.5	ND<0.5	
	1/22/14	3,400	11	1.4	16	5.2	41	ND<0.5	ND<0.5	ND<0.5	22	ND<50	ND<5	ND<0.5	ND<0.5	
6/10/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
8/13/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
11/12/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
1/20/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
TP-1 (cont.)	5/19/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/4/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/4/16	206	2.7	0.67	3.5	8.8	1.6	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	ND<0.5	ND<0.5
TP-2	7/20/05	26,000	1,800	1,100	1,100	2,500	63,000	ND<150	ND<150	400	ND<700	ND<15,000	ND<1,500	ND<150	ND<150
	11/22/05	16,000	1,200	140	840	820	52,000	ND<90	ND<90	340	1,200	ND<9,000	ND<900	ND<90	ND<90
	2/9/06	2,700	94	2.9	28	14	1,200	ND<2.5	ND<2.5	13	1,600	ND<250	ND<25	ND<2.5	ND<2.5
	5/17/06	31,000	2,200	1,100	1,500	3,300	87,000	ND<90	ND<90	680	4,800	ND<15,000	ND<1,500	ND<90	ND<90
	8/9/06	14,000	1,400	86	1,200	830	56,000	ND<2.5	ND<2.5	350	2,800	ND<4,000	ND<25	ND<2.5	ND<2.5
	11/8/06	16,000	1,300	ND<90	930	370	38,000	ND<90	ND<90	280	3,600	ND<40,000	ND<900	ND<90	ND<90
	2/14/07	22,000	1,900	230	1,700	1,600	53,000	ND<90	ND<90	400	2,800	ND<20,000	ND<900	ND<90	ND<90
	5/17/07	ND<25,000	2,400	51	1,500	510	69,000	ND<2	ND<0.5	550	4,300	ND<25,000	ND<5	--	--
	8/2/07	10,000	1,200	ND<25	640	140	14,000	ND<25	ND<25	110	16,000	ND<10,000	ND<250	ND<25	ND<25
	11/12/07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/14/08	12,000	920	28	850	740	17,000	ND<25	ND<25	120	5,900	ND<4,000	ND<250	ND<25	ND<25
	5/8/08	7,400	710	28	510	110	6,400	ND<8	ND<8	64	5,200	ND<12,000	ND<80	ND<8	ND<8
	7/23/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/13/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/11/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/27/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	8/4/09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
12/17/09	7,200	950	ND<25	77	ND<25	13,000	ND<25	ND<25	130	20,000	ND<2,500	ND<250	ND<25	ND<25	
2/11/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
TP-2 (cont.)	5/6/10	6,400	740	ND<25	450	130	14,000	ND<25	ND<25	130	9,900	ND<2,500	ND<250	ND<25	ND<25
	8/3/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/4/10	4,900	230	82	150	630	980	ND<5	ND<5	6.3	14,000	ND<500	ND<50	ND<5	ND<5
	2/2/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/28/11	130	1.6	ND<0.5	1.5	5.2	350	ND<0.5	ND<0.5	1.3	630	ND<50	ND<5	ND<0.5	ND<0.5
	8/4/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/11/11	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	120	ND<0.5	ND<0.5	ND<0.5	380	ND<50	ND<5	ND<0.5	ND<0.5
	1/31/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/7/12	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/7/12	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	8.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/12/12	59	ND<0.5	ND<0.5	0.59	0.54	2.8	ND<0.5	ND<0.5	ND<0.5	13	ND<50	ND<5	ND<0.5	ND<0.5
	2/12/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	0.57	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	4/24/13	100	1.2	0.88	1.6	7.4	0.54	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/21/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	0.89	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/7/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	1/21/14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	6/10/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	8/13/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	1/20/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
5/19/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
TP-2	3/4/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
(cont.)	5/2/16	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<1.5	0.79	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	ND<0.5	1.5
DW-1	5/22/08	5,100	470	150	210	570	100	ND<0.9	ND<0.9	0.98	76	ND<90	ND<9	ND<0.9	ND<0.9
	7/23/08	560	43	5.2	18	40	16	ND<0.5	ND<0.5	ND<0.5	21	ND<100	ND<5	ND<0.5	ND<0.5
	10/13/08	2,800	370	15	120	78	140	ND<0.5	ND<0.5	1.2	220	ND<300	ND<80	ND<0.5	ND<0.5
	2/11/09	520	45	5.3	32	31	42	ND<0.5	ND<0.5	ND<0.5	43	ND<100	ND<8	ND<0.5	ND<0.5
	4/28/09	2,700	250	36	160	190	86	ND<0.5	ND<0.5	0.84	120	ND<50	ND<5	ND<0.5	ND<0.5
	8/5/09	2,100	330	17	87	53	220	ND<0.5	ND<0.5	2.0	310	ND<50	ND<5	ND<0.5	ND<0.5
	12/8/09	6,200	560	63	400	490	140	ND<0.5	ND<0.5	1.1	200	ND<200	ND<8	ND<0.5	ND<0.5
	2/12/10	2,000	200	36	130	150	49	ND<0.5	ND<0.5	ND<0.5	58	ND<200	ND<5	ND<0.5	ND<0.5
	5/4/10	1,800	160	27	110	140	21	ND<0.5	ND<0.5	ND<0.5	41	ND<100	ND<5	ND<0.5	ND<0.5
	8/2/10	1,400	53	11	67	78	8.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/4/10	ND<50	0.90	ND<0.5	0.70	1.3	0.54	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/2/11	58	1.9	ND<0.5	2.0	2.5	0.52	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	4/28/11	72	2.2	5.7	2.0	9.3	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/4/11	55	0.57	ND<0.5	0.92	1.2	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	10/11/11	180	3.0	1.0	5.1	10	0.77	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/1/12	2,500	23	6.4	85	190	3.6	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/9/12	2,000	24	5.6	75	160	2.9	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
8/6/12	140	1.7	1.0	3.2	7.7	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
11/12/12	250	ND<0.5	ND<0.5	2.7	5.7	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
2/12/13	ND<50	ND<0.5	ND<0.5	0.54	0.68	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
4/22/13	ND<50	ND<0.5	ND<0.5	ND<0.5	0.78	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
6/24/13	12,000	110	66	280	860	13	ND<0.5	ND<0.5	ND<0.5	11	ND<50	ND<5	ND<0.5	ND<0.5	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
DW-1 (cont.)	8/21/13	1,100	18	5.8	34	82	5.9	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/7/13	5,200	69	13	130	200	18	ND<0.5	ND<0.5	ND<0.5	15	ND<50	ND<8	ND<0.5	ND<0.5
	1/22/14	5,000	51	13	98	110	12	ND<0.5	ND<0.5	ND<0.5	11	ND<50	ND<5	ND<0.5	ND<0.5
	6/11/14	3,600	56	9.4	130	220	18	ND<0.5	ND<0.5	ND<0.5	14	ND<50	ND<5	ND<0.5	ND<0.5
	8/13/14	1,200	24	1.4	7.2	1.4	12	ND<0.5	ND<0.5	ND<0.5	15	ND<50	ND<5	ND<0.5	ND<0.5
	11/12/14	160	3.0	ND<0.5	ND<0.5	ND<0.5	7.8	ND<0.5	ND<0.5	ND<0.5	9.2	ND<50	ND<5	ND<0.5	ND<0.5
	1/20/15	8,700	49	8.2	260	360	6.2	ND<0.5	ND<0.5	ND<0.5	14	ND<50	ND<5	ND<0.5	ND<0.5
	5/20/15	988	4.7	0.67	21	24	1.2	ND<0.5	ND<0.5	ND<0.5	12	191	ND<13	ND<0.5	ND<0.5
	7/23/15	343	2.6	ND<0.5	4.9	4.7	1.0	ND<0.5	ND<0.5	ND<0.5	6.6	ND<50	ND<5	ND<0.5	ND<0.5
	11/10/15	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<1	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	3/4/16	55	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	7.9	--	--	ND<0.5	ND<0.5
5/3/16	288	0.58	ND<0.5	4.8	2.2	0.96	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	ND<0.5	ND<0.5	
DW-2	5/22/08	11,000	1,300	170	460	230	620	ND<2.5	ND<2.5	9.6	870	ND<400	ND<25	ND<2.5	ND<2.5
	7/23/08	7,600	980	44	180	55	420	ND<2	ND<2	5.7	720	ND<200	ND<20	ND<2	ND<2
	10/13/08	7,300	910	23	120	18	280	ND<1.5	ND<1.5	3.1	650	ND<2,000	ND<50	ND<1.5	ND<1.5
	2/11/09	8,000	1,100	31	230	46	290	ND<2.5	ND<2.5	3.9	600	ND<800	ND<25	ND<2.5	ND<2.5
	4/28/09	5,800	500	27	110	55	330	ND<1	ND<1	4.4	600	ND<400	ND<10	ND<1	ND<1
	8/4/09	6,800	910	19	37	27	200	ND<1	ND<1	2.7	530	ND<200	ND<10	ND<1	ND<1
	12/9/09	6,600	450	14	55	34	210	ND<0.9	ND<0.9	2.6	410	ND<200	ND<9	ND<0.9	ND<0.9
	2/11/10	4,500	340	14	44	25	320	ND<0.9	ND<0.9	3.9	520	ND<300	ND<9	ND<0.9	ND<0.9
	5/4/10	2,300	110	7.1	17	16	350	ND<0.9	ND<0.9	4.1	550	ND<200	ND<9	ND<0.9	ND<0.9
	8/2/10	3,800	420	22	21	28	300	ND<0.9	ND<0.9	3.5	600	ND<300	ND<20	ND<0.9	ND<0.9
	11/2/10	2,600	230	7.0	11	4.0	300	ND<0.5	ND<0.5	3.3	660	ND<300	ND<8	ND<0.5	ND<0.5
	2/1/11	3,300	220	6.8	18	10	210	ND<0.5	ND<0.5	2.7	620	ND<300	ND<5	ND<0.5	ND<0.5

