



Alameda County

JUN 27 2005

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Environmental Health

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Facsimile Transmittal		
To:	Alameda County Health Care Services Agency	Date: 6/24/2005
	Environmental Health Service - Environmental Protection	
	1131 Harbor Bay Parkway, Suite 250	Job No: SJ37-90H-1.2005
	Alameda, California 94502-6577	
Attn:	Jerry Wickham	

We are sending the following items:

Date	Copies	Description
24-Jun-05	1	Re: Agency Reponse & Revised Work Plan
		Shell-branded Service Station
		3790 Hopyard Road
		Pleasanton, California

These are transmitted:

- For your Information
 For action specified below
 For review and comment
 For your use
 As requested

Remarks

Copies to: _____ By: Rebecca Wolff

_____ Title: Senior Staff Geologist

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Environmental Health

June 24, 2005
Project SJ3790-1.2005

Mr. Jerry Wickham
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

**Re: Agency Response and Revised Work Plan
Shell-branded Service Station
3790 Hopyard Road
Pleasanton, California**

Dear Mr. Wickham,

Delta Environmental Consultants, Inc. (Delta), on behalf of Shell Oil Products US (Shell), has prepared agency responses and revised work plan for the site referenced above (Figure 1). The responses and revised work plan were requested in a letter from the Alameda County Health Care Services Agency (ACHCSA) to Shell dated April 26, 2005.

BACKGROUND

On February 15 through 18, 2005, Delta performed groundwater sampling at nine locations (CPT-3 through CPT-11, Figure 2) using cone penetration testing (CPT) equipment. The goal of the CPT investigation was to define the lateral and vertical extent of methyl tert-butyl ether (MTBE) and tert butanol (TBA) previously detected in shallow groundwater beneath the site and downgradient areas. MTBE and TBA are concentrated in first encountered groundwater in the 15- to 20-foot depth interval.

The CPT boreholes encountered clay to a depth of approximately 50 feet below grade (bg). Interlayered silt, sandy silt, sand, and gravelly sand predominate from approximately 50 feet bg to the total depth explored of 80 feet bg. Delta prepared a series of geologic cross sections based on CPT data and boring logs from previous soil borings and borings for groundwater monitoring wells. The cross sections were presented in Delta's *CPT Soil and Groundwater Investigation Report* dated March 24, 2005.

A member of:



Groundwater analytical data from the CPT investigation confirmed that petroleum hydrocarbons, MTBE, and TBA are primarily confined to the groundwater contained in clay deposits in the 15- to 20-foot depth interval (see Table 1). The clay, extending from near the ground surface to a depth of approximately 50 feet bg, appears to act to retard the downward migration of contaminants. MTBE and TBA were detected in only three of sixteen groundwater samples collected from sand deposits below a depth of 50 feet. The three samples were collected from borings CPT-4 and CPT-5 in the area of highest TBA concentrations in shallow groundwater. MTBE was detected in the 55- to 60-foot groundwater sample from boring CPT-4 at 0.54 micrograms per liter (ug/l). MTBE was not detected in the 70- to 74-foot depth sample from boring CPT-4. MTBE and TBA were both detected in the 59- to 62-foot and 76- to 80-foot groundwater samples from boring CPT-5. MTBE and TBA concentrations increased with depth. MTBE and TBA concentrations in the 76- to 80-foot sample were 19 ug/l and 39 ug/l, respectively.

Delta, in its March 24, 2005 report, recommended the following:

- Drilling of an additional CPT boring (CPT-5A, Figure 2) near previous boring CPT-5. The purpose of the boring is to define the vertical extent of MTBE, and TBA detected in boring CPT-5 at a depth of 76 to 80 feet bg. The CPT boring will be extended to a depth of approximately 120 feet bg or refusal. Depth discrete groundwater samples will be collected from sand layers from 80 to 120 feet bg. The water samples will be analyzed for MTBE and TBA by EPA Method 8260B.
- Install a well cluster in the area of boring CPT-5. Existing Well S-5 will be used to monitor shallow groundwater. A series of wells will be installed at depths ranging from 75 to 120 feet bg based on the results of the CPT boring described above. Wells will be constructed with a maximum sand pack length of 5 feet in accordance with ACHCSA requirements.
- Install a well cluster in the southeast corner of the 3760 Hopyard Road (7-Eleven) property. A series of wells will be installed at depths ranging from 35 to 120 feet bg based on the results of the CPT boring described above. Wells will be constructed with maximum sand pack lengths of 5 feet.

The ACHCSA, in its letter to Shell dated April 26, 2005, concurred with Delta's recommendations. The ACHSA requested a work plan detailing the recommended work and responding to a series of technical comments.

WORK PLAN

The following sections describe tasks to be performed during completion of an additional soil and groundwater investigation at the site.

PREFIELD ACTIVITIES

Prior to drilling, Delta will mark the locations of all CPT, boring, and well locations and contact Underground Services Alert 48 hours prior to drilling. In addition, a private utility locator will be retained to perform a geophysical survey of the proposed boring locations. Each location will then air-knife to a depth of approximately seven feet to minimize the possibility of encountering underground utilities during drilling activities. Delta will obtain all required drilling permits and an encroachment permit for work adjacent to the Arroyo Mocho Canal from the Zone 7 Water Agency. ACHCSA will be notified a minimum of 72 hours prior to any drilling activities.

