

May 17, 2000
ERI 243103.W01

Mr. Darin L. Rouse
ExxonMobil Refining and Supply
P.O. Box 4032
Concord, California 94524-4032

Subject: Work Plan for Soil and Groundwater Investigation at Exxon Service Station 7-3567,
3192 Santa Rita Road, Pleasanton, California.

Mr. Rouse:

At the request of ExxonMobil Refining and Supply (formerly known as Exxon Company, U.S.A.) (ExxonMobil), Environmental Resolutions, Inc. (ERI) performs environmental assessment activities at the subject site. ERI has prepared this Work Plan in response to a letter from the Alameda County Health Care Services Agency (the County), dated March 28, 2000 (Attachment A). The County requested that ExxonMobil provide a Work Plan to further evaluate the subsurface conditions and extent of the petroleum hydrocarbon release at the subject site.

BACKGROUND

The site is located on the southeastern corner of Santa Rita Road and Las Positas Boulevard as shown on the Site Vicinity Map (Plate 1). The locations of underground storage tanks (USTs), dispenser islands, and other selected site features, are shown on the Generalized Site Plan (Plate 2).

The site has four groundwater monitoring wells (MW1 through MW4) and two tankpit wells (TPW) as shown on Plate 2. Based on quarterly groundwater monitoring data, historical depths to water (DTW) measurements have ranged from approximately 14 to 50 feet below ground surface (bgs). Historical and recent monitoring data are summarized in Table 1. The range of DTW values suggests that the monitoring wells are screened in different water-bearing zones. Well construction logs for the groundwater monitoring wells are included in Attachment B. A well information table is included as Table 2.

SITE CONDITIONS

During drilling of groundwater monitoring wells MW1 and MW2, groundwater was first encountered at 25 and 26.5 feet bgs respectively. The wells were constructed in a similar manner, with the screened interval from 20 to 35 feet bgs. MW1 and MW2 are screened exclusively in an upper clay, which has a historical DTW range of approximately 14 to 28 feet bgs and a groundwater elevation range from approximately 312 to 326 feet above mean sea level (msl) (ERI, 1998).

During the drilling of groundwater monitoring wells MW3 and MW4, groundwater was first encountered at 41.5 and 50 feet bgs respectively. The wells were constructed in a similar manner, with

the screened interval from 35 to 50 feet bgs. MW3 and MW4 are screened across a deeper gravelly sediment which has a historical DTW range from approximately 32 to 50 feet bgs and a groundwater elevation range of approximately 292 to 310 feet above msl (ERI, 1998).

Based on the difference in sediment composition and groundwater elevations, ERI concludes that the two water-bearing zones (the shallow clay and deeper gravelly sediments) have limited hydraulic connection.

SCOPE OF WORK

ERI proposes the installation of one groundwater monitoring well (MW5) in the shallow clay with similar construction to MW1, and one groundwater monitoring well (MW6) in the deeper gravel with similar construction to MW3 to evaluate groundwater flow directions, hydraulic gradients, and constituent distributions in each sediment. The locations of the proposed wells are shown on Plate 2. Fieldwork will be performed in accordance with ERI's Field Protocol (Attachment C). The scope of the Soil and Groundwater investigation includes the following work:

Task 1: Pre-Drilling Activities

- Obtain drilling permits from the Alameda County Flood Control and Water Conservation District (Zone 7).
- Contact Underground Service Alert (USA) to coordinate utility locating activities.

Task 2: Soil and Groundwater Investigation

- Obtain the services of a licensed well driller, and observe the drilling of two on-site soil borings utilizing a hollow-stem auger drilling rig and the construction of groundwater monitoring wells MW5 and MW6 in these borings. ERI expects groundwater to be encountered between 25 to 27 feet bgs in the clay and 40 to 50 feet bgs in the lower gravel. Well MW5 will be drilled to approximately 35 feet bgs and screened exclusively within the clay from approximately 20 to 35 feet bgs. Well MW6 will be drilled to approximately 50 feet bgs, and screened across the deeper gravelly sediment. The screen interval in MW6 will be selected in the field. Soil samples will be collected from each boring continuously, to the total depth of the boring, to allow detailed evaluation of the hydrostratigraphy.
- Develop the newly installed wells by overpurging and surging, and collect groundwater samples from the wells.
- Submit selected soil and groundwater samples to Southern Petroleum Laboratories, Inc. (SPL) for laboratory analysis of total purgeable petroleum hydrocarbons as gasoline (TPPHg) using modified EPA Method 8015, total extractable petroleum hydrocarbons as diesel (TEPHd) using modified EPA Method 8015, benzene, toluene, ethylbenzene, and total xylenes (BTEX) using EPA Method 8020. Selected groundwater samples will also be analyzed for methyl tertiary butyl ether (MTBE), tertiary butyl alcohol (TBA), tertiary amyl methyl ether (TAME), and ethyl tertiary butyl ether (ETBE) using EPA Method 8260.

- Drill cuttings will be stored on site and covered with plastic sheeting pending characterization and disposal. ERI will collect one composite soil sample from the soil stockpile for laboratory analysis. Upon receipt of analytical results for the stockpiled soil, ERI will apprise ExxonMobil of disposal options, and coordinate the disposal of the soil at an appropriate disposal facility selected by ExxonMobil.
- Contract with a licensed land surveyor to survey the location (known survey grid) and casing elevation (mean sea level) of the newly installed wells.
- Interpret field and laboratory data to evaluate soil and groundwater conditions.

