



GETTLER-RYAN INC.

MAY 16 2001

TRANSMITTAL

April 30, 2001
G-R #: 180181

TO: Mr. David B. De Witt
Tosco Marketing Company
2000 Crow Canyon Place, Suite 4000
San Ramon, California 94583

CC: Mr. David Vossler
Gettler-Ryan Inc.
Petaluma, California

FROM: Deanna L. Harding
Project Coordinator
Gettler-Ryan Inc.
6747 Sierra Court, Suite J
Dublin, California 94568

RE: Tosco (Unocal) SS #4186
1771 First Street
Livermore, California

WE HAVE ENCLOSED THE FOLLOWING:

COPIES	DATED	DESCRIPTION
1	April 24, 2001	Groundwater Monitoring and Sampling Report Second Quarter - Event of April 3, 2001

COMMENTS:

This report is being sent to you for your review/comment, prior to being distributed on your behalf. If no comments are received by **May 11, 2001**, this report will be distributed to the following:

cc: Ms. Eva Chu, Alameda County Health Care Services, 1131 Harbor Bay Pkwy., Alameda CA 94502

Enclosure

trans/4186.dbd



GETTLER-RYAN INC.

April 24, 2001
G-R Job #180181

Mr. David B. De Witt
Tosco Marketing Company
2000 Crow Canyon Place, Suite 400
San Ramon, California 94583

RE: Second Quarter Event of April 3, 2001
Groundwater Monitoring & Sampling Report
Tosco (Unocal) Service Station #4186
1771 First Street
Livermore, California

Dear Mr. De Witt:

This report documents the well development and the most recent groundwater monitoring and sampling events performed by Gettler-Ryan Inc. (G-R) at the referenced site. All field work was conducted in accordance with G-R Standard Operating Procedure - Groundwater Sampling (attached).

Static groundwater levels were measured and all wells were checked for the presence of separate-phase hydrocarbons. Separate-phase hydrocarbons were not present in the wells. Static water level data and groundwater elevations are summarized in Table 1. A Potentiometric Map is included as Figure 1.

Groundwater samples were collected from the monitoring wells as specified by G-R Standard Operating Procedure - Groundwater Sampling (attached). The field data sheets are also attached. The samples were analyzed by Sequoia Analytical. Analytical results are summarized in Tables 1 and 2. A Concentration Map is included as Figure 2. The chain of custody document and laboratory analytical reports are also attached.

