



Atlantic Richfield Company
(a BP affiliated company)

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August 28, 2009

Re: Soil and Ground-Water Investigation Work Plan
Atlantic Richfield Company Station #498
286 South Livermore Avenue
Livermore, California
ACEH Case RO0002873

RECEIVED

10:58 am, Aug 31, 2009

Alameda County
Environmental Health



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

Submitted by:

Paul Supple
Environmental Business Manager

August 28, 2009

Project No. 08-82-603

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

Attn.: Mr. Paul Supple

Re: Soil and Ground-Water Investigation Work Plan, Atlantic Richfield Company (a BP affiliated company) Station #498, 286 South Livermore Avenue, Livermore, California. Case No. RO0002873.

Dear Mr. Supple:

Broadbent & Associates, Inc. (BAI) is pleased to submit this Work Plan to conduct a soil and ground-water investigation work activities at Atlantic Richfield Company Station #498 (herein referred to as Station #498) located at 286 South Livermore Avenue, Livermore, California (Property). The Work Plan has been prepared in accordance with the Alameda County Environmental Health (ACEH) letter dated March 16, 2009.

Should you have any questions concerning this Work Plan, please do not hesitate to contact us at (530) 566-1400.

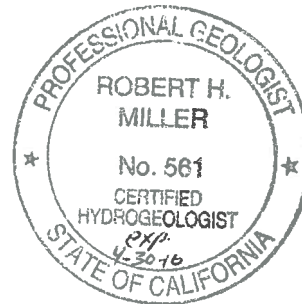
Sincerely,
BROADBENT & ASSOCIATES, INC.



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



Robert H. Miller, P.G., C.HG.
Principal Hydrogeologist



cc: Mr. Paresh Khatri, Alameda County Environmental Health, 1131 Harbor Bay Parkway, Suite 250, Alameda, CA 94502 (Submitted via ACEH ftp Site)
GeoTracker

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1.0 Introduction

On behalf of Atlantic Richfield Company, Broadbent & Associates, Inc. (BAI) has prepared this *Soil and Ground-Water Investigation Work Plan* for Atlantic Richfield Company Station #498 (herein referred to as Station #498) located at 286 South Livermore Avenue, Livermore, California. This document was prepared in response to the request in the March 16, 2009 letter from the Alameda County Environmental Health (ACEH).

2.0 Previous Environmental Activities

Provided herein is a Work Plan to conduct soil and ground-water investigation work activities at Station #498 located in Livermore, California. The Property is currently an operational gas station located in an area of mixed commercial and residential use. The property consists of a relatively flat asphalt and concrete covered lot. A site location map is provided in Drawing 1. A brief description of previous environmental activities is provided below.

Product Line and Dispenser Upgrade - June 2001

During product line and dispenser upgrade activities completed in June 2001, Delta Environmental Consultants, Inc. (Delta) collected soil samples beneath the product line and dispenser islands. Total purgeable hydrocarbons as gasoline (TPHg) were detected in two of the four dispenser island samples at 1.8 milligrams per kilogram (mg/Kg) in sample DP-1 and 87 mg/Kg in sample DP-3. Benzene, toluene, ethylbenzene, and total xylenes (BTEX), and methyl tertiary butyl ether (MTBE) were also detected in dispenser island sample DP-3. Only toluene and total xylenes were detected in product line sample PL-2 at relatively low concentrations. Historic soil analytical data are provided in Appendix A. Historic soil sample locations are depicted in Drawing 2. Product line and Dispenser Island Sampling activities are summarized in the Delta September 19, 2001 *Product Line and Dispenser Island Sampling Results Report*.

Site Assessment - January 2005

In January 2005, URS completed a site assessment to fulfill a due diligence audit as part of the sale of the Property. Field activities were conducted to assess whether subsurface soils in the vicinity of the underground storage tanks (USTs) and fuel dispensers had been impacted by petroleum hydrocarbons. The work was not required as part of a regulatory agency directive. Eight soil borings were advanced using a direct push Geoprobe® 6600 drill rig. URS stated in the February 15, 2005 *Site Assessment Report* that the proposed total depth of all borings was 30 feet below land surface (bls); however, due to difficult drilling conditions encountered, the borings were only advanced to depths ranging from 15 to 25 feet bls. Ground water was not encountered in any of the borings. Only MTBE and TBA were detected in four of the soil samples (SB-1-22', SB-1-24', SB-3-25', and SB-8-25') at maximum concentrations of 0.022 mg/kg (SB-8-25') and 0.031 mg/kg (SB-1-22'), respectively. Historic soil analytical data are provided in Appendix A and sample locations are depicted in Drawing 2.