Task 3: Report Preparation

- ERI will prepare a report for the investigation. The report will detail field activities, sample collection, field observations, results of the field investigations, and analytical results for soil and groundwater samples. If additional assessment work is warranted, the proposed work will be described in the report.

SCHEDULE OF OPERATIONS

Upon regulatory approval of this Work Plan, ERI is prepared to implement the work in accordance with the following schedule:

- Within 15 calendar days of receiving written approval of this Work Plan, permits included in Task 1 will be submitted to the appropriate agencies.
- Within 30 calendar days of receiving required permits and access agreements, Task 2 will be completed.
- Within 45 calendar days of receiving laboratory analysis results, the report described in Task 3 will be submitted to the County.

ERI recommends signed copies of this Work Plan be forwarded to the following:

Mr. Scott Seery
Alameda County Health Care Services Agency
Environmental Health Services Division
1131 Harbor Bay Parkway
Alameda, California 94502-6577

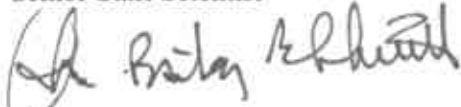
Mr. Stephen Hill
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, California 94612

Please call Mr. James F. Chappell, ERI's project manager for this site, at (415) 382-4323 with any questions regarding this project.

Sincerely,
Environmental Resolutions, Inc.



James F. Chappell
Senior Staff Scientist



John B. Bobbitt
R.G. 4313



- Attachments: References
- Table 1: Cumulative Groundwater Monitoring and Sampling Data
 - Table 2: Well Information

 - Plate 1: Site Vicinity Map
 - Plate 2: Generalized Site Plan

 - Attachment A: Alameda County Health Services Agency Letter,
 Dated March 28, 2000
 - Attachment B: Well Construction Logs
 - Attachment C: Field Protocol

REFERENCES:

Environmental Resolutions, Inc. December 26, 1998. Report for a Baseline Environmental Investigation at Exxon Station 7-3567, 3912 Santa Rita Road, Pleasanton, California. ERI 243102.R01

TABLE 1
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
 Exxon Service Station 7-3567
 3192 Santa Rita Road
 Pleasanton, California
 (Page 1 of 1)

Well ID# (TOC)	Sampling Date	SUBJ <.....>	DTW feet.....>	Elev.	TEPHd <.....>	TPPHg <.....>	MTBE <.....>	B ug/L.....>	T <.....>	E <.....>	X <.....>
MW1 (340.86)	11/17/98	NLPH	21.90	318.96	<50	<50	<2.5	<0.5	<0.5	<0.5	<0.5
	3/15/99	NLPH	21.15	319.71	<50	<50	<2.5	<0.5	<0.5	<0.5	<0.5
	6/25/99	NLPH	20.34	320.52	a	<50	<2.0	<0.5	<0.5	<0.5	<0.5
	9/24/99	NLPH	20.42	320.44	<50	<50	24.6	<0.5	<0.5	<0.5	<0.5
	12/22/99	NLPH	21.11	319.75	<61	<50	<2	<0.5	<0.5	<0.5	<0.5
	3/7/00	NLPH	14.12	326.74	57	<50	220	<0.5	<0.5	<0.5	<0.5
MW2 (340.61)	11/17/98	NLPH	20.42	320.19	91	<50	17/23*	1.5	<0.5	0.98	2.6
	3/15/99	NLPH	28.35	312.26	90	<50	12/12.5*	0.73	1.1	2.4	2.2
	6/25/99	NLPH	25.20	315.41	a	<50	<2.0	<0.5	<0.5	<0.5	<0.5
	9/24/99	NLPH	23.93	316.68	<50	<50	3.06	<0.5	<0.5	<0.5	<0.5
	12/22/99	NLPH	23.39	317.22	<56	<50	<2	<0.5	<0.5	<0.5	<0.5
	3/7/00	NLPH	17.08	323.53	52	<50	<2	<0.5	0.80	<0.5	<0.5
MW3 (342.95)	11/17/98	NLPH	36.58	306.37	120	<50	180/220*	<0.5	<0.5	<0.5	<0.5
	3/15/99	NLPH	40.01	302.94	180	<50	290/314*	<0.5	<0.5	<0.5	<0.5
	6/25/99	NLPH	46.83	296.12	a	<50	107/113*	<0.5	<0.5	<0.5	<0.5
	9/24/99 ^b	NLPH	47.71	295.24	---	---	---	---	---	---	---
	12/22/99	NLPH	43.82	299.13	140	<50	65	<0.5	<0.5	<0.5	<0.5
	3/7/00	NLPH	32.75	310.20	<50	<50	82	<0.5	0.88	<0.5	<0.5
MW4 (342.96)	11/17/98	NLPH	50.20	292.76	72	<50	4.1/3.5*	<0.5	<0.5	<0.5	<0.5
	3/15/99	NLPH	47.93	295.03	91	<50	280/260*	<0.5	<0.5	<0.5	<0.5
	6/25/99 ^b	NLPH	48.15	294.81	---	---	---	---	---	---	---
	9/24/99 ^b	NLPH	49.29	293.67	---	---	---	---	---	---	---
	12/22/99	NLPH	49.33	293.63	b	---	---	---	---	---	---
	3/7/00	NLPH	49.05	293.91	190	<50	710	<0.5	0.84	<0.5	<0.5