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
DW-2 (cont.)	4/27/11	1,900	78	2.6	2.6	5.6	200	ND<0.5	ND<0.5	2.2	590	ND<300	ND<5	ND<0.5	ND<0.5
	8/4/11	4,400	420	10	24	13	160	ND<0.5	ND<0.5	2.1	500	ND<100	ND<10	ND<0.5	ND<0.5
	10/11/11	2,700	110	5.0	4.0	11	170	ND<0.5	ND<0.5	1.9	440	ND<100	ND<5	ND<0.5	ND<0.5
	1/31/12	4,400	220	7.0	15	8.9	130	ND<0.5	ND<0.5	1.2	400	ND<50	ND<5	ND<0.5	ND<0.5
	5/10/12	2,200	140	8.6	0.63	15	98	ND<0.5	ND<0.5	1.1	430	ND<200	ND<8	ND<0.5	ND<0.5
	8/7/12	4,000	360	8.9	14	15	110	ND<0.5	ND<0.5	1.2	380	ND<400	ND<5	ND<0.5	ND<0.5
	11/14/12	4,000	190	7.8	13	13	120	ND<0.5	ND<0.5	1.3	390	ND<200	ND<5	ND<0.5	ND<0.5
	2/13/13	6,400	500	18	60	19	140	ND<0.5	ND<0.5	1.6	510	ND<400	ND<8	ND<0.5	ND<0.5
	4/24/13	4,500	320	7.2	26	9.5	100	ND<0.5	ND<0.5	1.3	370	ND<80	ND<5	ND<0.5	ND<0.5
	6/25/13	4,900	250	6.2	58	26	100	ND<0.5	ND<0.5	1.2	400	ND<50	ND<8	ND<0.5	ND<0.5
	8/22/13	8,300	600	23	96	42	240	ND<0.5	ND<0.5	2.5	500	ND<50	ND<5	ND<0.5	ND<0.5
	11/7/13	6,500	520	18	57	17	150	ND<0.9	ND<0.9	2.2	310	ND<90	ND<9	ND<0.9	ND<0.9
	1/22/14	8,500	490	14	55	15	150	ND<0.9	ND<0.9	1.9	380	ND<300	ND<9	ND<0.9	ND<0.9
	6/11/14	4,400	330	6.5	26	7.3	100	ND<0.5	ND<0.5	1.3	390	ND<200	ND<5	ND<0.5	ND<0.5
	8/14/14	3,000	170	3.0	5.8	2.7	58	ND<0.5	ND<0.5	0.76	410	ND<50	ND<5	ND<0.5	ND<0.5
	11/13/14	1,100	0.83	ND<0.5	ND<0.5	ND<0.5	9.0	ND<0.5	ND<0.5	ND<0.5	310	ND<50	ND<5	ND<0.5	ND<0.5
	1/21/15	5,700	260	12	110	48	100	ND<0.5	ND<0.5	1.1	300	ND<50	ND<5	ND<0.5	ND<0.5
	5/20/15	4,990	349	9.1	45	14	81	ND<0.84	ND<0.84	ND<0.84	239	4,690	24	ND<0.84	ND<0.84
	7/23/15	3,700	131	2.3	9.3	2.6	41	ND<0.5	ND<0.5	ND<0.5	182	281	ND<5	ND<0.5	ND<0.5
	11/10/15	1,130	ND<0.5	ND<0.5	ND<0.5	ND<1	4.5	ND<0.5	ND<0.5	ND<0.5	160	157	9.2	ND<0.5	ND<0.5
3/4/16	1,800	85	1.2	28	9.4	23	ND<1.3	ND<1.1	ND<0.8	93	--	--	ND<0.95	ND<0.57	
5/4/16	1,280	93	3.6	21	2.6	17	ND<0.5	ND<0.5	ND<0.5	69	--	--	ND<0.5	ND<0.5	
DW-3	5/22/08	4,700	8.7	2.1	120	200	0.86	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	7/23/08	2,800	8.1	1.4	94	100	2.8	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
DW-3 (cont.)	10/13/08	4,100	59	10	160	70	1.9	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<80	ND<0.5	ND<0.5
	2/11/09	1,700	21	1.7	35	21	9.8	ND<0.5	ND<0.5	ND<0.5	16	ND<50	ND<10	ND<0.5	ND<0.5
	4/27/09	1,800	16	2.3	26	10	3.0	ND<0.5	ND<0.5	ND<0.5	12	ND<50	ND<5	ND<0.5	ND<0.5
	8/4/09	1,200	6.8	0.99	4.3	3.4	18	ND<0.5	ND<0.5	ND<0.5	35	ND<50	ND<5	ND<0.5	ND<0.5
	12/9/09	2,200	24	5.9	56	29	ND<0.5	ND<0.5	ND<0.5	ND<0.5	7.2	ND<300	ND<20	ND<0.5	ND<0.5
	2/11/10	700	9.5	2.0	18	6.2	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<80	ND<8	ND<0.5	ND<0.5
	5/4/10	420	5.5	0.93	8.8	3.4	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<80	ND<5	ND<0.5	ND<0.5
	8/2/10	640	4.0	ND<0.5	5.3	3.9	0.59	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/3/10	170	0.85	ND<0.5	ND<0.5	0.59	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/1/11	60	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	4/27/11	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/4/11	310	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	10/10/11	120	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	1/31/12	1,300	1.0	ND<0.5	19	15	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/8/12	750	1.2	ND<0.5	5.4	4.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<80	ND<5	ND<0.5	ND<0.5
	8/6/12	900	0.56	ND<0.5	7.0	4.6	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/13/12	410	ND<0.5	ND<0.5	1.7	2.4	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/12/13	120	ND<0.5	ND<0.5	1.2	0.50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	4/23/13	66	ND<0.5	2.3	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	6/25/13	5,600	1.1	1.1	120	76	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
8/21/13	840	1.4	ND<0.5	3.2	1.7	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
11/7/13	960	ND<0.5	ND<0.5	5.1	2.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
1/22/14	860	ND<0.5	ND<0.5	3.0	1.6	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
6/11/14	1,900	0.64	ND<0.5	23	9.4	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<80	ND<5	ND<0.5	ND<0.5	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)	
DW-3 (cont.)	8/13/14	430	5.3	ND<0.5	1.4	0.71	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	11/12/14	290	0.72	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	1/20/15	1,600	17	2.2	37	22	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	5/19/15	1,120	13	1.3	13	4.1	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	89	ND<5	ND<0.5	ND<0.5	
	7/23/15	581	11	1.2	6.9	3.8	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/4/16	710	4.9	ND<0.25	3.1	1.1	ND<0.72	ND<0.64	ND<0.53	ND<0.4	8.7	--	--	ND<0.47	ND<0.28	
	5/3/16	1,640	12	0.69	8.6	ND<1.5	1.9	ND<0.5	ND<0.5	ND<0.5	6.3	--	--	ND<0.5	ND<0.5	
DW-4	5/22/08	1,200	4.2	8.6	16	200	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	7/23/08	91	0.79	ND<0.5	6.5	7.4	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	10/13/08	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	43	ND<0.5	ND<0.5	
	2/11/09	ND<50	0.68	ND<0.5	1.4	1.4	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	4/27/09	ND<50	0.50	ND<0.5	1.1	1.0	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/5/09	52	1.7	ND<0.5	1.4	0.83	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	12/9/09	ND<50	3.0	ND<0.5	2.0	1.2	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	2/11/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/6/10	180	3.3	3.7	13	20	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/3/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/3/10	ND<50	0.70	4.0	0.59	5.9	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	2/2/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/26/11	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/4/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/10/11	ND<50	ND<0.5	0.67	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
1/31/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
DW-4 (cont.)	5/7/12	ND<50	ND<0.5	ND<0.5	ND<0.5	0.98	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/6/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/12	ND<50	ND<0.5	ND<0.5	0.70	1.7	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	2/12/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/22/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/21/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/7/13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	1/21/14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	6/11/14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	53	ND<5	ND<0.5	ND<0.5
	8/13/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	1/20/15	ND<50	0.76	ND<0.5	0.68	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/19/15	ND<50	0.63	ND<0.5	ND<0.5	ND<1	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	75	ND<5	ND<0.5	ND<0.5
	7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/10/15	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<1	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
3/4/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
5/2/16	183	2.1	ND<0.5	25	22	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	ND<0.5	ND<0.5	
DW-5	12/9/09	15,000	140	25	200	960	ND<2.5	ND<2.5	ND<2.5	ND<2.5	ND<15	ND<250	ND<25	ND<2.5	ND<2.5
	2/11/10	1,600	37	2.5	36	21	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<80	ND<5	ND<0.5	ND<0.5
	5/4/10	2,100	69	2.9	41	18	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<80	ND<8	ND<0.5	ND<0.5
	8/2/10	12,000	240	9.4	350	280	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<10	ND<0.5	ND<0.5
	11/2/10	5,000	120	3.6	68	35	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<8	ND<0.5	ND<0.5
	2/1/11	3,800	70	2.5	37	18	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	4/27/11	710	8.0	ND<0.5	4.3	2.1	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
DW-5 (cont.)	8/4/11	6,100	76	3.7	110	97	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<20	ND<0.5	ND<0.5
	10/10/11	6,800	59	4.7	140	150	ND<1.5	ND<1.5	ND<1.5	ND<1.5	ND<7	ND<150	ND<15	ND<1.5	ND<1.5
	1/31/12	8,200	130	5.9	170	180	ND<1.5	ND<1.5	ND<1.5	ND<1.5	ND<7	ND<150	ND<200	ND<1.5	ND<1.5
	5/10/12	11,000	100	6.8	320	380	ND<1.5	ND<1.5	ND<1.5	ND<1.5	ND<7	ND<150	ND<20	ND<1.5	ND<1.5
	8/8/12	14,000	84	11	480	590	ND<1.5	ND<1.5	ND<1.5	ND<1.5	ND<7	ND<150	ND<15	ND<1.5	ND<1.5
	11/14/12	8,800	24	2.5	110	140	ND<1.5	ND<1.5	ND<1.5	ND<1.5	ND<7	ND<150	ND<15	ND<1.5	ND<1.5
	2/13/13	4,400	65	5.4	110	110	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<10	ND<0.5	ND<0.5
	4/24/13	3,000	32	2.5	38	31	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<8	ND<0.5	ND<0.5
	6/25/13	120,000	120	ND<4	1,400	2,200	ND<4	ND<4	ND<4	ND<4	ND<20	ND<400	ND<200	ND<4	ND<4
	8/22/13	22,000	58	11	770	1,200	ND<4	ND<4	ND<4	ND<4	ND<20	ND<400	ND<40	ND<4	ND<4
	11/7/13	26,000	62	12	1,000	1,400	ND<4	ND<4	ND<4	ND<4	ND<20	ND<400	ND<40	ND<4	ND<4
	1/22/14	17,000	66	6.1	440	470	ND<2.5	ND<2.5	ND<2.5	ND<2.5	ND<15	ND<400	ND<40	ND<2.5	ND<2.5
	6/11/14	18,000	53	4.3	340	410	ND<4	ND<4	ND<4	ND<4	ND<20	ND<400	ND<40	ND<4	ND<4
	8/14/14	15,000	60	5.0	330	570	ND<2	ND<2	ND<2	ND<2	ND<9	ND<200	ND<20	ND<2	ND<2
	11/13/14	18,000	27	4.3	290	510	ND<2	ND<2	ND<2	ND<2	ND<9	ND<200	ND<20	ND<2	ND<2
	1/21/15	26,000	92	11	650	860	ND<2.5	ND<2.5	ND<2.5	ND<2.5	48	ND<250	ND<25	ND<2.5	ND<2.5
	5/20/15	9,830	203	5.4	96	115	0.83	ND<0.5	ND<0.5	ND<0.5	6.9	ND<250	61	ND<0.5	ND<0.5
	7/23/15	12,000	110	3.1	57	73	ND<1.2	ND<1.2	ND<1.2	ND<1.2	ND<12.5	ND<50	ND<5	ND<1.2	ND<1.2
	11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
3/4/16	3,600	250	ND<5.3	100	70	ND<5.3	ND<5.3	ND<5.3	ND<5.3	ND<53	--	--	ND<5.3	ND<5.3	
5/4/16	7,300	7.4	70	2.9	310	ND<2.1	ND<2.1	ND<2.1	ND<2.1	44	--	--	ND<2.1	ND<2.1	
DW-6	12/9/09	6,200	33	4.3	100	43	9.7	ND<1	ND<1	ND<1	10	ND<100	ND<10	ND<1	ND<1
	2/11/10	4,800	18	3.0	44	15	14	ND<0.5	ND<0.5	ND<0.5	9.2	ND<80	ND<10	ND<0.5	ND<0.5
	5/4/10	4,600	13	3.5	29	17	5.6	ND<0.5	ND<0.5	ND<0.5	7.2	ND<80	ND<8	ND<0.5	ND<0.5