Soil and Ground-Water Investigation - November 2008 & Ground-Water Monitoring - 1st and 2nd Quarter, 2009

In November 2008, a soil and ground-water investigation was completed which included installation of monitor wells MW-1 through MW-4. Field activities were conducted to further define the vertical and lateral extent of impacted soil and complete an initial ground water investigation. Soil

sample analytical results showed the presence of petroleum hydrocarbon impacted soil at all four sample locations (MW-1 through MW-4) at depths ranging from 15 to 35 feet bls. Historic soil analytical data are provided in Appendix A. Elevated ground-water concentrations were detected in well MW-3 and moderately elevated concentrations were detected in wells MW-1 and MW-2. Well MW-4 was found to be dry. Although three wells were gauged for depth to ground water, a ground-water contour map could not be generated from the data as the water elevation in MW-1 was approximately 20 feet higher than wells MW-2 and MW-3. The February 6, 2009 *Soil and Ground-Water Investigation and Fourth Quarter, 2008 Quarterly Monitoring Report* recommended that two additional quarters (First and Second Quarter, 2009) of ground-water monitoring/sampling be completed to better understand the hydrogeology before additional investigation work activities were proposed. The ACEH approved these recommendations in their March 16, 2009 letter and requested that a soil and ground-water investigation work plan be submitted by August 28, 2009 following completion of the two additional monitoring/sampling events.

During the two additional quarters of ground-water monitoring/sampling elevated petroleum hydrocarbon concentrations continued to be detected in MW-3. A ground-water sample was collected from MW-4 during the First Quarter, 2009 and indicated moderate to low concentrations present in ground water in the well. A summary of ground-water elevations observed over the three quarters of monitoring (Fourth Quarter, 2008 through Second Quarter, 2009), important to understanding the hydrogeology at the site, are as follows:

- The ground-water elevation in MW-1 has remained relatively consistent, fluctuating approximately two feet from the time period fourth quarter, 2008 to second quarter, 2009.
- Ground-water elevations in wells MW-2 and MW-3 fluctuated significantly increasing approximately 10 feet from the time period fourth quarter, 2008 to first quarter, 2009 followed by a decrease of approximately 5 feet from the time period first quarter, 2009 to second quarter, 2009.
- Ground-water has only been observed in well MW-4 on one occasion during the first quarter, 2009.
- A ground-water elevation contour map has only been generated once (from data collected during the first quarter, 2009) utilizing wells MW-2, MW-3, and MW-4. The ground-water flow direction was measured toward the north-northwest.

As a reminder, construction of wells MW-1 and MW-4 are similar (both screened from 20 to 40 feet below land surface) and wells MW-2 and MW-3 are similar (both screened from 37 to 57 feet below land surface). Although the screen intervals overlap, based on the data collected to date it appears that MW-1 is completed in a different water bearing formation. Unfortunately, a review of the lithology from each boring did not provide further insight into separate water bearing zones. One possible explanation to explain the anomalous water levels in MW-1 could be the presence of a localized perched water bearing zone in the immediate vicinity of the well. A summary of ground-water monitoring including relative water elevations and laboratory analyses are provided in Table 1 and Table 2. Historical ground-water flow direction and gradient data are included in Table 3.

This *Soil and Ground-Water Investigation Work Plan* has been prepared in accordance with the ACEH March 16, 2009 letter to better understand the hydrogeology and further define the extent of impacted soil and ground water.

3.0 Scope of Work

It is proposed that one on-site well (MW-5) be installed a short distance (approximately 5 feet) from existing well MW-1 to determine if the anomalous water levels observed in MW-1 are a result of a localized perched water bearing zone. It is further recommended that two wells (MW-6 and MW-7) be installed to the northwest of Station #498 on the neighboring property to further define the extent of the petroleum hydrocarbon impacted ground water. Tri-Valley Optometry is currently occupying the building located on the neighboring property. An access agreement will be submitted to the property owner to facilitate completion of field work. Field work will not commence until an access agreement has been accepted and signed by the property owner. Proposed well locations are presented in Drawing 2.

4.0 Project Setup

In accordance with the current contract with Atlantic Richfield Company, Stratus Environmental, Inc. (Stratus) will complete the field work associated with this soil and ground-water investigation (i.e., drilling, gauging, and sampling). Stratus will obtain any permits necessary prior to initiation of field work. Once the field work is complete, Stratus will provide a data package which will include field notes, lithologic logs, and laboratory analytical reports from the investigation. BAI will then use this data package to generate a report for submittal to the ACEH summarizing the soil and ground-water investigation including data interpretation and recommendations.