TABLE 1
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA

Exxon Service Station 7-3567
3192 Santa Rita Road
Pleasanton, California

(Page 1 of 1)

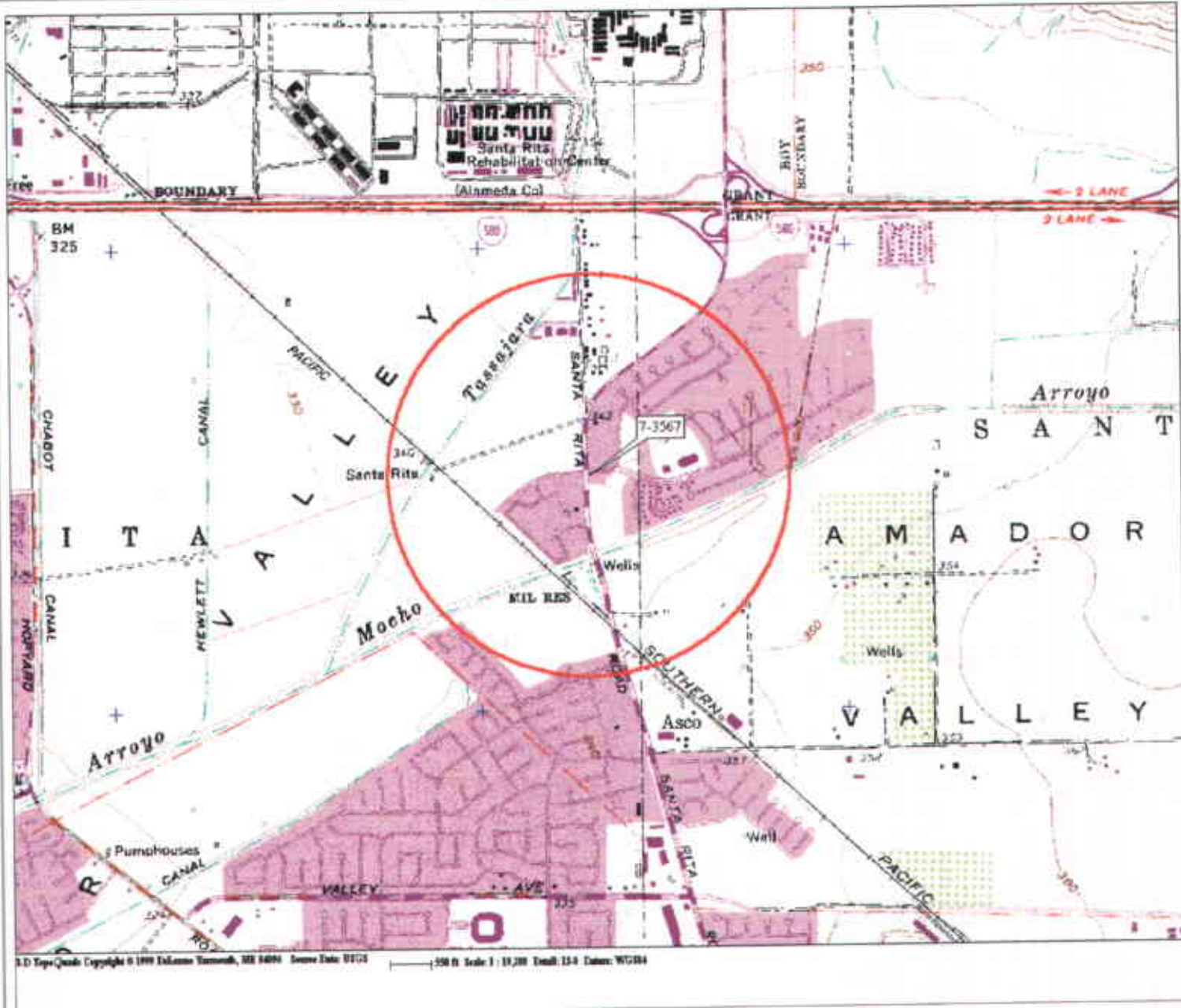
Notes:		
TOC	=	Elevation of top of well casing; in feet above mean sea level.
SUBJ	=	Results of subjective evaluation, liquid-phase hydrocarbon thickness (HT) in feet.
DTW	=	Depth to water.
Elev.	=	Elevation of groundwater in feet above mean sea level.
NLPH	=	No liquid-phase hydrocarbons present in well.
TEPHd	=	Total extractable petroleum hydrocarbons as diesel analyzed using modified EPA method 8015.
TPPHg	=	Total purgeable petroleum hydrocarbons as gasoline analyzed using modified EPA method 5030/8015 (modified).
BTEX	=	Benzene, toluene, ethylbenzene, and total xylenes analyzed using EPA method 8021B.
MTBE	=	Methyl tertiary butyl ether analyzed using EPA method 8021B.
*	=	MTBE confirmed using EPA method 8260.
a	=	No result because of sample loss during laboratory fire.
b	=	Well contained an insufficient amount of water to collect a sample.
<	=	Less than the indicated detection limit indicated.