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
DW-6 (cont.)	8/2/10	4,500	13	4.4	54	14	5.9	ND<0.5	ND<0.5	ND<0.5	12	ND<50	ND<8	ND<0.5	ND<0.5
	11/2/10	5,200	20	4.2	47	13	8.9	ND<0.9	ND<0.9	ND<0.9	26	ND<90	ND<9	ND<0.9	ND<0.9
	2/1/11	4,000	11	2.9	32	11	6.0	ND<0.5	ND<0.5	ND<0.5	16	ND<50	ND<5	ND<0.5	ND<0.5
	4/27/11	3,100	8.8	2.4	12	8.2	6.2	ND<0.5	ND<0.5	ND<0.5	19	ND<50	ND<8	ND<0.5	ND<0.5
	8/4/11	2,900	4.2	0.95	6.0	4.9	6.5	ND<0.5	ND<0.5	ND<0.5	24	ND<50	ND<8	ND<0.5	ND<0.5
	10/10/11	1,500	4.1	3.3	3.0	3.3	4.9	ND<0.5	ND<0.5	ND<0.5	20	ND<50	ND<5	ND<0.5	ND<0.5
	1/31/12	4,700	13	2.4	51	12	8.1	ND<0.5	ND<0.5	ND<0.5	28	ND<50	ND<80	ND<0.5	ND<0.5
	5/10/12	2,600	7.8	1.6	12	5.2	4.6	ND<0.5	ND<0.5	ND<0.5	17	ND<50	ND<5	ND<0.5	ND<0.5
	8/6/12	4,500	15	3.2	41	8.3	6.2	ND<0.5	ND<0.5	ND<0.5	20	ND<50	ND<8	ND<0.5	ND<0.5
	11/14/12	3,000	5.4	1.8	11	4.7	2.1	ND<0.5	ND<0.5	ND<0.5	6.8	ND<50	ND<5	ND<0.5	ND<0.5
	2/12/13	4,600	25	4.0	53	8.7	10	ND<0.5	ND<0.5	ND<0.5	34	ND<50	ND<9	ND<0.5	ND<0.5
	4/24/13	1,000	2.9	1.1	2.1	0.98	1.8	ND<0.5	ND<0.5	ND<0.5	6.2	ND<50	ND<5	ND<0.5	ND<0.5
	6/25/13	7,000	23	3.0	80	13	9.0	ND<0.5	ND<0.5	ND<0.5	34	ND<50	ND<5	ND<0.5	ND<0.5
	8/22/13	5,700	28	3.4	80	11	12	ND<0.5	ND<0.5	ND<0.5	37	ND<90	ND<8	ND<0.5	ND<0.5
	11/7/13	2,400	14	1.7	5.6	3.1	10	ND<0.5	ND<0.5	ND<0.5	35	ND<80	ND<5	ND<0.5	ND<0.5
	1/22/14	3,000	6.8	0.98	3.6	2.9	10	ND<0.5	ND<0.5	ND<0.5	36	ND<50	ND<5	ND<0.5	ND<0.5
	6/11/14	5,400	19	3.0	39	5.6	9.2	ND<0.5	ND<0.5	ND<0.5	35	ND<50	ND<8	ND<0.5	ND<0.5
	8/14/14	4,300	16	2.9	29	6.0	6.8	ND<0.5	ND<0.5	ND<0.5	34	ND<50	ND<10	ND<0.5	ND<0.5
	11/13/14	3,400	2.4	1.1	ND<0.5	0.65	5.3	ND<0.5	ND<0.5	ND<0.5	25	ND<50	ND<5	ND<0.5	ND<0.5
	1/21/15	3,400	6.1	1.5	35	7.7	4.9	ND<0.5	ND<0.5	ND<0.5	26	ND<80	ND<5	ND<0.5	ND<0.5
5/20/15	5,230	13	3.1	44	9.7	5.1	ND<0.5	ND<0.5	ND<0.5	18	392	ND<5	ND<0.5	ND<0.5	
7/23/15	5,030	6.9	2.3	25	5.5	3.5	ND<0.84	ND<0.84	ND<0.84	12	ND<50	ND<5	ND<0.84	ND<0.84	
11/10/15	2,290	ND<0.5	ND<0.5	ND<0.5	ND<1	2.0	ND<0.5	ND<0.5	ND<0.5	14	75	7.8	ND<0.5	ND<0.5	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
DW-6	3/4/16	1,600	6.0	ND<0.5	10	2.5	4.8	ND<1.3	ND<1.1	ND<0.8	16 J ^(h)	--	--	ND<0.95	ND<0.57
(cont.)	5/4/16	1,630	5.4	1.1	8.9	1.6	3.9	ND<0.5	ND<0.5	ND<0.5	36	--	--	ND<0.5	ND<0.5
DW-7	12/9/09	10,000	500	20	310	110	160	ND<2	ND<2	ND<2	270	ND<200	ND<20	ND<2	ND<2
	2/12/10	12,000	590	23	440	120	190	ND<2	ND<2	2.4	290	ND<200	ND<20	ND<2	ND<2
	5/4/10	4,100	250	15	89	32	97	ND<0.5	ND<0.5	1.0	160	ND<80	ND<5	ND<0.5	ND<0.5
	8/3/10	3,500	280	13	49	30	130	ND<0.5	ND<0.5	1.3	220	ND<50	ND<5	ND<0.5	ND<0.5
	11/4/10	660	30	1.2	5.0	3.3	130	ND<0.5	ND<0.5	1.2	220	ND<50	ND<5	ND<0.5	ND<0.5
	2/2/11	760	43	1.8	9.4	4.0	91	ND<0.5	ND<0.5	0.76	160	ND<50	ND<5	ND<0.5	ND<0.5
	4/27/11	1,600	120	4.6	4.2	6.7	95	ND<0.5	ND<0.5	1.0	170	ND<200	ND<5	ND<0.5	ND<0.5
	8/4/11	1,400	83	2.5	4.4	5.2	97	ND<0.5	ND<0.5	0.96	160	ND<80	ND<5	ND<0.5	ND<0.5
	10/11/11	400	45	1.1	0.80	1.6	90	ND<0.5	ND<0.5	0.89	180	ND<50	ND<5	ND<0.5	ND<0.5
	1/31/12	7,800	380	14	170	59	120	ND<0.5	ND<0.5	1.3	300	ND<150	ND<50	ND<0.5	ND<0.5
	5/10/12	940	47	1.6	6.1	5.2	120	ND<0.5	ND<0.5	1.1	280	ND<50	ND<5	ND<0.5	ND<0.5
	8/6/12	1,200	33	2.5	8.0	8.4	80	ND<0.5	ND<0.5	0.83	250	ND<300	ND<5	ND<0.5	ND<0.5
	11/13/12	6,500	340	11	45	22	51	ND<0.5	ND<0.5	0.56	160	ND<80	ND<8	ND<0.5	ND<0.5
	2/13/13	970	78	3.0	10	2.7	18	ND<0.5	ND<0.5	ND<0.5	56	ND<50	ND<5	ND<0.5	ND<0.5
	4/23/13	3,300	230	9.2	22	10	50	ND<0.5	ND<0.5	0.55	160	ND<50	ND<5	ND<0.5	ND<0.5
	6/25/13	27,000	590	32	960	640	100	ND<0.5	ND<0.5	0.95	330	ND<80	ND<20	ND<4	ND<0.5
	8/22/13	15,000	420	18	520	320	96	ND<2.5	ND<2.5	ND<2.5	310	ND<250	ND<25	ND<2.5	ND<2.5
11/7/13	9,700	260	8.4	200	63	52	ND<1.5	ND<1.5	ND<1.5	170	ND<150	ND<15	ND<1.5	ND<1.5	
1/22/14	15,000	380	15	430	200	77	ND<1.5	ND<1.5	ND<1.5	230	ND<150	ND<15	ND<1.5	ND<1.5	
6/11/14	12,000	380	13	370	190	79	ND<1.5	ND<1.5	ND<1.5	240	ND<150	ND<15	ND<1.5	ND<1.5	
8/14/14	2,400	110	3.2	30	17	37	ND<0.5	ND<0.5	ND<0.5	190	ND<50	ND<5	ND<0.5	ND<0.5	
11/12/14	1,000	8.9	ND<0.5	0.61	ND<0.5	17	ND<0.5	ND<0.5	ND<0.5	160	ND<50	ND<5	ND<0.5	ND<0.5	