5.0 Soil Investigation

Soil borings will be advanced using a hollow stem auger drilling technique. Soils will be lithologically logged by a qualified geologist using the Unified Soil Classification System (USCS). As discussed above, difficult drilling conditions encountered during completion of the 2005 investigation rule out the use of a direct push drilling technique and collection of grab ground-water samples. The expected depth to static ground water at Station 498 is estimated to be approximately 38 to 48 feet bls (based on the range of historic depth to ground water from wells MW-2 through MW-4). However, depth to static ground water at other Atlantic Richfield Company sites in Livermore has historically varied by up to 40 feet. Soil samples will be collected at five foot intervals beginning 6.5 feet bls and continue to just above the capillary fringe using a split-spoon sampler and brass sleeves. Continuous logging using a split spoon sample will be completed during installation of MW-5 to help determine if a localized perched water bearing zone is present.

A minimum of three soil samples will be submitted for laboratory analysis from each boring. The three soil samples will include: (1) the deepest sample collected just above the capillary fringe, (2) the sample with the highest PID reading, and (3) a sample to be determined in the field. Each sample collected for submittal to a laboratory for analysis will be sealed on both ends with Teflon tape, capped with plastic end caps, labeled, and placed in an ice-filled cooler for preservation. The soil samples will be transported under chain-of-custody protocol to a California State-certified analytical laboratory and analyzed for the following:

- Gasoline range organics (GRO) and BTEX via EPA Method 8260B; and
- Fuel additives MTBE, tert-butyl alcohol (TBA), ethyl tert-butyl ether (ETBE), tert-amyl methyl ether (TAME), di-isopropyl ether (DIPE), 1,2-dichloroethane (1,2-DCA), 1,2-dibromoethan (EDB), and ethanol via EPA Method 8260B.

Investigation-derived residuals will be collected in 55-gallon steel drums, stored on the Property, and profiled prior to disposal at an approved Atlantic Richfield Company disposal facility.

6.0 Ground-Water Investigation

As stated above, depth to static ground water is expected to be 38 to 48 feet bls (based on water levels observed in wells MW-2 through MW-4); however, has varied by up to 40 feet at other Atlantic Richfield Company sites in Livermore. Depth to static ground water in MW-1 which is the well that appears to be screened across a localized perched zone, has ranged from 29 to 31 feet bls. It is anticipated that the general ground-water flow direction is toward the northwest based on ground-water flow directions measured at the former Shell Station located across 3rd Street and from data collected on the Property during the First Quarter, 2009 monitoring event.

The proposed well design for well MW-5 (installed adjacent to MW-1) calls for a total well depth of 60 feet, with 15 feet of well screen from total depth to 45 feet bls. As a reminder well MW-1 was completed to a total depth of 40 feet with 20 feet of well screen from total depth to 20 feet bls. The deeper screen interval proposed for well MW-5 should be sufficient to confirm or refute the presence of a localized perched water bearing zone.

The proposed well design for MW-6 and MW-7 calls for a total well depth of 55 feet, with 20 feet of well screen from total depth to 35 feet bls. Total depth and well screen intervals have been adjusted for off-site wells MW-6 and MW-7 as the neighboring property is at an elevation slightly lower than Station #498. All three wells will be constructed using two-inch diameter, schedule 40 PVC well casing and factory slotted well screen (0.02 inch slots) with flush threaded water tight connections. The casing will be surrounded by silica sand compatible with 0.02 inch slots in the annular space from total depth to three feet above top of screen. A sanitary seal will be installed consisting of approximately three feet of bentonite well-seal overlain by neat cement grout to the surface. Well heads will be completed with a lockable water-tight plug and traffic rated monitor well vault.

Appropriate changes, if necessary, will be made to the total well depth and screen interval based on conditions encountered in the boreholes during drilling activities.

Upon completion of well construction, the wells will be developed by surging/bailing or pumping water until relatively silt free water is removed from the wells. A minimum of three wetted casing volumes of ground water will be removed until water quality parameters have stabilized. After development, the wells will be left to hydraulically equilibrate prior to water level measurement and sampling. When equilibrated, depth to water and presence of free-phase product will be measured in each well.

Prior to water sample collection, a minimum of three casing volumes of water will be purged from the wells. Purge water will be collected in drums and stored on the Property pending receipt of laboratory analytical results. Upon receipt of laboratory analytical results, the purge water will be transported and disposed at an approved Atlantic Richfield Company disposal facility. Ground-water samples will be collected with factory decontaminated disposable bailers and placed in laboratory prepared containers. Samples will be labeled and chilled prior to transport under chain-of-custody protocol to a California State-certified analytical laboratory and analyzed for the following:

- GRO and BTEX via EPA Method 8260B; and

- Fuel additives MTBE, TBA, ETBE, TAME, DIPE, 1,2-DCA, EDB, and ethanol via EPA Method 8260B.

A California-licensed Professional Land Surveyor will be scheduled to survey the new well heads and other relevant structures and land features. All elevations will be surveyed with respect to mean sea level. The survey information will be used to generate an accurate site map and ground water gradient map. Well survey information will be uploaded to GeoTracker.