CPT SOIL PROFILING

Groundwater samples will be collected from the underlying sand and gravel at proposed locations by the use of CPT drilling equipment (location CPT-5A, Figure 2). CPT drilling equipment will be provided and operated by Gregg In Situ, Inc. (License C57-656407). Boring CPT-5 in the area of proposed boring CPT-5A was previously advanced to a depth of 80 feet bg. Delta proposes to advance the CPT-5A borehole to a depth of approximately 120 feet bg or refusal.

The CPT investigation will consist of two separate boreholes – one for stratigraphic profiling and a second for collecting discrete soil and groundwater samples. The initial boring will be advanced to define the underlying soil profile. Soil classifications will be based on the cone penetration resistance, sleeve friction, and friction ratio. A soil classification graph will be generated during the advancement of the CPT borehole. Soil profile graphs will be provided in a summary report. Grout will be pumped into the initial borehole behind the cone by using a grout collar (retraction grouting).

CPT GROUNDWATER SAMPLING AND ANALYSIS

A second CPT borehole will be drilled for collection of depth discrete groundwater samples. A Delta geologist will determine the appropriate depths from which to collect discrete groundwater samples by interpreting the initial soil classification print out from the CPT profile. Sample collection will be focused on the 80- to 120-foot depth interval. To collect discrete groundwater samples, a sealed PVC hydropunch screen will be pushed to the desired sampling depth. The push rod will then be retracted exposing the hydropunch screen. Groundwater will flow hydrostatically from the formation into the sampler. A small diameter stainless steel bailer will be lowered through the hollow push rods, into the screen section for sample collection. The groundwater samples will be transferred to 40-milliliter glass VOA bottles. The bottles will be placed on ice for transportation to the laboratory. Groundwater samples will be analyzed for TPH-G, benzene, toluene, ethylbenzene, and xylene (BTEX compounds), and fuel oxygenates MTBE and TBA by EPA Method 8260B.

INSTALLATION OF GROUNDWATER MONITORING WELL CLUSTERS

Delta will install groundwater monitoring well clusters at the location of existing Wells S-5 and S-9. The second cluster was relocated from the 7-Eleven property to allow inclusion of existing Well S-9 in the well cluster. In accordance with ACHCSA guidelines, sand pack intervals will not exceed 5 feet in length. Delta anticipates wells completed in the following depth intervals at each location; 10 to 30 feet bg (existing well); 60 to 65 feet bg, and 80 to 85 feet bg. Each well will be completed in a separate borehole.

The wells will be installed using hollow-stem auger drilling equipment provided by Gregg Drilling (License C57- 485165). Soil samples will be collected every 5 feet from the ground surface to the total depth of the deepest boring for well installation. A PID will be used to measure soil hydrocarbon concentrations at 5-foot intervals. The PID soil samples will be placed in a sealed plastic bag. After approximately 5-minutes, the PID probe will be inserted into the plastic bag and soil gas allowed to pass through the PID until readings stabilize. The resulting concentration reading will be recorded on the geologist's field log.

Wells will be constructed of 4-inch diameter PVC casing and well screens. Wells will be developed by cycles of surging followed by pumping until clear water is obtained. Wells will be sampled by Blaine

Tech Services (Blaine) a minimum of 24 hours after development. The location and top of casing elevation of each well will be established by a California licensed surveyor.

Groundwater samples will be analyzed for TPH-G, BTEX compounds, MTBE and TBA by EPA Method 8260B.

DOWNGRADIENT GROUNDWATER INVESTIGATION

The ACHCSA, in its letter dated April 26, 2005, requested further delineation of the lateral extent of groundwater contamination in the shallow clay zone (15- to 20-foot depth interval). Delta proposes to install three additional monitoring wells, S-13 through S-15, at the locations adjacent to Arroyo Mocha Canal shown on Figure 2. The wells will be installed using hollow-stem auger drilling equipment provided by Gregg Drilling (License C57- 485165).

Soil samples will be collected every 5 feet from the ground surface to the total depth of the boring for the well installation. A PID will be used to measure soil hydrocarbon concentrations at 5-foot intervals. The PID soil samples will be placed in a sealed plastic bag. After approximately 5-minutes, the PID probe will be inserted into the plastic bag and soil gas allowed to pass through the PID until readings stabilize. The resulting concentration reading will be recorded on the geologist's field log.

Wells will be constructed of 4-inch diameter PVC casing and well screens. Delta anticipates constructing the three wells with screens at 15 to 25 feet bg. The longer well screens are required in the clay deposits to collect sufficient water for sampling. Wells will be developed by cycles of surging followed by pumping until clear water is obtained. Wells will be sampled by Blaine Tech Services (Blaine) a minimum of 24 hours after development. The location and top of casing elevation of each well will be established by a California licensed surveyor.

Groundwater samples will be analyzed for TPH-G, BTEX compounds, MTBE and TBA by EPA Method 8260B.

RESPONSE TO TECHNICAL COMMENTS

The following sections provide responses to comments contained in ACHCSA's April 26, 2005 letter.

BIODEGRADATION OF MTBE AND TBA

ACHCSA requested that Shell 1) evaluate TBA concentration trends downgradient of the site and propose any necessary sampling or analysis to verify that MTBE is degrading downgradient of the source area, and 2) provide confirmation that TBA is biodegrading in the source area.