TABLE D-1

**HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076**

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
DW-7 (cont.)	1/20/15	10,000	210	8.4	250	110	49	ND<0.5	ND<0.5	ND<0.5	260	ND<100	ND<5	ND<0.5	ND<0.5
	5/20/15	8,280	342	13	294	130	61	ND<1.2	ND<1.2	ND<1.2	236	3,260	ND<25	7.6	ND<1.2
	7/23/15	1,910	64	2.1	15	8.9	17	ND<0.5	ND<0.5	ND<0.5	166	136	ND<5	ND<0.5	ND<0.5
	11/10/15	866	ND<0.5	ND<0.5	ND<0.5	ND<1	2.9	ND<0.5	ND<0.5	ND<0.5	133	ND<500	ND<50	ND<0.5	ND<0.5
	3/4/16	2,200	69	ND<0.54	53	22	11	ND<1.3	ND<1.1	ND<0.8	48	--	--	ND<0.95	ND<0.57
	5/4/16	19,800	110	5.3	180	140	18	ND<2.1	ND<2.1	ND<2.1	80	--	--	ND<2.1	ND<2.1
DW-8	4/28/11	72,000	5,200	10,000	1,900	12,000	ND<10	ND<10	ND<10	ND<10	56	ND<1,000	ND<100	ND<10	ND<10
	8/4/11	65,000	2,900	8,100	650	10,000	ND<20	ND<20	ND<20	ND<20	ND<90	ND<2,000	ND<200	ND<20	ND<20
	10/25/11	82,000	4,300	10,000	1,900	12,000	ND<4	ND<4	ND<4	ND<4	58	ND<400	ND<40	ND<4	ND<4
	2/1/12	52,000	2,500	5,200	1,900	8,200	ND<9	ND<9	ND<9	ND<9	ND<50	ND<900	ND<90	ND<9	ND<9
	5/11/12	11,000	500	1,000	300	1,200	ND<2.5	ND<2.5	ND<2.5	ND<2.5	25	ND<250	ND<25	ND<2.5	ND<2.5
	8/8/12	52,000	1,900	4,500	1,500	5,900	ND<2.5	ND<2.5	ND<2.5	ND<2.5	58	ND<250	ND<25	ND<2.5	ND<2.5
	11/14/12	27,000	580	870	510	3,400	ND<5	ND<5	ND<5	ND<5	ND<25	ND<500	ND<50	ND<5	ND<5
	2/14/13	63,000	3,000	5,400	2,000	8,700	ND<5	ND<5	ND<5	ND<5	110	ND<500	ND<150	ND<5	ND<5
	4/24/13	5,900	350	370	140	790	ND<0.9	ND<0.9	ND<0.9	ND<0.9	8.0	ND<200	ND<80	ND<0.9	ND<0.9
	6/24/13	55,000	2,200	3,200	2,100	7,400	ND<0.9	ND<0.9	ND<0.9	ND<0.9	56	ND<90	ND<50	ND<0.9	ND<0.9
	8/22/13	16,000	380	240	500	1,400	ND<2.5	ND<2.5	ND<2.5	ND<2.5	ND<15	ND<250	ND<25	ND<2.5	ND<2.5
	11/7/13	56,000	1,800	2,800	2,100	7,900	ND<2.5	ND<2.5	ND<2.5	ND<2.5	37	ND<250	ND<25	ND<2.5	ND<2.5
	1/22/14	40,000	1,100	1,200	1,200	4,300	ND<7	ND<7	ND<7	ND<7	ND<40	ND<700	ND<70	ND<7	ND<7
	6/11/14	52,000	2,400	2,100	1,700	6,400	ND<7	ND<7	ND<7	ND<7	67	ND<700	ND<70	ND<7	ND<7
	8/14/14	44,000	3,200	1,200	1,700	6,100	ND<7	ND<7	ND<7	ND<7	70	ND<700	ND<70	ND<7	ND<7
	11/13/14	53,000	3,200	790	2,200	7,100	ND<7	ND<7	ND<7	ND<7	65	ND<700	ND<70	ND<7	ND<7
1/21/15	38,000	2,800	1,400	1,600	5,800	ND<9	ND<9	ND<9	ND<9	130	ND<900	ND<90	ND<9	ND<9	
5/20/15	47,300	4,340	1,360	2,120	6,550	ND<8.3	ND<8.3	ND<8.3	ND<8.3	151	378	228	ND<8.3	ND<8.3	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
DW-8 (cont.)	7/23/15	27,200	1,270	224	1,050	2,680	ND<4.2	ND<4.2	ND<4.2	ND<4.2	ND<41.6	ND<50	ND<5	ND<4.2	ND<4.2
	11/10/15	40,100	2,010	460	1,610	3,950	ND<5	ND<5	ND<5	ND<5	87	ND<5,000	666	ND<5	ND<5
	3/4/16	3,800	300	50	210	401	ND<5.3	ND<5.3	ND<5.3	ND<5.3	ND<53	--	--	ND<5.3	ND<5.3
	5/4/16	36,200	3,000	1,200	1,800	4,400	ND<21	ND<21	ND<21	ND<21	ND<210	--	--	ND<21	ND<21
DW-9	6/14/12	8,300	89	2.4	21	96	36	ND<1.5	ND<1.5	ND<1.5	80	ND<150	ND<15	ND<1.5	ND<1.5
	8/8/12	12,000	310	11	400	110	35	ND<1.5	ND<1.5	ND<1.5	96	ND<150	ND<15	ND<1.5	ND<1.5
	11/14/12	10,000	210	7.5	230	65	28	ND<1.5	ND<1.5	ND<1.5	94	ND<150	ND<15	ND<1.5	ND<1.5
	2/13/13	7,800	150	9.4	160	28	45	ND<1.5	ND<1.5	ND<1.5	110	ND<150	ND<15	ND<1.5	ND<1.5
	4/24/13	3,200	18	1.7	7.8	7.2	21	ND<0.5	ND<0.5	ND<0.5	67	ND<50	ND<5	ND<0.5	ND<0.5
	6/25/13	27,000	490	17	1,100	430	30	ND<4	ND<4	ND<4	62	ND<400	ND<40	ND<4	ND<4
	8/22/13	19,000	320	13	690	240	28	ND<4	ND<4	ND<4	87	ND<2,000	ND<40	ND<4	ND<4
	11/7/13	8,000	120	5.9	100	38	25	ND<1.5	ND<1.5	ND<1.5	73	ND<150	ND<15	ND<1.5	ND<1.5
	1/22/14	14,000	180	6.7	200	65	27	ND<1.5	ND<1.5	ND<1.5	77	ND<150	ND<15	ND<1.5	ND<1.5
	6/11/14	13,000	380	11	300	81	41	ND<2.5	ND<2.5	ND<2.5	100	ND<250	ND<25	ND<2.5	ND<2.5
	8/14/14	9,100	170	10	120	26	24	ND<1.5	ND<1.5	ND<1.5	70	ND<150	ND<15	ND<1.5	ND<1.5
	11/13/14	9,600	130	6.8	36	11	22	ND<1.5	ND<1.5	ND<1.5	53	ND<150	ND<15	ND<1.5	ND<1.5
	1/21/15	8,300	110	6.8	200	83	16	ND<1.5	ND<1.5	ND<1.5	58	ND<150	ND<15	ND<1.5	ND<1.5
	5/20/15	9,660	142	8.8	150	26	21	ND<1.2	ND<1.2	ND<1.2	59	1,300	ND<13	ND<1.2	ND<1.2
	7/23/15	9,530	75	5.2	40	8.9	13	ND<1.2	ND<1.2	ND<1.2	27	105	ND<5	ND<1.2	ND<1.2
	11/10/15	7,940	47	2.8	5.8	3.6	9.1	ND<1	ND<1	ND<1	38	ND<1,000	136	ND<1	ND<1
3/4/16	5,200	110	3.3 J	79	28	15	ND<1.6	ND<1.3	ND<1	53	--	--	ND<1.2	ND<0.71	
5/4/16	5,050	35	3.1	36	5.3	9.7	ND<0.5	ND<0.5	ND<0.5	20	--	--	ND<0.5	ND<0.5	
MW-A	1/17/99	5,800	1,700	85	65	320	ND<5	--	--	--	--	--	--	--	--
MW-B	1/17/99	4,400	240	30	21	39	ND<5	--	--	--	--	--	--	--	--