TABLE 2
WELL INFORMATION
 Exxon Service Station 7-3567
 3192 Santa Rita Road
 Pleasanton, California
 (Page 1 of 1)

Well	Top of Casing Elevation	Screened Interval	First Groundwater	DTW range	Average DTW	Elevation Range	Average Elevation
				<.....Feet.....>			
MW1	340.86	20-35	25.0	14-22	19.84	318-326	321.02
MW2	340.61	20-35	26.5	17-28	23.06	312-323	317.55
MW3	342.95	35-50	41.5	32-47	41.28	295-310	301.67
MW4	342.96	35-50	50.0	47-50	48.99	292-295	293.97

Notes:

Values are based on data recorded from November 17, 1998, through March 17, 2000.



FN 2431Topo

EXPLANATION



1/2-mile radius circle

APPROXIMATE SCALE



SOURCE:
 Modified from a map
 provided by
 DeLorme 3-D TopoQuads



SITE VICINITY MAP

EXXON SERVICE STATION 7-3567
 3192 Santa Rita Road
 Pleasanton, California

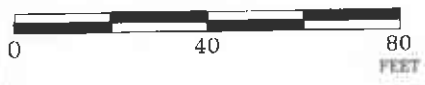
PROJECT NO.

2431

PLATE

1

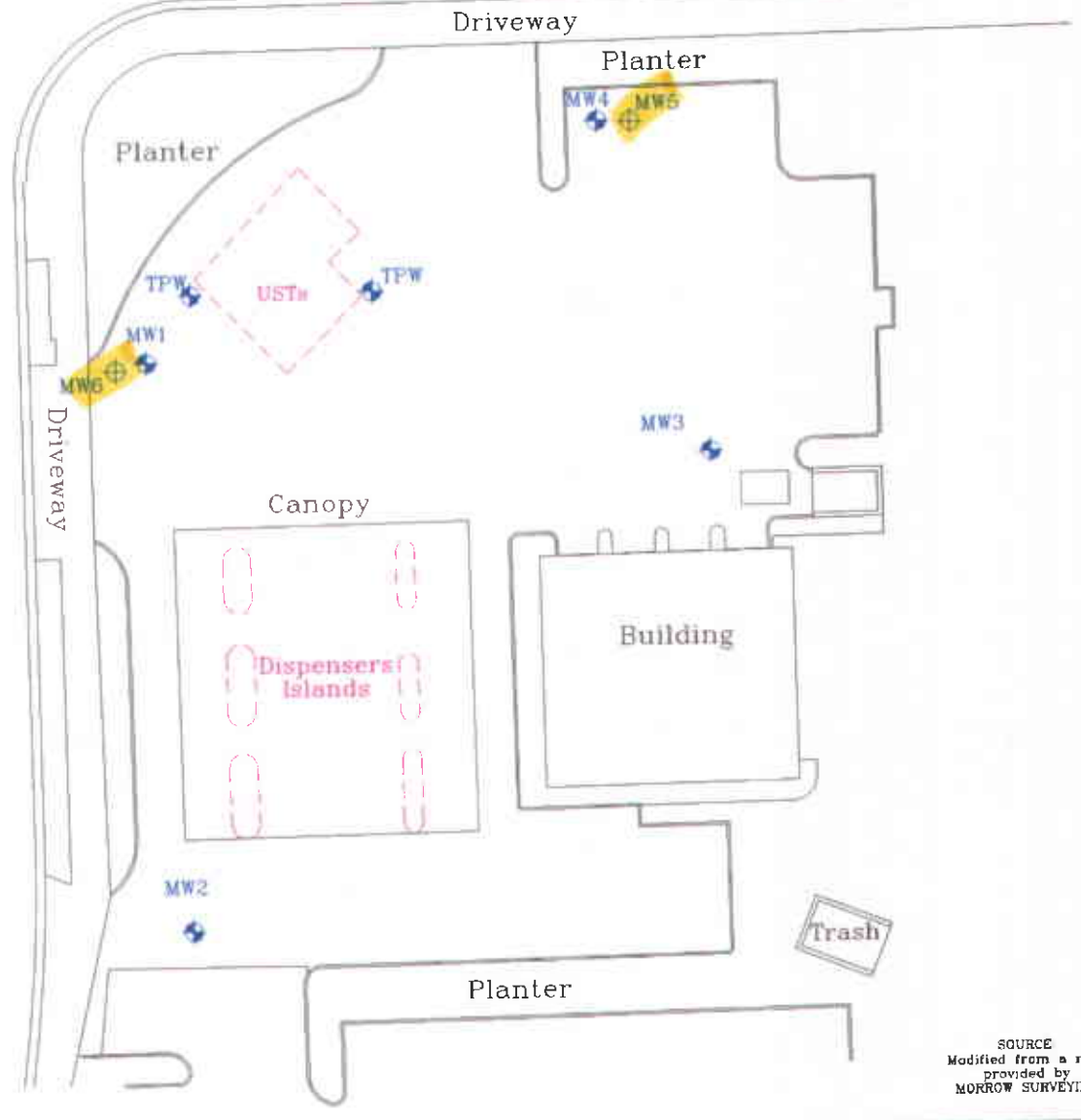
APPROXIMATE SCALE



LOS POSITAS BOULEVARD



SANTA RITA ROAD



SOURCE
Modified from a map
provided by
MORROW SURVEYING

FN 24310002

EXPLANATION

- MW4 Groundwater Monitoring Well
- TPW Tank Pit Well
- MW5 Proposed Groundwater Monitoring Well



GENERALIZED SITE PLAN

EXXON SERVICE STATION 7-3567
3192 Santa Rita Road
Pleasanton, California

PROJECT NO.