Downgradient Area

TBA appears to be biodegrading downgradient of the source area. TBA and MTBE concentration graphs for downgradient Wells S-6 and S-7 are shown on Figures 3 and 4. In both wells, MTBE and TBA concentrations have peaked and are now declining. TBA has not been detected in nearby Wells S-11 and S-12, indicating that the decline in TBA concentrations observed in Wells S-6 and S-7 is the result of biodegradation rather than downgradient migration. Delta does not recommend any modifications to the existing groundwater monitoring program.

Source Area

TBA appears to be also biodegrading in the site source area. TBA and MTBE concentration graphs for on-site Wells S-4 and SR-2 are shown on Figures 5 and 6. MTBE and TBA concentrations in both wells have peaked and are now declining. Delta does not recommend any modifications to the existing groundwater monitoring program.

TBA CONCENTRATION IN SYSTEM INFLUENT

ACHCSA requested the Shell provide an analysis of TBA for the groundwater extraction and treatment system. A system influent sample was collected on April 27, 2005 and analyzed for TPH-G, BTEX compounds, TBA, and MTBE by EPA Method 8260B. The system was extracting groundwater from Wells SR-1, SR-2, and SR-3 at the time the sample was collected. MTBE and TBA were the only compounds detected above the laboratory method detection limit. MTBE and TBA were detected at 31 ug/l and 760 ug/l, respectively. Delta requests permission from ACHCSA to discontinue groundwater water extraction on a trial basis. MTBE concentrations have been reduced to relatively low concentrations (see graphs, Figures 5 and Figure 6). Delta anticipates that TBA concentrations will continue to decline through biodegradation activities. Delta will evaluate quarterly groundwater monitoring data and make recommendations regarding the need to restart the groundwater extraction and treatment system.

WELL SCREENING INTERVALS

All site monitoring wells have what the ACHCSA refer to as a "long well screen." Well construction details are provided on Table 2. The ACHCSA has the following concerns regarding well screens greater than 5 feet in length:

- Longer well screens could potentially intercept two water bearing horizons, leading to potential cross-contamination or a diluted groundwater sample,
- Long-screened wells, even when screened within a hydraulically distinct unit, may experience vertical gradients and consequently produce faulty potentiometric surface data and/or faulty concentration data; and
- Long-screened wells produce composite samples that may not be representative of the zone that poses a potential threat to receptors.

Delta provides the following responses to the above concerns expressed by ACHCSA;

- Site groundwater monitoring wells are all screened in the clay deposit that extends from the ground surface to a depth of approximately 50 feet bg. There is no potential that existing site wells connect shallow perched water in clay with underlying sand and gravel aquifer;
- It does not appear that strong vertical gradients exist within the portion of the clay monitored by existing wells. The horizontal groundwater flow, based on well data, appears consistent with the distribution of MTBE and TBA.
- Long screen wells are required to collect a sufficient quantity of groundwater from clay deposits. Delta and the previous site investigator found that it can require up to 12 hours for enough water into accumulate in a borehole to collect a sample for chemical analysis. Water that collects in wells is believed to be derived from thin silt or sand layers within the clay.

It is Delta's opinion that modifications of existing wells are not required.

SUMMARY

Delta proposes the following site assessment activities:

- Drilling of an additional CPT boring to a depth of approximately 120 feet bg near previous boring CPT-5. Depth discrete groundwater samples will be collected from sand layers from 80 to 120 feet bg. The water samples will be analyzed for MTBE and TBA by EPA Method 8260B.
- Completion of a well cluster in the area of Well S-5. Two additional wells will be installed at depths ranging from 60 to 120 feet bg based on the results of the CPT boring described above. The wells will be constructed with maximum sand pack lengths of 5 feet.
- Completion of a well cluster in the area of existing Well S-9. Two additional wells will be installed at depths ranging from 60 to 120 feet bg based on the results of the CPT boring described above. Wells will be constructed with maximum sand pack lengths of 5 feet.
- Installation of three wells along the Arroyo Mocho Canal. Wells will be screened in the clay deposits at depths of 15 to 25 feet bg. The reasons for using longer than a 5-foot well screen are described above.
- Development and sampling of all new wells. The water samples will be analyzed for TPH-G, BTEX compounds, MTBE, and TBA by EPA Method 8260B.
- Establishment of the location and elevation of each well by a licensed surveyor.
- Preparation of a summary report containing a description of field activities, summary analytical tables, hydrogeologic cross sections, discussion of horizontal and vertical gradients, certified laboratory analytical reports, and recommendations regarding the need for additional site assessment.

If you have any questions, please call me at (408) 224-4724.

Sincerely,

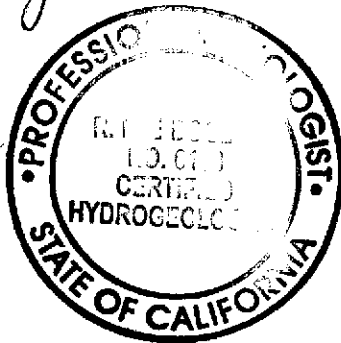
Delta Environmental Management, Inc.