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
MW-C	1/17/99	1,800	0.80	ND<0.5	ND<0.5	0.55	ND<5	--	--	--	--	--	--	--	--
MW-D	1/17/99	5,600	1,600	130	66	220	ND<5	--	--	--	--	--	--	--	--
MW-E	1/17/99	5,700	1,600	180	180	310	ND<50	--	--	--	--	--	--	--	--
	6/10/99	5,000	1,300	130	320	450	ND<25	--	--	--	--	--	--	--	--
MW-W	1/17/99	23,000	7,600	760	1,400	5,000	ND<50	--	--	--	--	--	--	--	--
	6/10/99	16,000	4,100	420	1,300	4,000	ND<50	--	--	--	--	--	--	--	--
IP-1	7/23/08	62,000	2,100	6,800	2,700	11,000	16	ND<15	ND<15	ND<15	ND<70	ND<1,500	ND<150	ND<15	ND<15
	10/13/08	55,000	3,100	3,300	2,300	7,700	ND<15	ND<15	ND<15	ND<15	98	ND<1,500	ND<150	ND<15	ND<15
	5/5/10(g)	33,000	900	1,500	1,400	5,000	ND<7	ND<7	ND<7	ND<7	ND<40	ND<700	ND<70	ND<7	ND<7
	4/27/11	24,000	750	2,200	420	4,800	ND<7	ND<7	ND<7	ND<7	ND<40	ND<700	ND<70	ND<7	ND<7
	2/1/12	15,000	370	350	600	1,300	ND<2	ND<2	ND<2	ND<2	16	ND<200	ND<20	NS	NS
	5/9/12	16,000	580	850	800	2,100	ND<2	ND<2	ND<2	ND<2	12	ND<200	ND<20	ND<2	ND<2
	8/8/12	12,000	260	190	470	860	ND<2	ND<2	ND<2	ND<2	ND<9	ND<200	ND<20	ND<2	ND<2
	11/13/12	9,000	170	74	280	540	ND<2	ND<2	ND<2	ND<2	ND<9	ND<200	ND<20	ND<2	ND<2
	2/13/13	17,000	480	480	690	2,000	ND<2	ND<2	ND<2	ND<2	20	ND<200	ND<20	ND<2	ND<2
	4/24/13	9,700	230	160	370	1,200	ND<2	ND<2	ND<2	ND<2	ND<9	ND<200	ND<20	ND<2	ND<2
	6/24/13	14,000	130	260	280	1,000	ND<2	ND<2	ND<2	ND<2	10	ND<200	ND<20	ND<2	ND<2
	8/22/13	23,000	360	430	740	2,300	ND<2	ND<2	ND<2	ND<2	25	ND<200	ND<20	ND<2	ND<2
	11/7/13	7,400	70	94	200	400	ND<0.9	ND<0.9	ND<0.9	ND<0.9	14	ND<90	ND<9	ND<0.9	ND<0.9
	1/22/14	16,000	190	280	460	1,600	ND<0.9	ND<0.9	ND<0.9	ND<0.9	20	ND<90	ND<10	ND<0.9	ND<0.9
	6/10/14	50,000	1,600	4,000	1,200	5,700	ND<9	ND<9	ND<9	ND<9	110	ND<900	ND<90	ND<9	ND<9
8/13/14	24,000	530	980	690	3,100	ND<5	ND<5	ND<5	ND<5	47	ND<500	ND<50	ND<5	ND<5	
11/13/14	24,000	480	510	620	2,300	ND<5	ND<5	ND<5	ND<5	37	ND<500	ND<50	ND<5	ND<5	
1/21/15	18,000	320	340	550	1,800	ND<2.5	ND<2.5	ND<2.5	ND<2.5	38	ND<250	ND<25	ND<2.5	ND<2.5	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)	
IP-1 (cont.)	5/20/15	15,200	333	278	405	1,610	2.7	ND<2.5	ND<2.5	ND<2.5	50	444	82	ND<2.5	ND<2.5	
	7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	3/2/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	5/4/16	516	8.3	6.7	15	61	ND<5.3	ND<5.3	ND<5.3	ND<5.3	ND<53	--	--	ND<5.3	ND<5.3	
IP-2	7/23/08	5,500	160	43	130	350	10	ND<0.9	ND<0.9	ND<0.9	ND<5	ND<90	ND<9	ND<0.9	ND<0.9	
	10/13/08	13,000	1,900	58	600	630	180	ND<0.9	ND<0.9	9.4	46	ND<90	ND<20	ND<0.9	ND<0.9	
	5/5/10(g)	2,700	66	220	61	240	3.3	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	4/26/11	350	8.9	1.7	4.7	5.7	0.90	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	5/8/12	340	10	4.8	6.3	13	2.4	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/7/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/12/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/23/13	160	5.6	3.7	1.3	3.6	1.4	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/21/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/7/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	1/21/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	6/11/14	350	2.4	2.4	2.2	5.9	ND<0.5	ND<0.5	ND<0.5	ND<0.5	6.4	ND<50	ND<5	ND<0.5	ND<0.5	
	8/13/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	1/20/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/19/15	654	2.8	2.8	3.2	13	9.9	ND<0.5	ND<0.5	0.63	17	442	ND<5	ND<0.5	ND<0.5	
7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)	
IP-2 (cont.)	3/2/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	5/3/16	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<1.5	0.92	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	ND<0.5	ND<0.5	
IP-3	7/23/08	1,100	23	14	7.5	90	32	ND<0.5	ND<0.5	ND<0.5	32	ND<50	ND<5	ND<0.5	ND<0.5	
	10/13/08	1,700	83	4.7	11	54	72	ND<0.5	ND<0.5	0.84	71	ND<50	ND<8	ND<0.5	ND<0.5	
	5/5/10(g)	430 ⁽ⁱ⁾	6.4	22	4.9	21	3.9	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<80	ND<5	ND<0.5	ND<0.5	
	4/26/11	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	5/8/12	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/7/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/12/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/22/13	ND<50	0.51	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/21/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/7/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	1/21/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	6/11/14	580	2.6	1.0	7.2	7.4	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/13/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	1/20/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/19/15	2,080	22	4.5	38	47	6.5	ND<0.5	ND<0.5	ND<0.5	9.5	342	ND<5	ND<0.5	ND<0.5	
	7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
3/2/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
5/4/16	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	ND<0.5	ND<0.5	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)	
IP-4	7/23/08	7,600	130	45	240	750	940	ND<1.5	ND<1.5	6.9	890	ND<150	ND<15	ND<1.5	ND<1.5	
	10/13/08	4,200	110	11	78	310	3,700	ND<1.5	ND<1.5	7.1	15,000	ND<2,000	ND<15	ND<1.5	ND<1.5	
	5/6/10(g)	190	5.4	25	6.9	29	3.4	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	4/26/11	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	1.1	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	5/8/12	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	5.3	ND<0.5	ND<0.5	
	8/7/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/12/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/23/13	140	ND<0.5	43	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/21/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/7/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	1/21/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	6/11/14	70	ND<0.5	ND<0.5	ND<0.5	ND<0.5	1.2	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/13/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	1/20/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/19/15	156	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<1	0.83	ND<0.5	ND<0.5	ND<0.5	ND<5	98	ND<5	ND<0.5	ND<0.5
	7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
3/2/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
5/2/16	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<1.5	0.79	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	ND<0.5	1.5	
IP-5	7/23/08	2,000 ⁽ⁱ⁾	3.0	17	5.1	31	4.4	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	10/13/08	720	14	13	8.7	32	19	ND<0.5	ND<0.5	ND<0.5	26	ND<50	ND<5	ND<0.5	ND<0.5	
	5/6/10(g)	270	5.7	25	5.9	29	20	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<80	ND<5	ND<0.5	ND<0.5	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