7.0 Schedule and Reporting

Once the ACEH has approved this Soil and Ground-Water Investigation Work Plan, access agreement negotiations with the neighboring property owner will be initiated. With a signed access agreement in place, Stratus will be directed to execute field work. If, a signed access agreement is not in place 90 days following approval of this Work Plan by the ACEH, assistance with access agreement negotiations from the ACEH will be requested.

Upon completion of field work and receipt of a data packet from Stratus summarizing field activities including laboratory analytical reports, BAI will complete a soil and ground-water investigation report for submittal to ACEH. It is recommended that the deadline for submittal of the report be set to 90 days following receipt of a signed property access agreement.

8.0 Closure

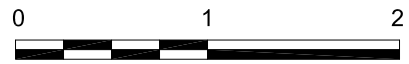
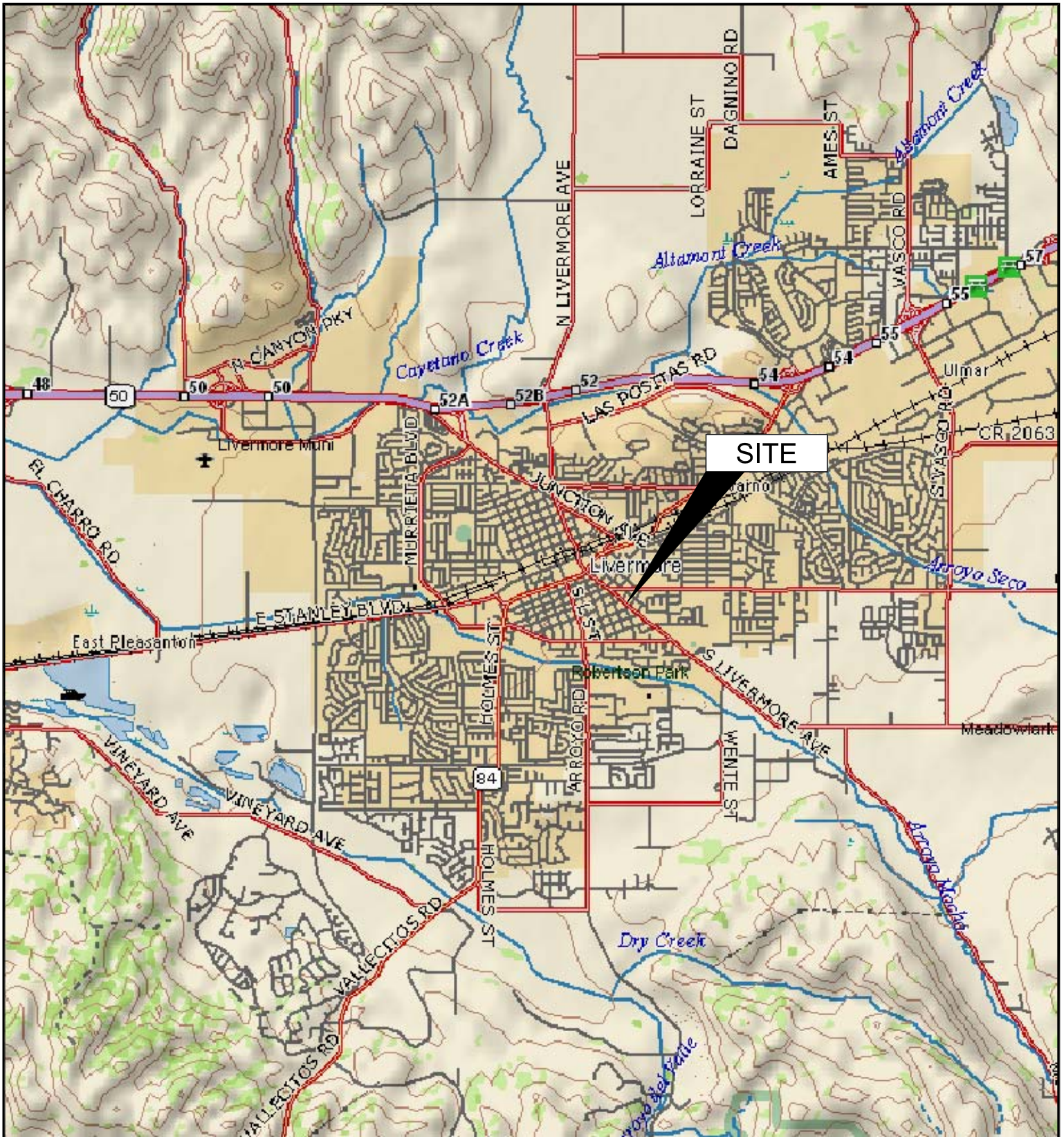
Our services will be performed in accordance with the generally accepted standard of practice at the time work commences. Results and recommendations will be based on review of available documentation and written or verbal correspondence with appropriate regulatory agencies, laboratory results, observations of Stratus field personnel, and the points investigated. No other warranty, expressed or implied is made.