Heather Buckingham

FOR: Rebecca Wolff
Senior Staff Geologist

R. Lee Dooley

R. Lee Dooley
Senior Hydrogeologist
CHG 183



Attachments: Table 1 – Summary of Groundwater Analytical Data
Table 2 – Well Construction Detail

Figure 1 – Site Location and Well Survey Map

June 24, 2005

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Figure 2 – CPT Boring, Soil Boring, and Well Location Map

Figure 3 – MTBE and TBA Concentrations, Well S-6

Figure 4 – MTBE and TBA Concentrations, Well S-7

Figure 5 – MTBE and TBA Concentrations, Well S-4

Figure 6 – MTBE and TBA Concentrations, Well SR-2

cc. Denis Brown, Shell Oil Products US
Betty Graham, RWQCB – San Francisco Bay Region
Danielle Stefani, Livermore-Pleasanton Fire Department
Matthew Katen, Zone 7 Water Agency

Table 1
Summary of Groundwater Analytical Data
 Shell Service Station
 3790 Hopyard Road
 Pleasanton, California

Sample Designation	Date Sampled	Depth (feet bg)	TPH-G (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Ethyl-benzene (ug/l)	Xylene (ug/l)	MTBE (ug/l)	TBA (ug/l)
CPT-3	2/15/2005	33-38	DRY						
CPT-3	2/15/2005	43-48	DRY						
CPT-4	2/16/2005	33-38	DRY						
CPT-4	2/16/2005	55-60	<50	1.2	<0.50	3.0	3.0	0.54	<5.0
CPT-4	2/16/2005	70-74	<50	<0.50	<0.50	1.1	1.3	<0.50	<5.0
CPT-5	2/18/2005	33-38	DRY						
CPT-5	2/18/2005	59-62	150	0.64	<0.50	1.7	1.3	1.2	6.8
CPT-5	2/18/2005	76-80	620	16	0.66	32	14	19	39
CPT-6	2/18/2005	33-38	DRY						
CPT-6	2/18/2005	59-63	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<5.0
CPT-6	2/18/2005	75-78	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<5.0
CPT-7	2/16/2005	20-35	<50	<0.50	<0.50	<0.50	<1.0	160	<5.0
CPT-7	2/16/2005	60-63	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<5.0
CPT-7	2/16/2005	75-80	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<5.0
CPT-8	2/16/2005	33-38	DRY						
CPT-8	2/16/2005	60-63	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<5.0
CPT-8	2/16/2005	75-80	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<5.0
CPT-9	2/18/2005	33-38	DRY						
CPT-9	2/18/2005	58-62	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<5.0
CPT-9	2/18/2005	74-77	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<5.0
CPT-10	2/17/2005	20-38	<100	<1.0	<1.0	<1.0	<2.0	200	11
CPT-10	2/17/2005	62-64	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<5.0
CPT-10	2/17/2005	76-80	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<5.0
CPT-11	2/17/2005	33-38	DRY						
CPT-11	2/17/2005	63	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<5.0
CPT-11	2/17/2005	70-74	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<5.0

Notes:

Table 1
Summary of Groundwater Analytical Data
 Shell Service Station
 3790 Hopyard Road
 Pleasanton, California

Sample Designation	Date Sampled	Depth (feet bg)	TPH-G (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Ethyl-benzene (ug/l)	Xylene (ug/l)	MTBE (ug/l)	TBA (ug/l)
DRY = insufficient water in borehole for sample. ug/l = micrograms per liter TPH-G = Total petroleum hydrocarbons as gasoline MTBE = Methyl tert-butyl ether TBA = tert-Butyl alcohol									

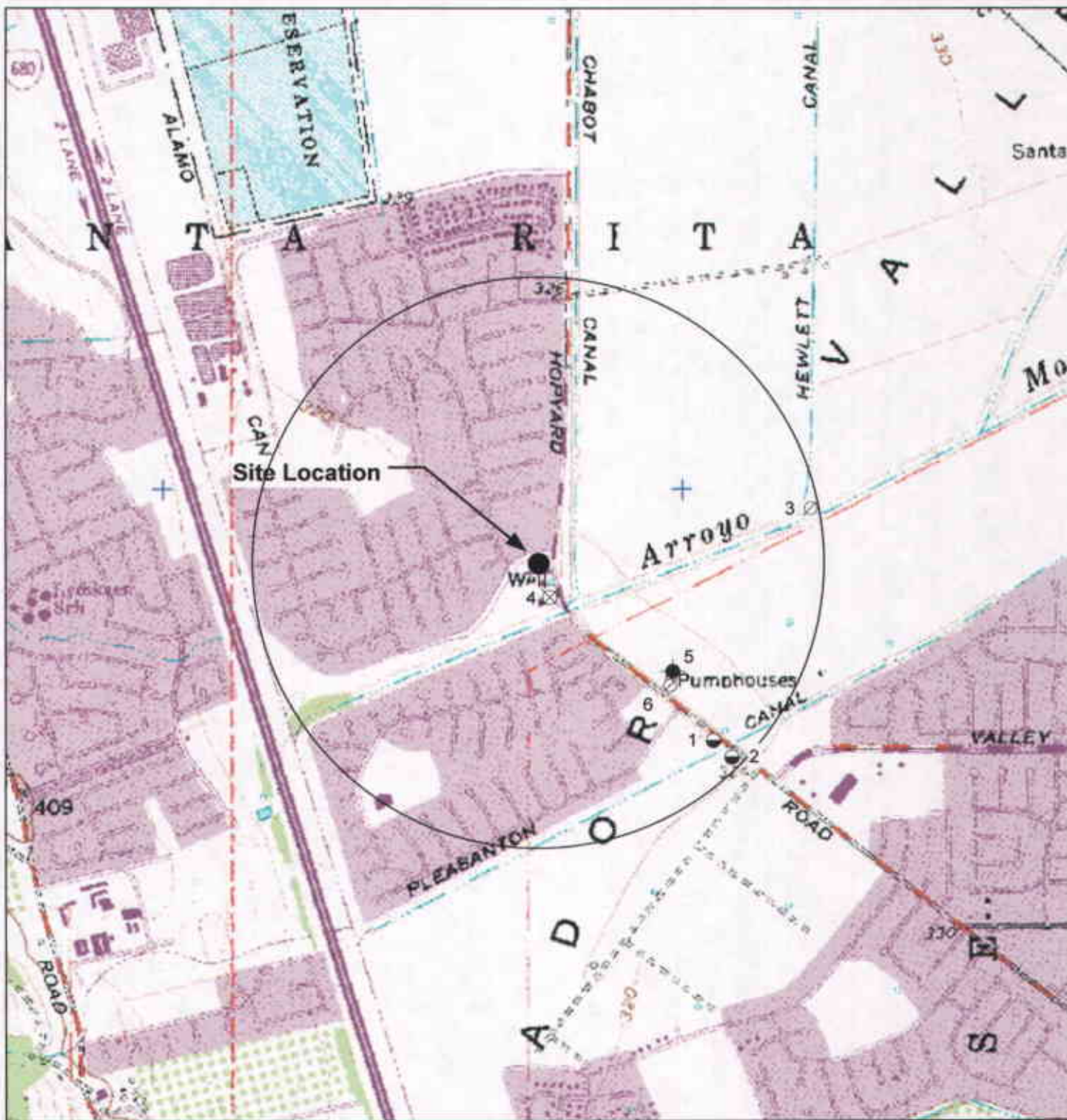
Table 2
Well Construction Details
Shell-branded Service Station
3790 Hopyard Road
Pleasanton, California