IP-5 (cont.)	4/26/11	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	0.72	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/8/12	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/7/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/12/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/23/13	ND<50	ND<0.5	4.1	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/21/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/7/13	180	ND<0.5	ND<0.5	3.0	6.1	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	1/21/14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	0.60	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	6/10/14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	1.8	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/13/14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	1.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/12/14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	0.76	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	1/20/15	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/19/15	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<1	ND<0.5	ND<0.5	ND<0.5	ND<5	65	ND<5	ND<0.5	ND<0.5
	7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
3/2/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
5/2/16	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	ND<0.5	ND<0.5
IP-6	7/23/08	4,400	260	78	98	340	180	ND<0.5	ND<0.5	1.6	190	ND<80	ND<9	ND<0.5	ND<0.5
	10/13/08	1,400	150	1.6	1.5	3.5	7.4	ND<0.5	ND<0.5	ND<0.5	10	ND<50	ND<50	ND<0.5	ND<0.5
	5/5/10(g)	8,000 ^(d)	24	100	18	98	0.51	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<80	ND<5	ND<0.5	ND<0.5
	4/27/11	ND<50	1.1	0.66	ND<0.5	0.71	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	5/8/12	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/7/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)	
IP-6 (cont.)	11/12/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	2/12/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	4/23/13	57	ND<0.5	11	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/21/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	11/7/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	1/21/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	6/11/14	70	8.6	ND<0.5	ND<0.5	ND<0.5	3.1	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/13/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	1/20/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/19/15	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<1	1.1	ND<0.5	ND<0.5	ND<0.5	ND<5	125	ND<5	ND<0.5	ND<0.5	
	7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/2/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
5/4/16	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<1.5	0.85	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	ND<0.5	ND<0.5		
IP-7	7/23/08	4,200	190	12	99	190	49	ND<0.9	ND<0.9	1.1	58	ND<90	ND<9	ND<0.9	ND<0.9	
	10/13/08	6,000	350	6.6	150	60	97	ND<0.9	ND<0.9	2.5	76	ND<90	ND<50	ND<0.9	ND<0.9	
	5/5/10(g)	33,000	49	62	38	69	14	ND<0.9	ND<0.9	ND<0.9	20	ND<90	ND<9	ND<0.9	ND<0.9	
	4/27/11	220	8.1	0.69	3.4	1.5	0.95	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	5/8/12	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/7/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/12/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/23/13	ND<50	ND<0.5	5.1	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
IP-7 (cont.)	8/21/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/7/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	1/21/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	6/11/14	2,100	18	0.77	7.5	2.0	12	ND<0.5	ND<0.5	ND<0.5	82	ND<50	ND<5	ND<0.5	ND<0.5
	8/13/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/12/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	1/20/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/19/15	254	0.80	ND<0.5	ND<0.5	ND<1	3.5	ND<0.5	ND<0.5	ND<0.5	ND<5	269	ND<5	ND<0.5	ND<0.5
	7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/2/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
5/3/16	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<1.5	1.0	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	ND<0.5	ND<0.5	
IP-8	12/16/08	120,000	7,800	20,000	3,500	16,000	ND<40	ND<40	ND<40	ND<40	ND<200	ND<4,000	ND<400	ND<40	ND<40
	5/5/10(g)	83,000	3,900	13,000	2,400	14,000	ND<25	ND<25	ND<25	ND<25	ND<150	ND<2,500	ND<250	ND<25	ND<25
	4/28/11	13,000	620	2,000	240	2,200	ND<3	ND<3	ND<3	ND<3	27	ND<300	ND<30	ND<3	ND<3
	2/1/12	67,000	2,900	7,300	1400	11,000	ND<15	ND<15	ND<15	ND<15	ND<70	ND<1,500	ND<150	NS	NS
	5/9/12	50,000	2,400	4,900	790	8,600	ND<9	ND<9	ND<9	ND<9	ND<50	ND<900	ND<90	ND<9	ND<9
	8/8/12	63,000	3,500	6,700	980	7,400	ND<9	ND<9	ND<9	ND<9	65	ND<900	ND<90	ND<9	ND<9
	11/14/12	33,000	1,000	2,300	260	4,300	ND<7	ND<7	ND<7	ND<7	47	ND<700	ND<70	ND<7	ND<7
	2/14/13	65,000	3,300	7,100	1,600	9,200	ND<7	ND<7	ND<7	ND<7	110	ND<700	ND<150	ND<7	ND<7
	4/24/13	33,000	1,700	4,200	430	5,600	ND<6	ND<6	ND<6	ND<6	ND<30	ND<600	ND<60	ND<6	ND<6
	8/22/13	19,000	130	440	260	1,900	ND<4	ND<4	ND<4	ND<4	ND<20	ND<400	ND<80	ND<4	ND<4
	11/7/13	18,000	400	520	170	1,700	ND<4	ND<4	ND<4	ND<4	23	ND<400	ND<40	ND<4	ND<4
1/22/14	41,000	550	1,600	560	4,200	ND<4	ND<4	ND<4	ND<4	22	ND<400	ND<40	ND<4	ND<4	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)	
IP-8 (cont.)	6/11/14	52,000	1,200	3,300	940	6,400	ND<5	ND<5	ND<5	ND<5	28	ND<500	ND<50	ND<5	ND<5	
	8/13/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	11/13/14	53,000	1,200	3,900	1,000	8,000	ND<9	ND<9	ND<9	ND<9	ND<50	ND<900	ND<90	ND<9	ND<9	
	1/21/15	36,000	1,200	3,300	1,000	6,700	ND<9	ND<9	ND<9	ND<9	99	ND<900	ND<90	ND<9	ND<9	
	5/20/15	47,600	1,590	3,900	1,070	7,490	ND<8.3	ND<8.3	ND<8.3	ND<8.3	ND<83	264	199	ND<8.3	ND<8.3	
	7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/2/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
5/4/16	1,430	7.4	70	2.9	310	ND<2.1	ND<2.1	ND<2.1	ND<2.1	44	--	--	ND<2.1	ND<2.1		
IP-9	12/16/08	110,000	7,800	23,000	2,800	16,000	ND<40	ND<40	ND<40	ND<40	ND<200	ND<4,000	ND<400	ND<40	ND<40	
	5/5/10(g)	92,000	6,000	19,000	2,500	14,000	ND<40	ND<40	ND<40	ND<40	ND<200	ND<4,000	ND<400	ND<40	ND<40	
	4/28/11	38,000	1,400	4,300	860	6,000	ND<6	ND<6	ND<6	ND<6	38	ND<600	ND<60	ND<6	ND<6	
	2/1/12	19,000	180	1,200	640	3,100	ND<3	ND<3	ND<3	ND<3	ND<15	ND<300	ND<30	NS	NS	
	5/9/12	10,000	14	180	270	780	ND<1.5	ND<1.5	ND<1.5	ND<1.5	ND<7	ND<150	ND<15	ND<1.5	ND<1.5	
	8/7/12	11,000	22	240	210	880	ND<1.5	ND<1.5	ND<1.5	ND<1.5	ND<7	ND<150	ND<15	ND<1.5	ND<1.5	
	11/13/12	9,800	22	200	150	690	ND<1.5	ND<1.5	ND<1.5	ND<1.5	ND<7	ND<150	ND<15	ND<1.5	ND<1.5	
	2/13/13	12,000	68	560	280	1,300	ND<1.5	ND<1.5	ND<1.5	ND<1.5	ND<7	ND<150	ND<15	ND<1.5	ND<1.5	
	4/24/13	8,800	42	480	210	1,100	ND<1.5	ND<1.5	ND<1.5	ND<1.5	11	ND<150	ND<15	ND<1.5	ND<1.5	
	8/22/13	7,500	14	250	190	1,000	ND<1.5	ND<1.5	ND<1.5	ND<1.5	ND<7	ND<400	ND<15	ND<1.5	ND<1.5	
	11/7/13	1,100	4.9	30	14	89	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<20	ND<0.5	ND<0.5	
	1/22/14	1,600	1.9	9.7	8.6	16	0.50	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	6/11/14	2,000	ND<0.5	ND<0.5	1.5	2.4	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5	
	8/13/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
11/12/14	3,000	5.4	97	49	340	ND<0.5	ND<0.5	ND<0.5	ND<0.5	31	ND<50	ND<5	ND<0.5	ND<0.5		