References:

Broadbent & Associates, Inc. February 6, 2009. *Soil and Ground-Water Investigation and Fourth Quarter, 2008 Monitoring Report Atlantic Richfield Company Station #498.*

Delta. September 19, 2001. *Product Line and Dispenser Island Sampling Results ARCO Station No. 498.*

URS. February 15, 2005. *Site Assessment Report ARCO Service Station #0498.*



APPROXIMATE SCALE (mi)

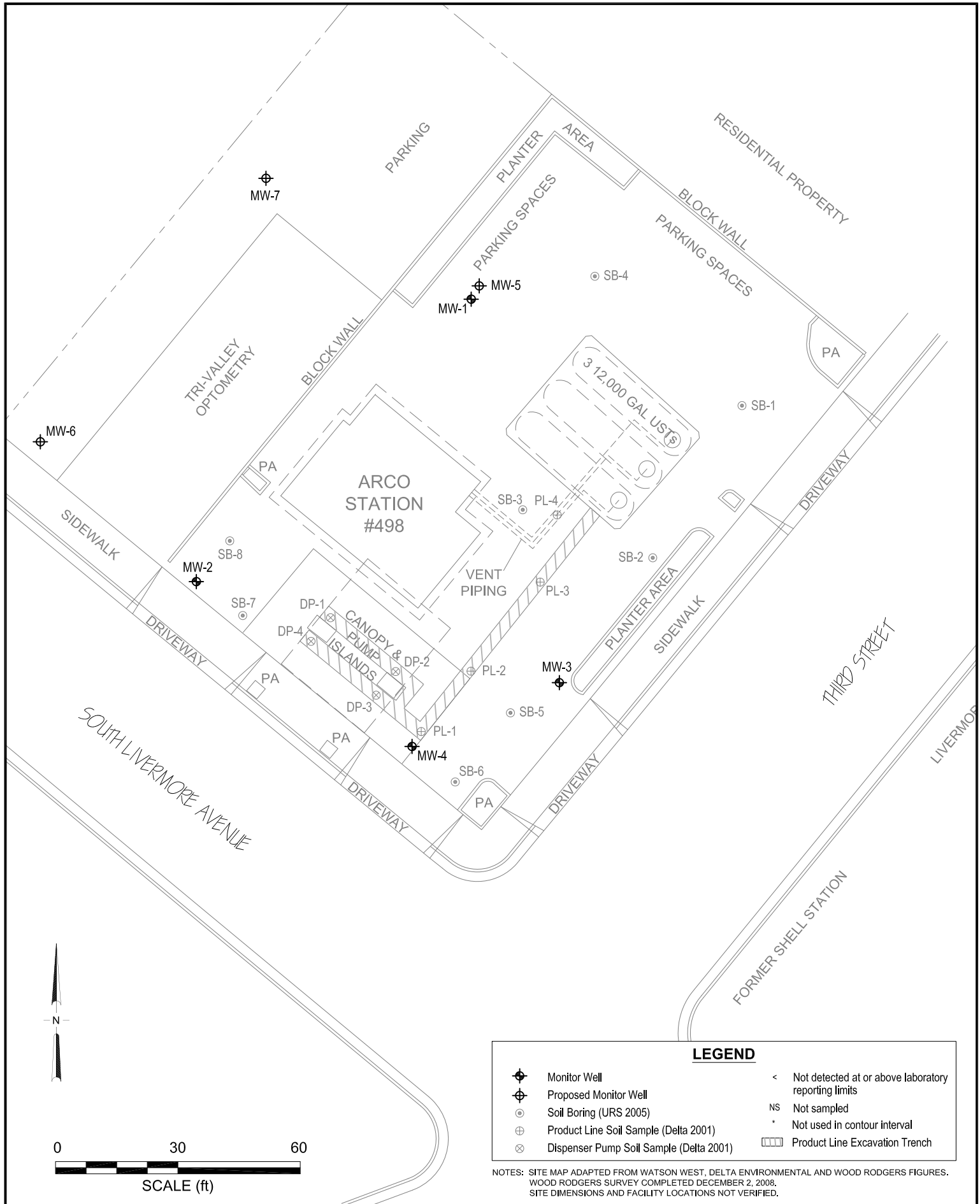
IMAGE SOURCE: DELORME

BROADBENT & ASSOCIATES, INC.
 ENGINEERING, WATER RESOURCES & ENVIRONMENTAL
 1324 Mangrove Ave, Suite 212, Chico, California 95926
 Project No.: 06-82-603 Date: 7/22/2009