Well Designation	Date Installed	Total Depth (feet)	Screened Interval (feet)	TOC Elevation (feet - MSL)
S-1 (destroyed)	10/28/87			
S-2	10/28/87	35	5 to 35	328.77
S-3	01/26/88	36	5 to 36	327.40
S-4	01/26/88	36	5 to 36	328.11
S-5	01/26/88	36	5 to 36	329.36
S-6	10/04/88	35	10 to 35	327.26
S-7	10/04/88	35	10 to 35	328.41
S-8	02/24/89	34.5	9.5 to 34.5	326.14
S-9	02/24/89	34.5	9.5 to 34.5	327.85
S-10	8/9/1989	35.5	unknown	325.87
S-11	08/26/02	25	10 to 25	327.48
S-12	09/19/02	25	10 to 25	322.76
SR-1	08/09/89	35	10 to 35	328.33
SR-2	09/20/89	35	10 to 35	327.31
SR-3	09/19/89	35	10 to 35	327.50

Notes

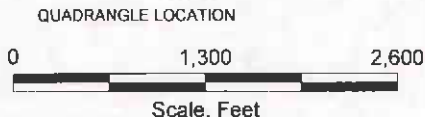
TOC = top of casing

MSL = mean sea level



LEGEND

- **WELL OF UNKNOWN USE**
- ⊗ **DESTROYED WELL**
- ⊠ **ABANDONED WELL**
- **MUNICIPAL WELL**

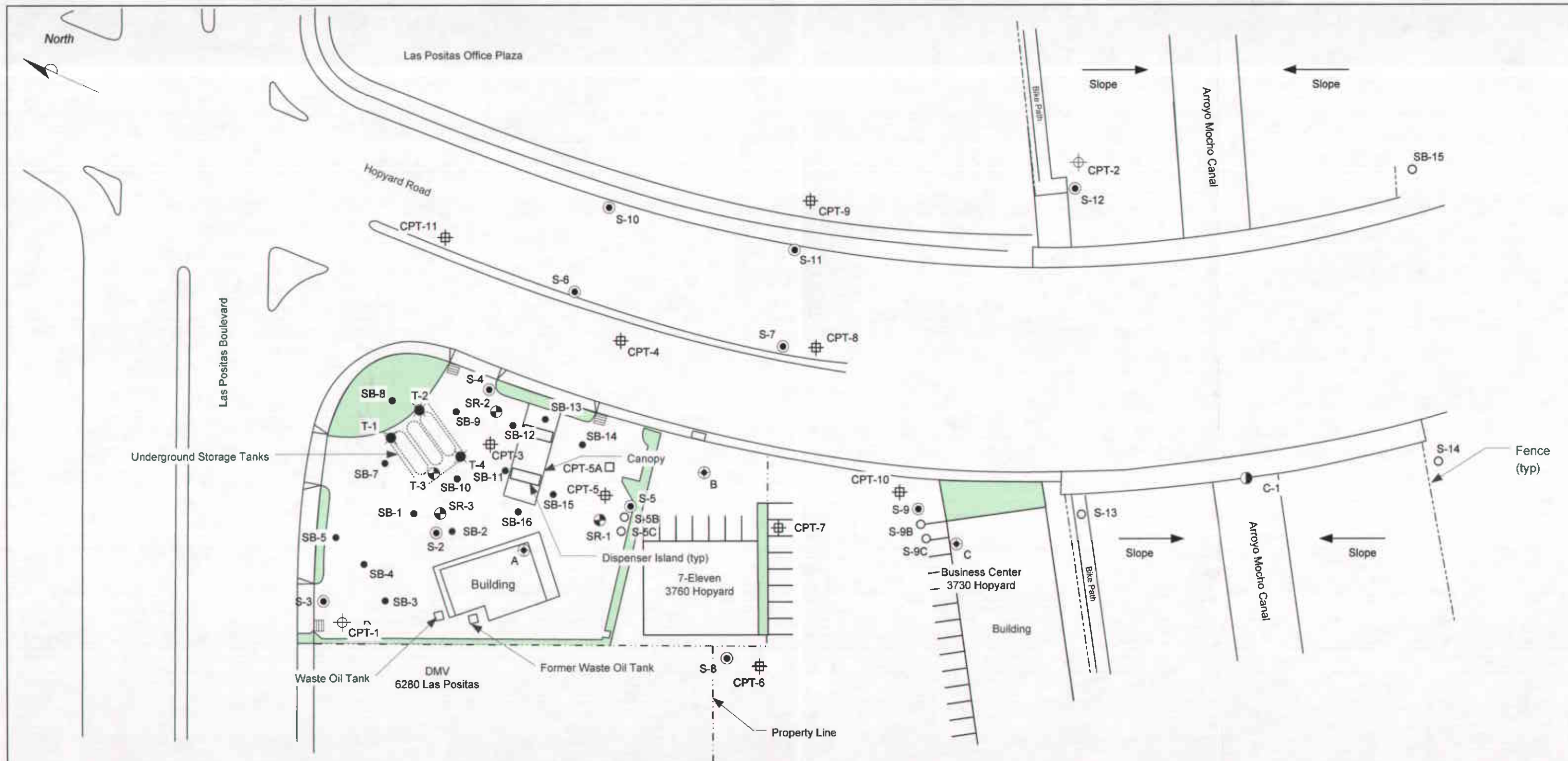


GENERAL NOTES
Base Map from DeLorme Yarmouth, ME 04096
Source Data USGS

FIGURE 1
SITE LOCATION AND WELL SURVEY MAP
SHELL-BRANDED SERVICE STATION
3790 Hopyard Road
Pleasanton, California

PROJECT NO. SJ37-90H-1.2005	DRAWN BY VF 12/04/03
FILE NO. SJ37-90H-1.2005	PREPARED BY VF
REVISION NO.	REVIEWED BY

Delta
Environmental
Consultants, Inc



LEGEND

- SB-3 ● SOIL BORING LOCATION (OCTOBER 2004)
- S-5 ● GROUNDWATER MONITORING WELL
- SR-1 ● GROUNDWATER RECOVERY WELL
- T-1 ● TANK BACKFILL WELL
- C-1 ● CREEK GAUGING LOCATION
- CPT-1 ⊕ CPT SAMPLING LOCATION (CPT-1 7/26/02; CPT-2 11/25/02)
- CPT-5 ⊕ CPT SAMPLING LOCATION, FEBRUARY 2005

- ⊕ APPROXIMATE LOCATION OF ABANDONED IRRIGATION WELL 3S/1E-7Q1
- PROPOSED CPT SAMPLING LOCATION
- PROPOSED WELL LOCATIONS
- A ● LOCATION FROM ZONE 7 WATER AGENCY WELL LOCATION MAP, DATED 5/1/02
- B ● LOCATION BASED ON USGS DUBLIN 7 1/2 MINUTE TOPOGRAPHIC QUADRANGLE
- C ● LOCATION BASED ON DESCRIPTION FROM CALIFORNIA DEPARTMENT OF WATER RESOURCES, WELL DATA FORM, DATED 10/22/59

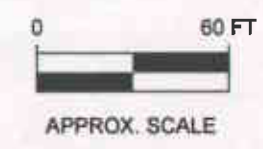


FIGURE 2
CPT BORING, SOIL BORING, AND WELL LOCATION MAP
SHELL-BRANDED SERVICE STATION
3790 Hopyard Road
Pleasanton, California

PROJECT NO. SJ37-90H-1.2005	DRAWN BY V.F. 3/1/05
FILE NO. SJ37-90H-1.2005	PREPARED BY V.F.
REVISION NO. 2	REVIEWED BY



Figure 3
MTBE and TBA Concentrations
Well S-6
Shell-branded Service Station
3790 Hopyard Road
Pleasanton, California