TABLE D-1

**HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076**

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl- benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
IP-9 (cont.)	1/21/15	330	ND<0.5	1.7	0.56	7.7	ND<0.5	ND<0.5	ND<0.5	ND<0.5	35	ND<50	ND<5	ND<0.5	ND<0.5
	5/19/15	314	1.5	6.1	1.8	26	ND<0.5	ND<0.5	ND<0.5	ND<0.5	15	ND<50	ND<5	ND<0.5	ND<0.5
	7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/2/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/2/16	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	8.6	--	--	ND<0.5	ND<0.5
IP-10	2/11/09	8,100	29	58	170	1,200	ND<1.5	ND<1.5	ND<1.5	ND<1.5	ND<7	ND<150	ND<20	ND<1.5	ND<1.5
	5/3/10(g)	3,600	73	80	140	240	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<20	ND<0.5	ND<0.5
	4/26/11	4,300	28	140	110	330	ND<0.5	ND<0.5	ND<0.5	ND<0.5	10	ND<50	ND<8	ND<0.5	ND<0.5
	2/1/12	3,200	8.2	4.6	93	2.0	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<20	NS	NS
	5/9/12	3,900	24	38	110	58	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<20	ND<0.5	ND<0.5
	8/7/12	2,700	15	5.8	31	6.4	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/13/12	2,600	12	7.6	4.7	20	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<8	ND<0.5	ND<0.5
	2/12/13	6,500	26	270	180	590	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<20	ND<0.5	ND<0.5
	4/24/13	1,800	12	11	24	81	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<8	ND<0.5	ND<0.5
	6/24/13	1,500	5.4	1.1	0.76	6.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	8/22/13	1,100	2.2	ND<0.5	ND<0.5	2.3	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	11/7/13	810	2.6	1.7	1.5	7.6	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<5	ND<0.5	ND<0.5
	1/22/14	2,100	7.2	2.7	1.8	7.9	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<8	ND<0.5	ND<0.5
	6/10/14	2,600	10	1.8	3.4	6.2	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<20	ND<0.5	ND<0.5
	8/13/14	1,100	2.9	ND<0.5	0.58	0.92	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<8	ND<0.5	ND<0.5
	11/12/14	1,800	7.7	1.2	3.5	3.9	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	ND<50	ND<8	ND<0.5	ND<0.5
1/21/15	2,700	23	4.9	37	42	ND<0.5	ND<0.5	ND<0.5	ND<0.5	15	ND<100	ND<5	ND<0.5	ND<0.5	
5/19/15	2,440	15	1.1	11	ND<1	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	97	ND<5	ND<0.5	ND<0.5	

TABLE D-1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076

Monitoring Well	Sample Date ^(a)	TPHg ^(b) (µg/l)	Benzene ^(b) (µg/l)	Toluene ^(b) (µg/l)	Ethyl-benzene ^(b) (µg/l)	Total Xylenes ^(b) (µg/l)	MTBE ^(b) (µg/l)	DIPE ^(b) (µg/l)	ETBE ^(b) (µg/l)	TAME ^(b) (µg/l)	TBA ^(b) (µg/l)	Methanol ^(b) (µg/l)	Ethanol ^(b) (µg/l)	1,2-DCA ^(b) (µg/l)	EDB ^(b) (µg/l)
IP-10 (cont.)	7/23/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/10/15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/2/16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/4/16	556	2.1	4.0	4.7	42	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5	--	--	ND<0.5	ND<0.5
IP-11	3/4/16	2,600	15	ND<0.62	22	20	ND<1.8	ND<1.6	ND<1.3	ND<1	ND<16	NS	NS	ND<1.2	ND<0.71
	5/4/16	7,030	81	2.8	26	14	0.61	ND<0.5	ND<0.5	ND<0.5	6.8	NS	NS	ND<0.5	ND<0.5
IP-12	3/4/16	1,900	19	ND<0.5	14	9.4	1.9 J	ND<1.3	ND<1.1	ND<0.8	ND<13	NS	NS	ND<0.95	ND<0.57
	5/3/16	1,610	99	4.7	16	ND<1.5	2.0	ND<0.5	ND<0.5	ND<0.5	ND<5	NS	NS	ND<0.5	ND<0.5
IP-13	3/4/16	6,000	210	14	130	134	ND<5.3	ND<5.3	ND<5.3	ND<5.3	ND<53	NS	NS	ND<5.3	ND<5.3
	5/3/16	7,120	340	22	160	150	5.8	ND<2.1	ND<2.1	ND<2.1	ND<21	NS	NS	ND<2.1	ND<2.1
IP-14	3/4/16	990	64	ND<2.1	6.4	ND<6.3	19	ND<2.1	ND<2.1	ND<2.1	86	NS	NS	ND<2.1	ND<2.1
	5/3/16	ND<50	140	7.4	19	ND<6.3	16	ND<2.1	ND<2.1	ND<2.1	44	NS	NS	ND<2.1	ND<2.1

- (a) Samples collected before July 2005 collected by others; data provided by Delta Environmental Consultants, Inc., Second Quarter 2005 Groundwater Monitoring Report dated 31 July 2005.
- (b) Total petroleum hydrocarbons as gasoline (TPHg), benzene, toluene, ethylbenzene, xylenes, methyl tert-butyl ether (MTBE), di-isopropyl ether (DIPE), ethyl tert-butyl ether (ETBE), tert-amyl methyl ether (TAME), tert-butyl alcohol (TBA), methanol, ethanol, 1,2-dichloroethane (1,2-DCA), and 1,2-dibromoethane (EDB) analyzed by EPA Method 8260; reported in micrograms per liter (µg/l). Total xylenes results on March 2016 is the sum of m, p-xylenes and o-xylenes.
- (c) ND - Not detected at the reporting limit listed.
- (d) "--" - Not analyzed.
- (e) NS - Not sampled.
- (f) TBA results may be biased slightly high. A fraction of MTBE (typically less than 10 percent) converts to TBA during the analysis of water samples. This conversion effect is considered to be mathematically significant in samples that contain MTBE/TBA ratios of over 20:1.
- (g) Sample collected from water in sump below well screen. Analytical data not representative of groundwater conditions.
- (h) J - A value between the method detection limit and practical quantitation limit and that the reported concentration should be considered as an estimated value.
- (i) Baseline remediation system values.
- (j) Primarily compounds not found in typical gasoline.

APPENDIX E
HISTORICAL SOIL VAPOR ANALYTICAL RESULTS

TABLE E-1

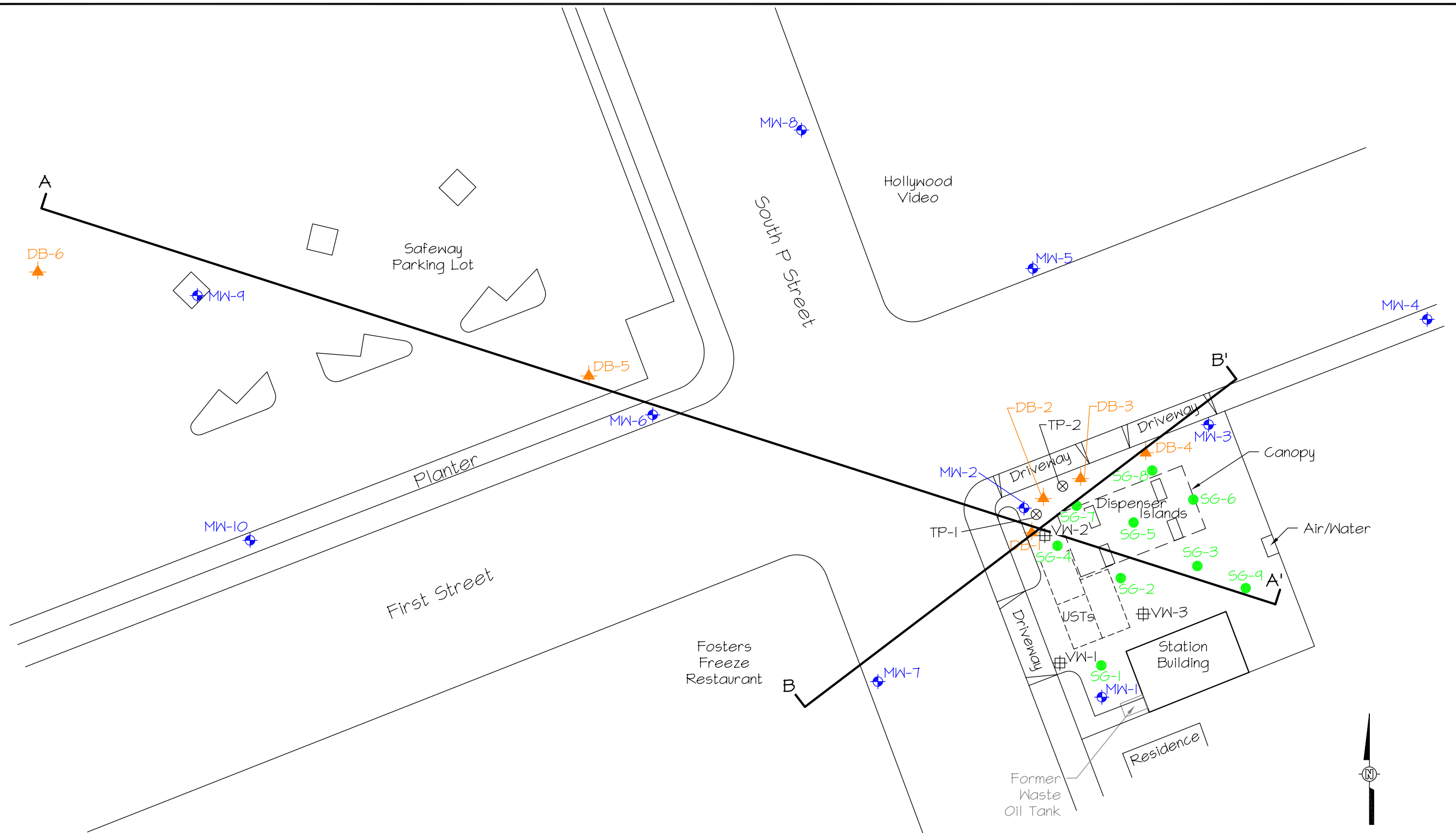
**SOIL VAPOR ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076**