2431

PLATE

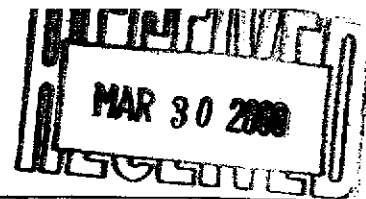
2

ATTACHMENT A

**ALAMEDA COUNTY HEALTH CARE SERVICES AGENCY LETTER,
DATED MARCH 28, 2000**

ALAMEDA COUNTY
HEALTH CARE SERVICES

AGENCY
DAVID J. KEARS, Agency Director



March 28, 2000

STID 1932

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

Mr. Darin Rouse
Exxon Company, U.S.A.
P.O. Box 4032
Concord, CA 94524-4032

RE: Exxon Service Station #7-3567, 3192 Santa Rita Road, Pleasanton

Dear Mr. Rouse:

As you have been made aware recently, the environmental investigation case for the subject site has been reopened after consultation with representatives of both Zone 7 Water Agency (Zone 7) and Regional Water Quality Control Board (RWQCB). The reopening of this case was due strictly to the occurrence of methyl tert-butyl ether (MtBE) in shallow groundwater sampled from wells at the site, and the site's relative proximity to municipal water supply wells. The Alameda County Department of Environmental Health (ACDEH) will oversee the renewed assessment of the site in consultation with both Zone 7 and RWQCB.

Assessment reports submitted on behalf of Exxon by Environmental Resolutions, Inc. (ERI) were reviewed. The cited ERI reports document the November 1998 installation and continued monitoring of four (4) monitoring wells located about the site. Boring logs, in concert with initial and stabilized depth-to-water and water elevation measurements, appear to demonstrate the occurrence of perhaps three distinct shallow water bearing zones to the depths explored. Each zone is impacted by MtBE to some degree. Site stratigraphy and hydrogeology, and the distribution of MtBE beneath and beyond the site require further investigation.

In conformance with provisions of Article 11, Title 23, California Code of Regulations, Exxon is directed to submit a *Soil and Water Investigation (SWI)* workplan. The SWI workplan shall present a proposal to further evaluate the extent and factors controlling the dispersal of the release at the site, among other relevant objectives.

Please ensure that the SWI workplan provides for an appropriate number of continuously-cored, strategically-located borings to facilitate stratigraphic interpretation. Further, in addition to MtBE, other fuel oxygenates - tertiary butyl alcohol (TBA), tertiary amyl methyl ether (TAME), and ethyl tertiary butyl ether (ETBE) - are to be sought in collected samples submitted for laboratory analysis. Because the ether oxygenates and TBA are not included in the standard list of analytes for EPA Method 8260B or 8020/8021, these additional compounds must be specifically requested when submitting samples to the laboratory for analysis.

Mr. Darin Rouse
Re: Exxon Station 7-3567, 3192 Santa Rita Rd., Pleasanton
March 28, 2000
Page 2 of 2

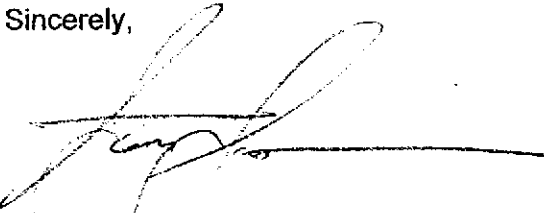
The SWI workplan is due within 60 days of the date of this letter.

For your information, Senate Bill (SB) 989 was signed into law by Governor Davis on October 8, 1999. SB 989 directs the State Water Resources Control Board (SWRCB) to identify areas most vulnerable to releases of MtBE, prioritize resources, and develop investigation and cleanup guidelines. The SWRCB MtBE cleanup guidelines have now been drafted, and prescribe the step-wise process in development of a *Site Conceptual Model (SCM)*. A SCM, now required for all MtBE release sites, is the progressive assemblage of information regarding the distribution of chemicals at a site, its hydrologic setting, geology, surrounding land use, well locations, and existing and projected water use patterns. The SCM functions as the framework for the investigation, remediation, and ultimately the closure of the site. Each phase of an investigation should seek to fill any data gaps that may remain from previous phases. Once the source area and receptor pathways have been adequately characterized, an appropriate remedial alternative can be selected and implemented.

Attached to this letter you will find a copy of Appendix C, derived from the referenced SWRCB MtBE guidance. Appendix C provides a format for your consultant to follow when putting together the SCM for this site. You are requested to ensure that your consultant adheres to this format when submitting the report documenting this phase, and subsequent phases, of work at your site.

Please call me at (510) 567-6783 should you have any questions.