Sincerely,

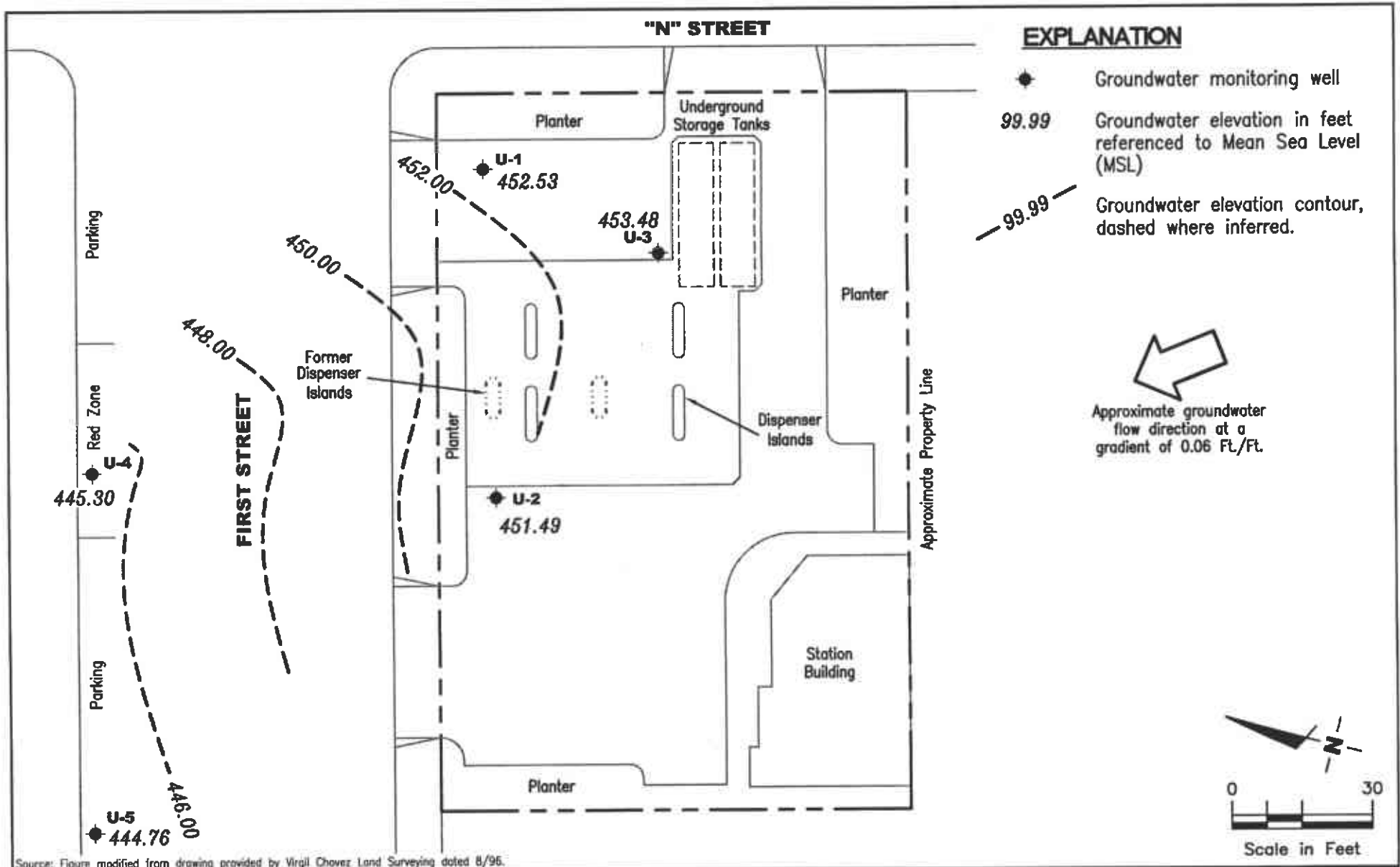
Deanna L. Harding
Project Coordinator

Hagop Kevork
P.E. No. C55734



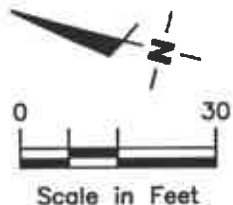
Figure 1: Potentiometric Map
Figure 2: Concentration Map
Table 1: Groundwater Monitoring Data and Analytical Results
Table 2: Groundwater Analytical Results - Oxygenate Compounds
Attachments: Standard Operating Procedure - Groundwater Sampling
Field Data Sheets
Chain of Custody Document and Laboratory Analytical Reports

4186.qml



- EXPLANATION**
- ◆ Groundwater monitoring well
 - 99.99 Groundwater elevation in feet referenced to Mean Sea Level (MSL)
 - 99.99 - Groundwater elevation contour, dashed where inferred.

Approximate groundwater flow direction at a gradient of 0.06 Ft./Ft.



Source: Figure modified from drawing provided by Virgil Chavez Land Surveying dated 8/96.