Sample	Depth (feet)	Number of Purge Volumes	Sample Date	TPHg ^(a) ($\mu\text{g}/\text{m}^3$)	Benzene ^(a) ($\mu\text{g}/\text{m}^3$)	Toluene ^(a) ($\mu\text{g}/\text{m}^3$)	Ethylbenzene ^(a) ($\mu\text{g}/\text{m}^3$)	Xylenes ^(a) ($\mu\text{g}/\text{m}^3$)	MTBE ^(a) ($\mu\text{g}/\text{m}^3$)	DIPE ^(a) ($\mu\text{g}/\text{m}^3$)	ETBE ^(a) ($\mu\text{g}/\text{m}^3$)	TAME ^(a) ($\mu\text{g}/\text{m}^3$)	TBA ^(a) ($\mu\text{g}/\text{m}^3$)
SG-1	5	3	1/3/06	ND<5,000 ^(b)	ND<100	280	ND<100	270	ND<100	ND<100	ND<100	ND<100	ND<500
SG-2	5	3	1/3/06	ND<5,000	ND<100	240	ND<100	250	ND<100	ND<100	ND<100	ND<100	ND<500
SG-3	5	3	1/3/06	ND<5,000	ND<100	200	ND<100	190	ND<100	ND<100	ND<100	ND<100	ND<500
SG-4	4.5	1	1/3/06	19,000	ND<100	230	ND<100	170	ND<100	ND<100	ND<100	ND<100	ND<500
		3	1/3/06	11,000	ND<100	210	ND<100	210	ND<100	ND<100	ND<100	ND<100	ND<500
		7	1/3/06	9,400	ND<100	180	ND<100	180	ND<100	ND<100	ND<100	ND<100	ND<500
SG-5	5	3	1/3/06	ND<5,000	ND<100	220	ND<100	220	ND<100	ND<100	ND<100	ND<500	
SG-5 DUP	5	3	1/3/06	ND<5,000	ND<100	170	ND<100	190	ND<100	ND<100	ND<100	ND<500	
SG-6	5	3	1/3/06	ND<5,000	ND<100	180	ND<100	190	ND<100	ND<100	ND<100	ND<500	
SG-7	5	3	1/3/06	ND<5,000	ND<100	230	ND<100	170	ND<100	ND<100	ND<100	ND<500	
SG-8	5	3	1/3/06	ND<5,000	ND<100	140	ND<100	160	ND<100	ND<100	ND<100	ND<500	
SG-9	5	3	1/3/06	ND<5,000	ND<100	180	ND<100	190	ND<100	ND<100	ND<100	ND<500	

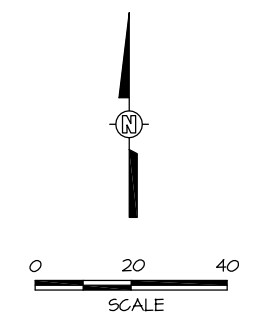
(a) Total petroleum hydrocarbons as gasoline (TPHg), benzene, toluene, ethylbenzene, xylenes, methyl tert-butyl ether (MTBE), di-isopropyl ether (DIPE), ethyl tert-butyl ether (ETBE), tert-amyl methyl ether (TAME), and tert-butyl alcohol (TBA) analyzed by EPA Method 8260; reported in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) of vapor.

(b) ND - Not detected at the reporting limit listed.

5/5/2006 1:15 PM 01LVB30401.dwg



- Legend
- SG-1 ● Soil Gas Sampling Location
 - DB-1 ▲ Soil Boring and Grab Groundwater Sampling Location
 - MW-7 ◆ Groundwater Monitoring Well
 - VW-2 ⊞ Vapor Extraction Well
 - TP-2 ⊗ Temporary Monitoring Well
 - A A' Geologic Cross Section



REVISION	REVISIONS			
	NO.	BY	DATE	DESCRIPTION
1	0	MY	9/8/05	Site Investigation Work Plan
	1	MY	4/28/06	Investigation Report

ARCTOS ENVIRONMENTAL			
TESORO - LIVERMORE			
SITE PLAN			
PROJECT NO. OILV	DRAWN BY MY	CHECKED BY MP	APPROVED BY JPG
FILE NO. OILVB30401.DWG	FIGURE 2		

TABLE E-2

**SOIL VAPOR ANALYTICAL RESULTS
TESORO - LIVERMORE, 67076**

Sample Location	Sample Date	TPHg ^(a) (µg/m ³)	Benzene ^(a) (µg/m ³)	Toluene ^(a) (µg/m ³)	Ethylbenzene ^(a) (µg/m ³)	Total Xylenes ^(a) (µg/m ³)	MTBE ^(a) (µg/m ³)	TBA ^(a) (µg/m ³)	Oxygen ^(b)	Carbon Dioxide ^(b)
MW-1	6/24/10	NS ^(c)	NS	NS	NS	NS	NS	NS	NS	NS
	2/28/13	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-11	6/24/10	2,300,000	13,000	10,000	7,400	20,500	ND<100 ^(d)	ND<1,000	16	4.29
	2/28/13	26,000	ND<200	ND<200	ND<250	ND<200	ND<200	NA ^(e)	NA	NA
TP-1	6/24/10	350,000	150	250	460	1,110	ND<100	ND<1,000	21.7	ND<0.5
	2/28/13 ^(f)	32,000	ND<200	ND<200	ND<250	ND<200	ND<200	NA	NA	NA
TP-2	6/24/10	3,600,000	24,000	590	27,000	28,100	18,000	ND<1,000	20.3	0.93
	2/28/13	26,000	ND<200	ND<200	ND<250	ND<200	ND<200	NA	NA	NA
VW-2	6/24/10	3,100,000	910	680	1,800	2,100	ND<100	ND<1,000	17	2.96
	2/28/13	ND<20,000	ND<200	ND<200	ND<250	ND<200	ND<200	NA	NA	NA
VW-3	6/24/10 ^(f)	120,000	330	ND<200	1,800	2,320	ND<100	ND<1,000	21.9	ND<0.5
	2/28/13	ND<20,000	ND<200	ND<200	ND<250	ND<200	ND<200	NA	NA	NA

(a) Total petroleum hydrocarbons as gasoline (TPHg), benzene, toluene, ethylbenzene, total xylenes, methyl tert-butyl ether (MTBE), and tert-butyl alcohol (TBA) analyzed using EPA Method 8260B; reported in micrograms per cubic meter (µg/m³) of vapor.

(b) Results are in percent by volume.

(c) NS - Not sampled. A sample was not collected due to a submerged screen.

(d) ND - Not detected at the reporting limit listed.

(e) NA - Not analyzed.

(f) Duplicate sample also collected; highest value presented in table (see laboratory report for results).

APPENDIX F
ACEH APPROVAL

Scott Stromberg

From: Wickham, Jerry, Env. Health <jerry.wickham@acgov.org>
Sent: Tuesday, June 23, 2015 4:56 PM
To: Scott Stromberg
Subject: RE: RO0434 - Tesoro - Livermore - 1Q15 Status Report

Scott,

We concur with the recommendations in your First Quarter 2015 Status Report dated April 29, 2015 to:

- 1) Discontinue the increased groundwater monitoring sampling frequency and additional analytical parameters for the expanded ISCO pilot test.
- 2) Restarting of the oxygen injection system as previously discussed in February 2015.
- 3) Resuming semiannual groundwater monitoring with quarterly groundwater monitoring of selected wells to assess the oxygen system performance.

Regards,

Jerry Wickham
Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda, CA 94502
510-567-6791
jerry.wickham@acgov.org

From: Scott Stromberg [<mailto:sstromberg@orionenv.com>]
Sent: Monday, June 22, 2015 5:25 PM
To: Wickham, Jerry, Env. Health
Subject: RO0434 - Tesoro - Livermore - 1Q15 Status Report

Jerry,

Have you had a chance to review the 1Q15 status report for the Tesoro - Livermore site, uploaded to ACEH's ftp site on 29 April? In the report we recommend discontinuing analysis of the additional groundwater parameters that we used to monitor the ISCO pilot tests, and propose a new monitoring schedule to monitor oxygen injection performance. The oxygen system was restarted after discussing with you on the phone back in February.

Thanks
Scott