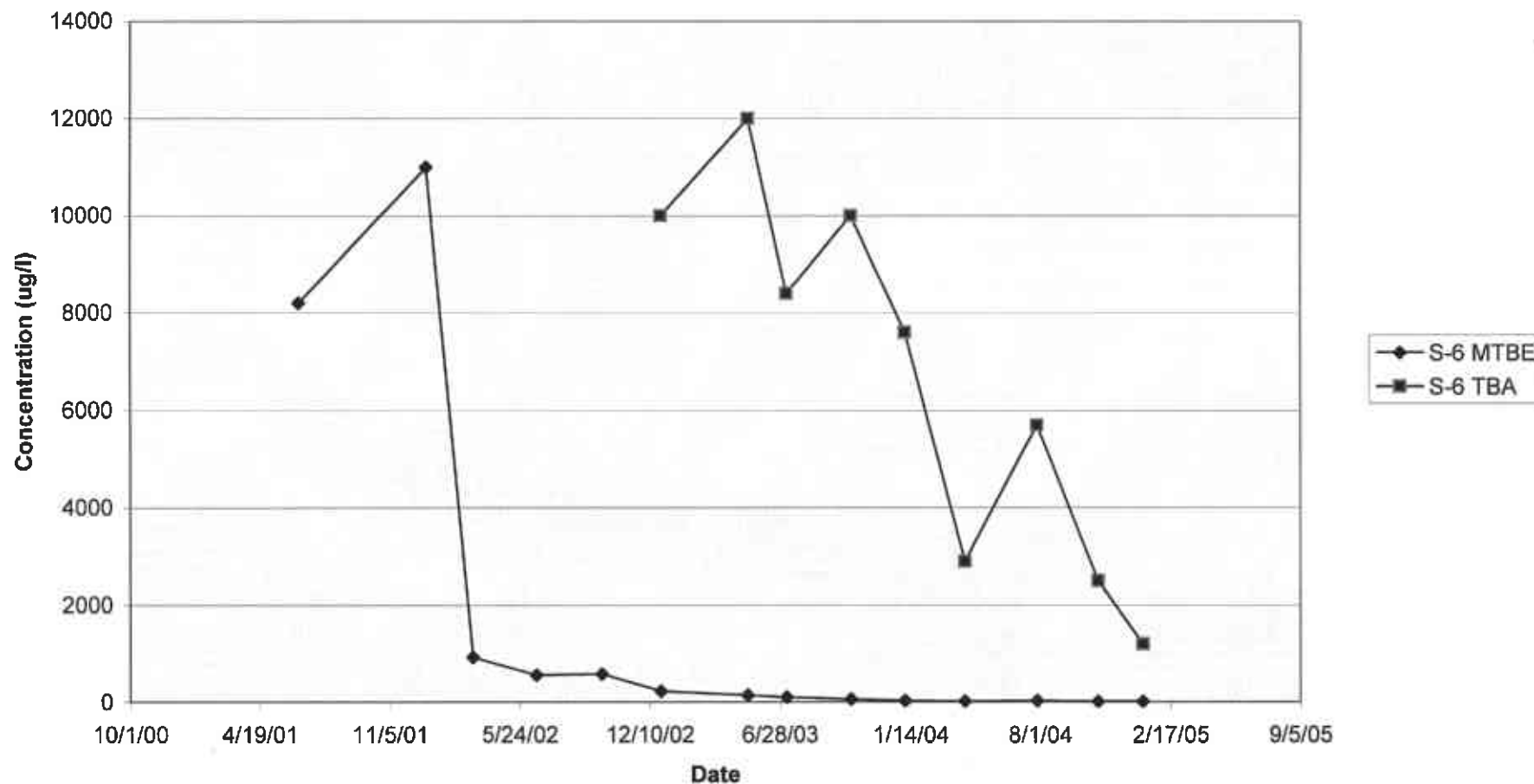


Figure 4
MTBE and TBA Concentrations
Well S-7
Shell-branded Service Station
3790 Hopyard Road
Pleasanton, California