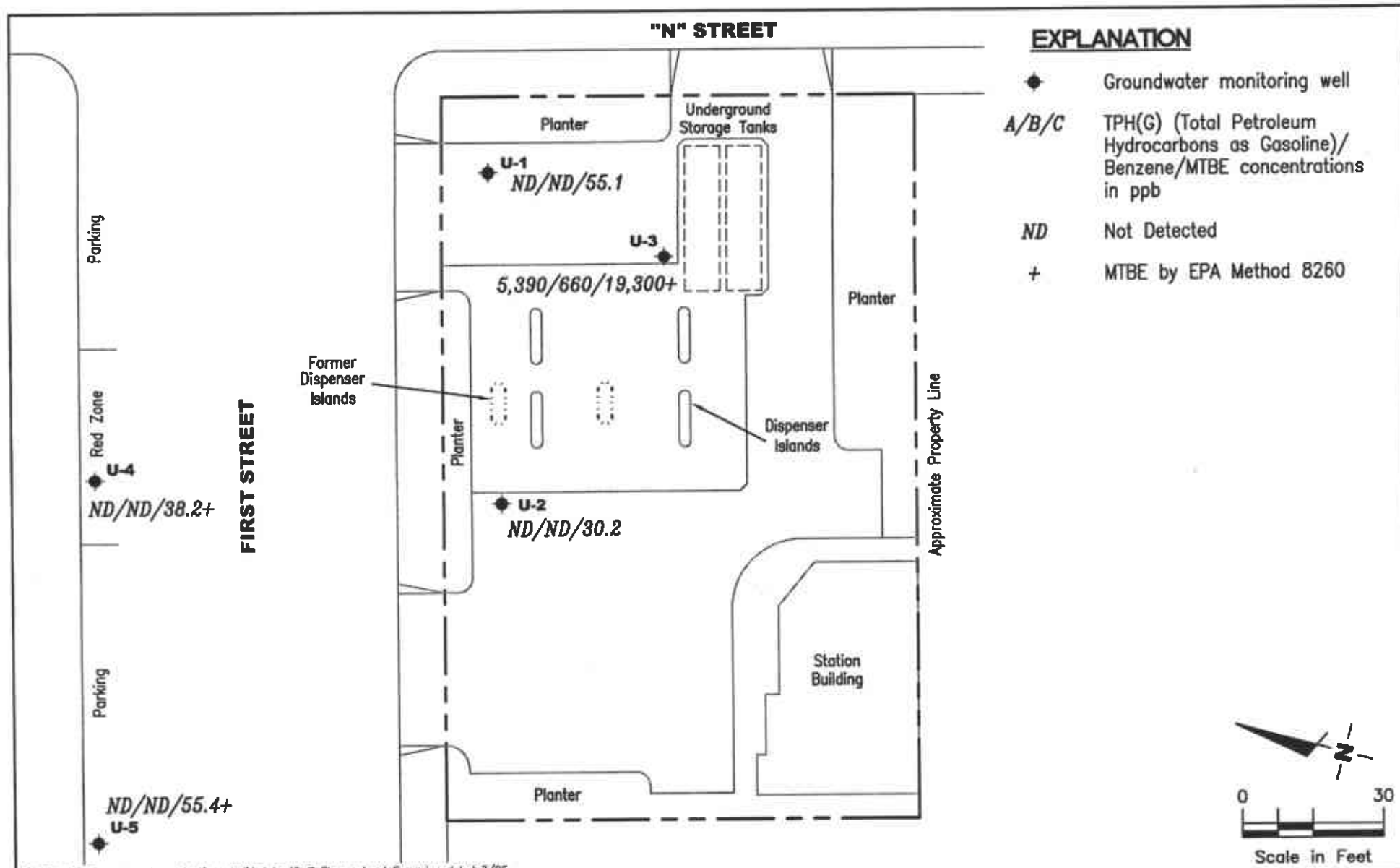
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 Dublin, CA 94568 (925) 551-7555

POTENTIOMETRIC MAP
 Tosco (Unocal) Service Station #4186
 1771 First Street
 Livermore, California

FIGURE
1

PROJECT NUMBER 180181 REVIEWED BY DATE April 3, 2001 REVISED DATE

FILE NAME: P:\Environ\Tosco\4186\001-4186.DWG | Layout Tab: Pot2



Source: Figure modified from drawing provided by Virgil Chavez Land Surveying dated 8/96.