Station #498
 286 South Livermore Avenue
 Livermore, California

Site Location Map

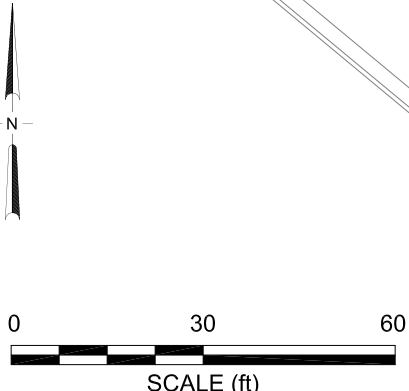
Drawing
1



LEGEND

- ⊕ Monitor Well
- ⊕ Proposed Monitor Well
- ⊙ Soil Boring (URS 2005)
- ⊕ Product Line Soil Sample (Delta 2001)
- ⊗ Dispenser Pump Soil Sample (Delta 2001)
- < Not detected at or above laboratory reporting limits
- NS Not sampled
- * Not used in contour interval
- ▭ Product Line Excavation Trench

NOTES: SITE MAP ADAPTED FROM WATSON WEST, DELTA ENVIRONMENTAL AND WOOD RODGERS FIGURES. WOOD RODGERS SURVEY COMPLETED DECEMBER 2, 2008. SITE DIMENSIONS AND FACILITY LOCATIONS NOT VERIFIED.



**Table 1. Summary of Ground-Water Monitoring Data: Relative Water Elevations and Laboratory Analyses
Station #498, 286 South Livermore Avenue, Livermore, CA**

Well and Sample Date	P/NP	Comments	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet bgs)	Product Thickness (feet)	Water Level Elevation (feet)	Concentrations in (µg/L)						DO (mg/L)	pH
									GRO/TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MtBE		
MW-1																
12/29/2008	P		496.72	20	40	28.81	--	467.91	1,100	38	1.2	4.0	3.3	17	2.72	6.83
3/20/2009	P		496.72	20	40	28.95	--	467.77	640	9.1	<0.50	4.1	<0.50	21	0.35	7.28
6/2/2009	P		496.72	20	40	30.90	--	465.82	600	1.6	<0.50	<0.50	<0.50	32	0.59	7.17
MW-2																
12/29/2008	P		495.35	37	57	48.76	--	446.59	110	7.1	<0.50	<0.50	0.76	16	1.04	7.67
3/20/2009	P		495.35	37	57	38.78	--	456.57	200	3.9	<1.0	<1.0	<1.0	56	0.41	7.51
6/2/2009	P		495.35	37	57	43.98	--	451.37	110	5.1	<1.0	<1.0	<1.0	44	1.87	7.42
MW-3																
12/29/2008	P		496.32	37	57	48.21	--	448.11	28,000	310	200	840	6,200	71	1.95	7.39
3/20/2009	P		496.32	37	57	38.48	--	457.84	11,000	360	84	600	1,500	71	0.56	7.25
6/2/2009	P	a	496.32	37	57	43.33	--	452.99	5,100	310	14	180	310	66	2.06	7.18
MW-4																
12/29/2008	--	Dry	496.01	20	40	--	--	--	--	--	--	--	--	--	--	--
3/20/2009	P		496.01	20	40	37.82	--	458.19	410	0.78	<0.50	<0.50	0.64	16	0.52	7.16
6/2/2009	--	Dry	496.01	20	40	--	--	--	--	--	--	--	--	--	--	--

SYMBOLS AND ABBREVIATIONS:

-- = Not sampled/analyzed/applicable/measured/ available
< = Not detected at or above specified laboratory reporting limit
DO = Dissolved oxygen
DTW = Depth to water in ft bgs
ft bgs= feet below ground surface
ft MSL= feet above mean sea level
GRO = Gasoline range organics
GWE = Groundwater elevation measured in ft MSL
mg/L = Milligrams per liter
MTBE = Methyl tert-butyl ether
NP = Not purged before sampling
P = Purged before sampling
TOC = Top of casing measured in ft MSL
µg/L = Micrograms per liter

NOTES:

a = Sample preserved improperly.

**Table 2. Summary of Fuel Additives Analytical Data
Station #498, 286 South Livermore Avenue, Livermore, CA**

Well and Sample Date	Concentrations in (µg/L)								Comments
	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	
MW-1									
12/29/2008	<300	<10	17	<0.50	<0.50	<0.50	<0.50	<0.50	
3/20/2009	<300	25	21	<0.50	<0.50	<0.50	<0.50	<0.50	
6/2/2009	<300	28	32	<0.50	<0.50	<0.50	<0.50	<0.50	
MW-2									
12/29/2008	<300	22	16	<0.50	<0.50	<0.50	<0.50	<0.50	
3/20/2009	<600	62	56	<1.0	<1.0	<1.0	<1.0	<1.0	
6/2/2009	<600	83	44	<1.0	<1.0	<1.0	<1.0	<1.0	
MW-3									
12/29/2008	<30,000	<1,000	71	<50	<50	<50	<50	<50	
3/20/2009	<7,500	<250	71	<12	<12	<12	<12	<12	
6/2/2009	<3,000	100	66	<5.0	<5.0	<5.0	<5.0	<5.0	
MW-4									
3/20/2009	<300	2,000	16	<0.50	<0.50	<0.50	<0.50	<0.50	