Sincerely,



Scott O. Seery, CHMM
Hazardous-Materials Specialist

Attachment – Appendix C

cc: Steve Cusenza, Pleasanton Public Works Department
Chuck Headlee, RWQCB
Matt Katen, Zone 7
Danielle Stefani, Livermore-Pleasanton Fire Department
/ Jim Chappell, Environmental Resolutions, Inc. (w/ attachment)
73 Digital Drive, Ste. 100, Novato, CA 94949-5791

ATTACHMENT B
WELL CONSTRUCTION LOGS



Project No.: 2431 Boring: B3/MW1 Plate: APPENDIX
 Site: Exxon Station 7-3567 Date: 11/12/98
 Drill Contractor: Woodward

Sample Method: Split Spoon Geologist: STEVE M. ZIGAN
 Drill Rig: B-57 Bore Hole Diameter: 8" Signature: *Steve M. Zigan*
 Location: Western corner of underground tank field Registration: R.G. 4333
 Logged by: Dave Arndal

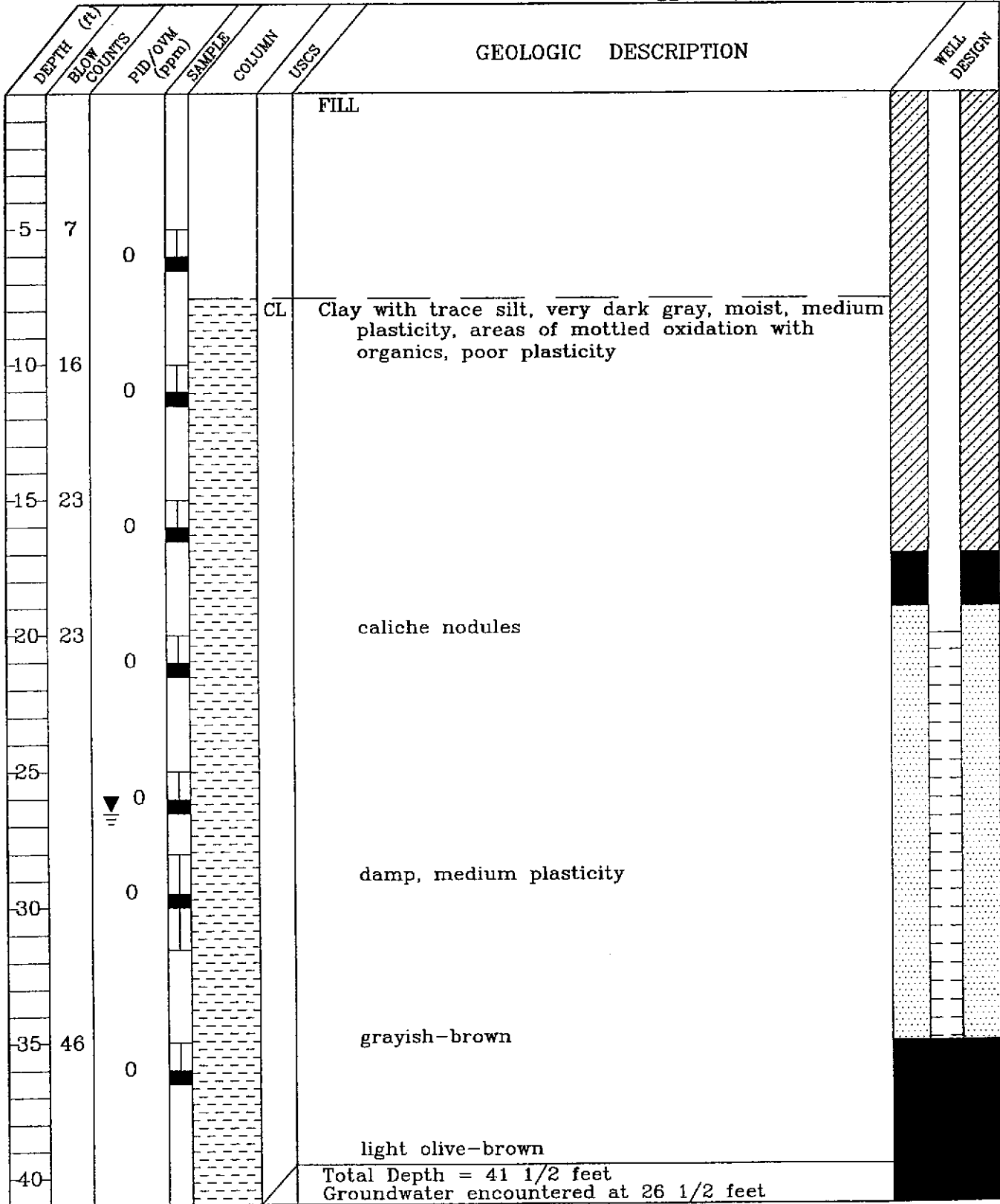
DEPTH (ft)	BLOW COUNTS	PID/OVM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
5					CL	6" concrete Clay with some silt, black, slightly damp, medium plasticity	
10	17	0					
15	22	0				trace of organic material	
20	27	0					
25	29	0				trace fine gravel, grayish-brown, wet, poor plasticity damp, medium plasticity, no gravel	
30	22	0				trace fine gravel, dark gray, poor plasticity	
35	44	0					
40						Total Depth = 36 1/2 feet Groundwater encountered at 25 feet	