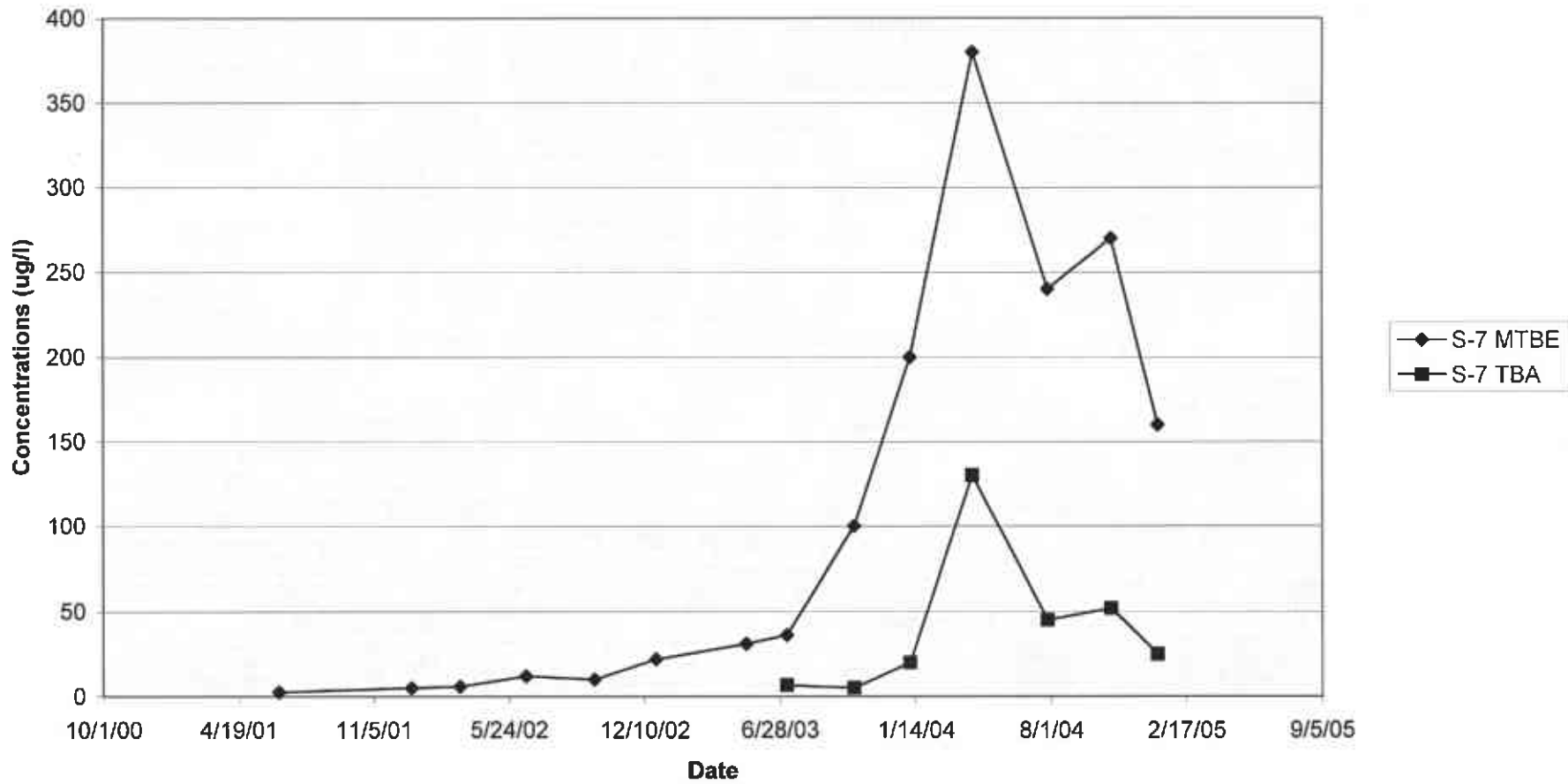


Figure 5
MTBE and TBA Concentrations
Well S-4
Shell-branded Service Station
3790 Hopyard Road
Pleasanton, California