SYMBOLS AND ABBREVIATIONS:

--/-- = Not sampled/analyzed/applicable/measured/available

< = Not detected at or above specified laboratory reporting limit

1,2-DCA = 1,2-Dichloroethane

DIPE = Di-isopropyl ether

EDB= 1,2-Dibromoethane

ETBE = Ethyl tert-butyl ether

MTBE = Methyl tert-butyl ether

TAME = tert-Amyl methyl ether

TBA = tert-Butyl alcohol

µg/L = Micrograms per liter

**Table 3. Historical Ground-Water Flow Direction and Gradient
Station #498, 286 South Livermore Avenue, Livermore, CA**

Date Sampled	Approximate Flow Direction	Approximate Hydraulic Gradient
12/29/2008	NA	NA
3/20/2009	North-Northwest	0.02
6/2/2009	NA	NA

NOTES:

NA = Not Available

Appendix A:
Historic Soil Analytical Data

TABLE 1

SOIL SAMPLE LABORATORY ANALYTICAL RESULTS

ARCO Service Station No. 498
286 South Livermore Avenue
Livermore, California

Sample ID	Date	Depth (ft)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Total Xylenes (mg/kg)	TPH as gasoline (mg/kg)	MTBE (mg/kg)	Total Lead (mg/kg)
<u>Dispenser Island Samples</u>									
DP-1	06/01/01	3.0	<0.0050	<0.0050	<0.0050	0.019	1.8	<0.050	23
DP-2	06/01/01	3.5	<0.0050	<0.0050	<0.0050	<0.0050	<1.0	<0.050	3.7
DP-3	06/01/01	3.5	0.11	2.8	1.2	8.9	87	3.7	17
DP-4	06/01/01	3.5	<0.0050	<0.0050	<0.0050	<0.0050	<1.0	<0.050	4.2
<u>Product Line Samples</u>									
PL-1	06/01/01	3.8	<0.0050	<0.0050	<0.0050	<0.0050	<1.0	<0.050	2.3
PL-2	06/01/01	4.5	<0.0050	0.011	<0.0050	0.010	<1.0	<0.050	13
PL-3	06/01/01	5.0	<0.0050	<0.0050	<0.0050	<0.0050	<1.0	<0.050	5.4
PL-4	06/01/01	2.5	<0.0050	<0.0050	<0.0050	<0.0050	<1.0	<0.050	190
<u>Soil Stockpile Results</u>									
SP-1,2,3,4	06/01/01	Composite	<0.0050	<0.0050	<0.0050	0.13	5.6	<0.050	32

TPH = Total purgeable hydrocarbons.

MTBE = Methyl tertiary butyl ether (analyzed by DHS LUFT Methods)

NA = Not Analyzed

Table 1 - Soil Analytical Data
ARCO Service Station #0498
286 South Livermore Avenue, Livermore California

Sample Name	Sample Depth (ft)	Date Sampled	TPH-GRO (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)
SB-1-7'	7.0	01/20/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-1-12'	12.0	01/20/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-1-17'	17.0	01/20/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-1-22'	22.0	01/20/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-1-24'	24.0	01/20/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-2-10'	10.0	01/19/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-2-15'	15.0	01/19/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-2-18.5'	18.5	01/19/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-3-10'	10.0	01/19/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-3-15'	15.0	01/19/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-3-20'	20.0	01/19/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-3-25'	25.0	01/19/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-4-7'	7.0	01/19/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-4-12'	12.0	01/19/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-4-17'	17.0	01/19/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-4-22'	22.0	01/19/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-5-10'	10.0	01/20/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-5-15'	15.0	01/20/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-6-10'	10.0	01/20/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-6-15'	15.0	01/20/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-6-22'	22.0	01/20/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-7-10'	10.0	01/20/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-7-14.5'	14.5	01/20/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-7-20'	20.0	01/20/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-8-10'	10.0	01/20/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-8-15'	15.0	01/20/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-8-20'	20.0	01/20/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-8-25'	25	01/20/05	ND <1.0	ND <0.005	ND <0.005	ND <0.005	ND <0.005

Notes:

- ND = Not Detected at or above the laboratory reporting limit
- mg/kg = milligrams per kilogram
- TPH-GRO = Total Petroleum Hydrocarbons gasoline range organics
- BTEX = Benzene, toluene, ethylbenzene, and xylenes