Casing Diameter: 2", Slot Size: 0.020", Sand Size: #3, Grout: Portland Type I/II



Project No.: 2431 Boring: B4/MW2 Plate: APPENDIX
 Site: Exxon Station 7-3567 Date: 11/12/98
 Drill Contractor: Woodward

Sample Method: Split Spoon Geologist: STEVE M. ZIGAN
 Drill Rig: B-57 Bore Hole Diameter: 8" Signature: *Steve M. Zigan*
 Location: Southwestern corner of dispenser island Registration: R.G. 4338
 canopy Logged by: Dave Arndal



Casing Diameter: 2", Slot Size: 0.020", Sand Size: #3, Grout: Portland Type I/II



Project No.: 2431 Boring: B1/MW3 Plate: 1 OF 2
 Site: Exxon Station 7-3567 Date: 11/11/98
 Drill Contractor: Woodward

Sample Method: Split Spoon Geologist: STEVE M. ZIGAN
 Drill Rig: B-57 Bore Hole Diameter: 8" Signature: *Steve M. Zigan*
 Location: North of eastern half of station building Registration: R.G. 4333
 Logged by: Dave Arndal

DEPTH (ft)	BLOW COUNTS	PID/OVM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
						6" concrete	
					CL	Clay with some silt, dark olive-brown, slightly damp, low plasticity	
5	34	0					
10	15	0				olive-gray, high plasticity	
15	31	0				very dark grayish brown, medium plasticity	
20	28	0				slightly mottled, very dark grayish-brown and light gray, low plasticity	
25	29	0				trace small organics (roots)	
30	51	0				no organics	
35	36	0				olive-brown, caliche nodules up to 1/4", trace organics	
40							

Casing Diameter: 2", Slot Size: 0.020", Sand Size: #3, Grout: Portland Type I/II

(Continued downward on next page.)



Project No.: 2431 Boring: B1/MW3 Plate: 2 OF 2
 Site: Exxon Station 7-3567 Date: 11/11/98
 Drill Contractor: Woodward

Sample Method: Split Spoon Geologist: STEVE M. ZIGAN
 Drill Rig: B-57 Bore Hole Diameter: 8" Signature: *Steve M. Zigan*
 Location: North of eastern half of station building Registration: R.G. 4333
 Logged by: Dave Arndal

DEPTH (ft)	BLOW COUNTS	PID/OVM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION (Continued downward from previous page.)	WELL DESIGN
40	0				CL	Clay with some silt, olive-brown, caliche nodules up to 1/4", trace organics	
					SC	Clayey sand, fine-grained, dark yellowish-brown, wet	
45	76	0			GP	Sandy gravel, gravel up to 3/4", fine-grained sand, dark yellowish-brown, wet	
50	76/8'					Total Depth = 51 1/2 feet Groundwater encountered at 41 1/2 feet	
55							
60							
65							
70							
75							
80							

Casing Diameter: 2", Slot Size: 0.020", Sand Size: #3, Grout: Portland Type I/II



Project No.: 2431 Boring: B2/MW4 Plate: 1 OF 2
 Site: Exxon Station 7-3567 Date: 11/11/98
 Drill Contractor: Woodward

Sample Method: Split Spoon Geologist: STEVE M. ZIGAN
 Drill Rig: B-57 Bore Hole Diameter: 8" Signature: *Steve M. Zigan*
 Location: Central northern property line Registration: R.G. 4338
 Logged by: Jen Schulte

DEPTH (ft)	BLOW COUNTS	PID/OVM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
5	23	0			CL	6" concrete Clay with some silt, very dark gray, damp, medium plasticity	
10	14	0			SC	Clayey sand, dark gray, damp, low plasticity	
15	8	0			CL	Clay with some silt, dark gray, moist, medium plasticity	
20	24	0				caliche nodules, trace organics/woody fiber	
25	16	0			SC	gray with mottled oxidation Clayey sand, gray, damp, low plasticity	
30	31	0			CL	Clay with trace silt, very dark gray, moist, medium plasticity	
35	25	0				dark grayish-brown, trace organics and mottled oxidation	
40	42					light olive-brown, caliche areas	

Casing Diameter: 2", Slot Size: 0.020", Sand Size: #3, Grout: Portland Type I/II

(Continued downward on next page.)



Project No.: 2431 Boring: B2/MW4 Plate: 2 OF 2
 Site: Exxon Station 7-3567 Date: 11/11/98
 Drill Contractor: Woodward

Sample Method: Split Spoon Geologist: STEVE M. ZIGAN
 Drill Rig: B-57 Bore Hole Diameter: 8" Signature: Steve M. Zigan
 Location: Central northern property line Registration: R.G. 4333
 Logged by: Jen Schulte

DEPTH (ft)	BLOW COUNTS	PID/OVM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION (Continued downward from previous page.)	WELL DESIGN
40	42	0			CL	Clay with trace silt, light olive-brown, moist, medium plasticity	
					SC	Clayey sand, fine-grained, light olive-brown, moist	
45	28	0				with grayish-brown areas	
					SW	Gravelly sand, gravel up to 1", fine-grained, light olive-brown, wet	
50	74/10"	0				Total Depth = 51 1/2 feet Groundwater encountered at 50 feet	
55							
60							
65							
70							
75							
80							

Casing Diameter: 2", Slot Size: 0.020", Sand Size: #3, Grout: Portland Type I/II

ATTACHMENT C
FIELD PROTOCOL

FIELD PROTOCOL

Site Safety Plan

Field work will be performed by ERI personnel in accordance with a Site Safety Plan developed for the site. This plan describes the basic safety requirements for the subsurface investigation and the drilling of soil borings at the work site. The Site Safety Plan is applicable to personnel and subcontractors of ERI. Personnel at the site are informed of the contents of the Site Safety Plan before work begins. A copy of the Site Safety Plan is kept at the work site and is available for reference by appropriate parties during the work. The ERI geologist will act as the Site Safety Officer.