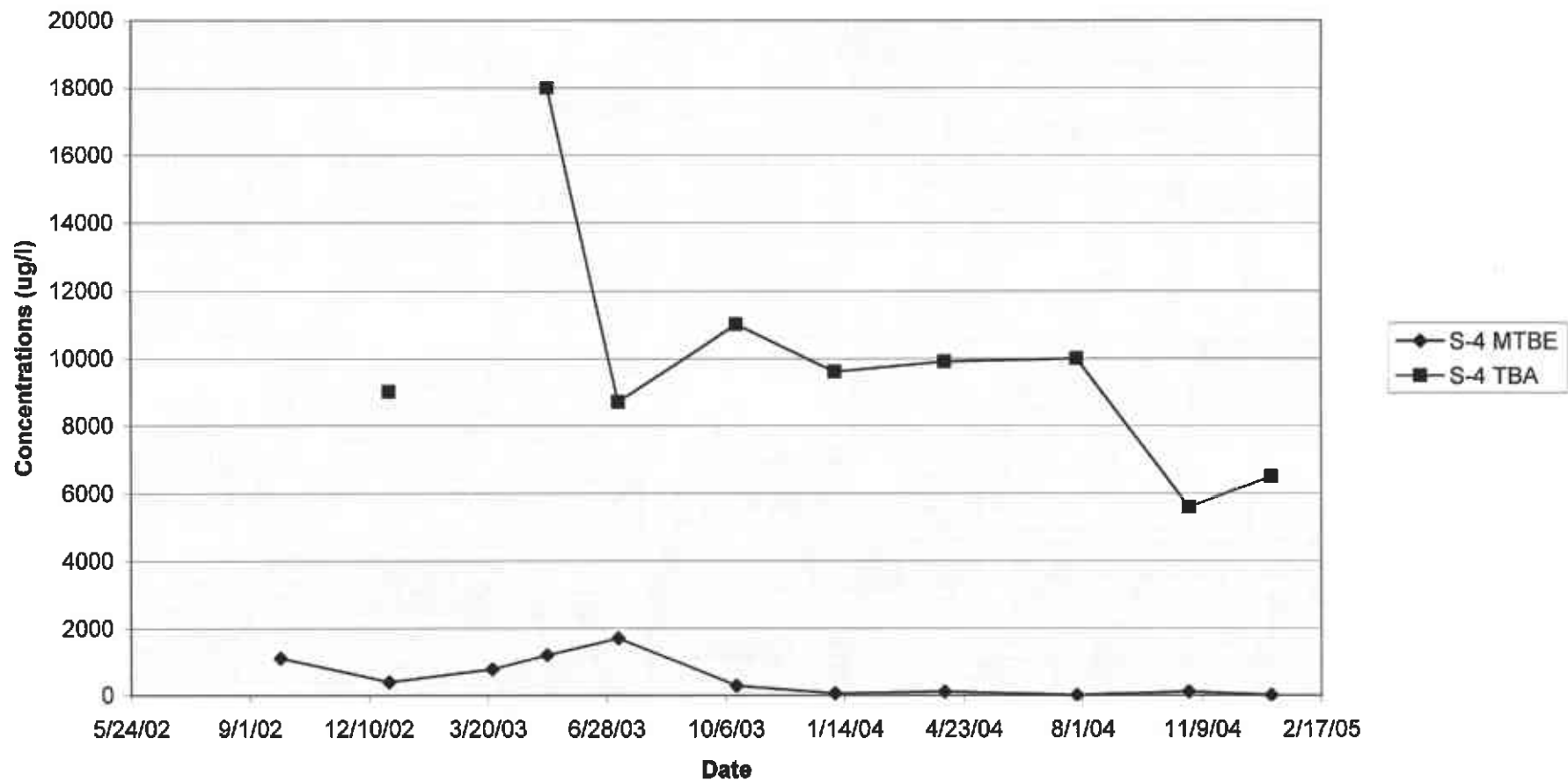


Figure 6
MTBE and TBA Concentrations
Well SR-2
Shell-branded Service Station
3790 Hopyard Road
Pleasanton, California