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CONCENTRATION MAP
 Tosco (Unocal) Service Station #4186
 1771 First Street
 Livermore, California

FIGURE
2

PROJECT NUMBER 180181	REVIEWED BY	DATE April 3, 2001	REVISED DATE
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Table 1
Groundwater Monitoring Data and Analytical Results
 Tosco (Unocal) Service Station #4186
 1771 First Street
 Livermore, California

WELL ID/ TOC*	DATE	DTW (ft.)	S.I. (ft. bgs)	GWE (msl)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
U-1										
478.27	07/13/98	23.28	14.0-34.0	454.99	ND	ND	ND	ND	ND	ND
	10/07/98	26.43		451.84	ND	ND	ND	ND	ND	ND
	01/15/99	30.42		447.85	ND	ND	ND	ND	1.1	7.3
	04/14/99	24.21		454.06	ND	ND	ND	ND	ND	160
	07/19/99	27.10		451.17	ND	ND	ND	ND	ND	92
	10/12/99	29.40		448.87	ND	ND	ND	ND	ND	37
	01/24/00	27.90		450.37	ND	ND	ND	ND	ND	28
	04/10/00	26.16		452.11	ND	ND	0.930	ND	ND	ND
	07/17/00	28.04		450.23	ND	ND	ND	ND	ND	160
	10/02/00	28.41		449.86	ND	ND	ND	ND	ND	120
	01/08/01	28.68		449.59	ND	ND	ND	ND	ND	103
	04/03/01	25.74		452.53	ND	ND	ND	ND	ND	55.1
U-2										
477.44	07/13/98	23.52	13.0-33.0	453.92	1,200	130	12	62	180	1,100
	10/07/98	25.31		452.13	ND	ND	ND	ND	ND	160
	01/15/99	30.22		447.22	ND	ND	ND	ND	ND	280
	04/14/99	24.50		452.94	ND	ND	ND	ND	ND	460
	07/19/99	28.54		448.90	ND	ND	ND	ND	ND	220
	10/12/99	30.48		446.96	ND	ND	ND	ND	ND	160
	01/24/00	24.52		452.92	ND	ND	ND	ND	ND	150
	04/10/00	23.68		453.76	ND	ND	ND	ND	ND	177
	07/17/00	28.35		449.09	ND	ND	ND	ND	ND	62.7
	10/02/00	28.72		448.72	ND	ND	ND	ND	ND	52
	01/08/01	29.11		448.33	ND	ND	ND	ND	ND	57.3
	04/03/01	25.95		451.49	ND	ND	ND	ND	ND	30.2

Table 1
Groundwater Monitoring Data and Analytical Results
 Tosco (Unocal) Service Station #4186
 1771 First Street
 Livermore, California

WELL ID/ TOC*	DATE	DTW (ft.)	S.L. (ft. bgs)	GWE (msl)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
U-3										
478.46	07/13/98	23.82	14.0-34.0	454.64	70,000	3,100	5,500	2,700	16,000	7,500
	10/07/98	25.64		452.82	54,000	5,000	1,100	3,100	14,000	6,100
	01/15/99	30.92		447.54	41,000 ¹	3,100	ND ²	1,800	3,800	15,000
	04/14/99	24.48		453.98	33,000	86	290	2,200	7,800	39,000
	07/19/99	28.46		450.00	48,000	3,900	2,500	3,600	14,000	12,000/16,000 ³
	10/12/99	30.39		448.07	35,000 ⁴	4,200	ND ²	2,300	1,800	22,000/8,300 ⁵
	01/24/00	23.43		455.03	13,000 ⁴	260	ND ²	770	3,200	53,000/42,000 ³
	04/10/00	23.31		455.15	35,200 ⁴	1,070	241	2,820	8,850	35,600/40,900 ³
	07/17/00	27.53		450.93	29,000 ⁴	3,570	525	3,180	5,660	22,500/21,000 ³
	10/02/00	28.19		450.27	11,000 ⁴	2,100	31	2,000	780	25,000/28,000 ^{3,6}
	01/08/01	29.85		448.61	33,600 ⁴	3,060	427	3,040	4,190	24,700/30,900 ³
	04/03/01	24.98		453.48	5,390 ⁴	660	10.8	304	356	15,200/19,300 ⁵
U-4										
476.93	04/03/01 ⁷	31.63	35.0-45.0	445.30	ND	ND	ND	ND	ND	37.8/38.2 ³
U-5										
476.51	04/03/01 ⁷	31.75	37.0-47.0	444.76	ND	ND	0.728	ND	0.993	54.8/55.4 ³
TRIP BLANK										
	07/13/98	--		--	ND	ND	ND	ND	ND	ND
	10/07/98	--		--	ND	ND	ND	ND	ND	ND
	01/15/99	--		--	ND	ND	ND	ND	ND	ND
	04/14/99	--		--	ND	ND	ND	ND	ND	ND
	07/19/99	--		--	ND	ND	ND	ND	ND	ND
	10/12/99	--		--	ND	ND	ND	ND	ND	ND