Drilling of Soil Borings

Prior to the drilling of soil borings, ERI will acquire necessary permits from the appropriate agency(ies). ERI will also contact Underground Service Alert (USA) and a private underground utility locator (per ExxonMobil protocol) before drilling to help locate public utility lines at the site. ERI will clear the proposed locations to a depth of approximately 4 or 8 feet (depending on the location), before drilling to reduce the risk of damaging underground structures.

The soil borings will be drilled with a B57 (or similar) drill rig with hollow-stem auger. Auger flights and sampling equipment will be steam-cleaned before use to minimize the possibility of crosshole contamination. The rinseate will be containerized and stored on site. ERI will coordinate with ExxonMobil for appropriate disposal of the rinseate.

Drilling will be performed under the observation of a field geologist, and the earth materials in the boring will be identified using visual and manual methods, and classified as drilling progresses using the Unified Soil Classification System. Soil borings MW5 and MW6 will be drilled to approximately 35 feet bgs and 50 feet bgs respectively.

During drilling, soil samples will be continuously collected. Samples will be collected with a California-modified, split-spoon sampler equipped with laboratory-cleaned brass sleeves. Samples will be collected by advancing the auger to a point just above the sampling depth and driving the sampler into the soil. The sampler will be driven 18 inches with a standard 140-pound hammer repeatedly dropped 30 inches. The number of blows required to drive the sampler each successive 6-inch interval will be counted and recorded to give an indication of soil consistency.

Soil samples will be monitored with a photoionization detector (PID), which measures hydrocarbon concentrations in the ambient air or headspace above the soil sample. Field instruments such as the PID are useful for indicating relative levels of hydrocarbon vapors, but do not detect concentrations of hydrocarbons with the same precision as laboratory analyses. Soil samples selected for possible chemical analysis will be sealed promptly with Teflon® tape and plastic caps. The samples will be labeled and placed in iced storage for transport to the laboratory. Chain of Custody Records will be initiated by the geologist in the field, updated throughout handling of the samples, and sent with the samples to the laboratory. Copies of these records will be in the final report. Cuttings generated during drilling will be placed on plastic sheeting and covered and left at the site. ERI will coordinate with ExxonMobil for the soil to be removed to an appropriate disposal facility.

Well Construction

The monitoring wells will be constructed in the borings using thread-jointed, 2-inch inner diameter, Schedule 40 polyvinyl chloride (PVC) casing. No chemical cements, glues, or solvents will be used in well construction. The screened portion of the wells will consist of factory-perforated casing with 0.020-inch wide slots. Unperforated casing will be installed from the top of each screen to the ground surface. The annular space in the wells will be packed with number 2/12 sand to approximately one foot above the slotted interval and a surged and refilled bentonite plug will be added above the sand pack to prevent cement from entering the well pack. The remaining annulus will be backfilled to grade with a slurry of cement and bentonite powder.

The wells will be protected with a locking cap and a traffic-rated, cast-steel utility box equipped with a steel skirt. The box has a watertight seal to protect against surface-water infiltration.

Well Development and Sampling

ERI will wait a minimum of 24 hours before development of the wells to allow the grout to set. The wells will be developed with a surge block and pump. Well development will continue until the discharge water is clear of silt and sand. Clay-size sediments derived from the screened portion of the formation cannot be eliminated by well development. After the wells have been allowed to stabilize, the wells will be checked for separate phase hydrocarbons using an interface probe. The thickness of any free phase hydrocarbons detected in the wells will be recorded. If free phase hydrocarbons are encountered in a well, the well will not be purged, and the water will not be sampled for chemical analysis.

If no free phase hydrocarbons are detected after development, the groundwater monitoring wells will be purged of stagnant water and a sample will be collected for laboratory analysis. The wells will be purged of approximately 3 to 5 well volumes of water with a submersible pump, or until pH, conductivity, and temperature of the purged water have stabilized. Water purged from the wells will be transported by ERI for disposal at Romic, Inc., of East Palo Alto, California.

The wells will be allowed to recover to at least 80 percent of static conditions, and a sample of the formation water will be collected with a disposable Teflon® bailer. The water will be transferred slowly from the bailer to laboratory-cleaned, 1 liter amber bottles and 40-milliliter glass vials for analyses by the laboratory. The glass vials will contain hydrochloric acid as a preservative. The sampler will check to see if headspace is present. If headspace is present, the sampler will collect more samples until none is present. Chain of Custody Record will be initiated in the field by the sampler, updated throughout handling of the samples, and sent along with the samples to the laboratory. A copy of the Chain of Custody Record will be included in our final report.