Table 2 Soil Analytical Data-Oxygenates
ARCO Service Station #0498
286 South Livermore Avenue, Livermore California

Sample Name	Sample Depth (ft)	Date Sampled	Ethanol (mg/kg)	TBA (mg/kg)	MTBE (mg/kg)	DIPE (mg/kg)	ETBE (mg/kg)	TAME (mg/kg)	1,2-DCA (mg/kg)	EDB (mg/kg)
SB-1-7'	7.0	01/20/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-1-12'	12.0	01/20/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-1-17'	17.0	01/20/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-1-22'	22.0	01/20/05	ND <0.1	0.031	0.015	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-1-24'	24.0	01/20/05	ND <0.1	0.025	0.006	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-2-10'	10.0	01/19/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-2-15'	15.0	01/19/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-2-18.5'	18.5	01/19/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-3-10'	10.0	01/19/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-3-15'	15.0	01/19/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-3-20'	20.0	01/19/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-3-25'	25.0	01/19/05	ND <0.1	0.021	0.011	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-4-7'	7.0	01/19/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-4-12'	12.0	01/19/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-4-17'	17.0	01/19/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-4-22'	22.0	01/19/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-5-10'	10.0	01/20/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-5-15'	15.0	01/20/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-6-10'	10.0	01/20/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-6-15'	15.0	01/20/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-6-22'	22.0	01/20/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-7-10'	10.0	01/20/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-7-14.5'	14.5	01/20/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-7-20'	20.0	01/20/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-8-10'	10.0	01/20/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-8-15'	15.0	01/20/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-8-20'	20.0	01/20/05	ND <0.1	ND <0.01	ND <0.005	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005
SB-8-25'	25	01/20/05	ND <0.1	0.012	0.022	ND <0.01	ND <0.005	ND <0.005	ND <0.005	ND <0.005

Notes:

- ND = Not Detected at or above the laboratory reporting limit
- mg/kg = milligrams per kilogram
- TBA = Tert-butyl alcohol
- MTBE = Methyl tertiary butyl ether
- DIPE = Di-isopropyl ether
- ETBE = Ethyl tertiary butyl ether
- TAME = Tert-amyl methyl ether
- 1,2-DCA = 1,2-Dichloroethane
- EDB = 1,2-Dibromoethane

Table 1. Summary of Soil Sample Analytical Data
Station #498, 286 South Livermore Avenue, Livermore, CA

Boring and Sample Date	Sample ID	Concentrations in (mg/kg)								Comments
		GRO/TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE	Ethanol	TBA	
MW-1										
11/24/2008	MW-1 25'	45	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.10	<0.010	
11/24/2008	MW-1 30'	0.86	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.10	<0.010	
11/24/2008	MW-1 40'	<0.50	<0.0010	<0.0010	<0.0010	<0.0010	0.16	0.23	0.036	
MW-2										
11/24/2008	MW-2 40'	<0.50	<0.0010	<0.0010	<0.0010	<0.0010	0.010	<0.10	0.022	
11/24/2008	MW-2 45'	18	<0.0010	<0.0010	<0.0010	<0.0010	0.0019	0.44	0.022	
11/24/2008	MW-2 50'	<0.50	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.10	<0.010	
MW-3										
11/26/2008	MW-3 15'	6.7	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.10	0.14	
11/26/2008	MW-3 20'	210	<0.0010	<0.0010	0.88	<0.0010	<0.0010	<0.10	<0.010	
11/26/2008	MW-3 25'	530	<0.10	<0.10	1.5	0.17	<0.10	<10	<1.0	
11/26/2008	MW-3 30'	0.84	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.10	<0.010	
11/26/2008	MW-3 35'	<0.50	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.10	0.028	
11/26/2008	MW-3 40'	<0.50	<0.0010	<0.0010	<0.0010	<0.0010	0.013	<0.10	0.014	
MW-4										
11/25/2008	MW-4 30'	2.0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.35	0.054	
11/25/2008	MW-4 35'	75	<0.0010	<0.0010	<0.0010	<0.0010	0.0030	<0.10	0.65	
11/25/2008	MW-4 40'	<0.50	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.10	0.14	

SYMBOLS AND ABBREVIATIONS:

< = Not detected at or above specified laboratory reporting limit

GRO = Gasoline range organics

MTBE = Methyl tert-butyl ether

TBA = Tert-Butyl Alcohol

mg/kg = Milligrams per Kilogram

NOTES:

1,2-dibromoethane (EDB), 1,2-dichloroethane (1,2 DCA), Di-isopropyl ether (DIPE), ethyl tert-butyl ether (ETBE) and ter-amyl methyl ether (TAME) were not detected at or above their respective laboratory reporting limits.

GRO (C6-C12) analyzed using EPA method 8015B.

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

The number after space in Sample ID denotes the depth at which the sample was collected in feet bls.