Table 1
Groundwater Monitoring Data and Analytical Results
 Tosco (Unocal) Service Station #4186
 1771 First Street
 Livermore, California

WELL ID/ TOC*	DATE	DTW (ft.)	S.L. (ft. bgs)	GWE (msl)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
TB-LB	01/24/00	--		--	ND	ND	ND	ND	ND	ND
(cont)	04/10/00	--		--	ND	ND	ND	ND	ND	ND
	07/17/00	--		--	ND	ND	ND	ND	ND	ND
	10/02/00	--		--	ND	ND	ND	ND	ND	ND
	01/08/01	--		--	ND	ND	ND	ND	ND	ND
	04/03/01	--		--	ND	ND	ND	ND	ND	ND

Table 1
Groundwater Monitoring Data and Analytical Results
Tosco (Unocal) Service Station #4186
1771 First Street
Livermore, California

EXPLANATIONS:

TOC = Top of Casing

DTW = Depth to Water

(ft.) = Feet

S. I. = Screen Interval

(ft. bgs) = Feet Below Ground Surface

GWE = Groundwater Elevation

(msl) = Mean sea level

TPH-G = Total Petroleum Hydrocarbons as Gasoline

B = Benzene

T = Toluene

E = Ethylbenzene

X = Xylenes

MTBE = Methyl tertiary butyl ether

(ppb) = Parts per billion

ND = Not Detected

-- = Not Measured/Not Analyzed

- * TOC elevations are relative to msl in feet. The benchmark used was a City of Livermore survey monument at First & "Q" Streets, (Benchmark Elevation = 469.246 feet, msl).
- 1 Laboratory report indicates gasoline and unidentified hydrocarbons C6-C12.
- 2 Detection limit raised. Refer to analytical reports.
- 3 MTBE by EPA Method 8260.
- 4 Laboratory report indicates gasoline C6-C12.
- 5 MTBE by EPA Method 8260 analyzed past EPA recommended holding time.
- 6 Laboratory report indicates the sample was analyzed within holding time. Re-analysis for confirmation or dilution was performed past the recommend holding time.
- 7 Well development performed.

Table 2
Groundwater Analytical Results - Oxygenate Compounds
 Tosco (Unocal) Service Station #4186
 1771 First Street
 Livermore, California

WELL ID	DATE	ETHANOL (ppb)	TBA (ppb)	MTBE (ppb)	DIPE (ppb)	ETBE (ppb)	TAME (ppb)	EDB (ppb)	1,2-DCA (ppb)
U-1	10/02/00	--	ND	--	--	--	--	--	--
U-2	10/02/00	--	ND	--	--	--	--	--	--
U-3	07/19/99	--	--	16,000	--	--	--	--	--
	10/12/99	--	--	8,300	--	--	--	--	--
	01/24/00	--	--	42,000	--	--	--	--	--
	04/10/00	--	--	40,900	--	--	--	--	--
	07/17/00	--	--	21,000	--	--	--	--	--
	10/02/00	--	63,000	28,000	--	--	--	--	--
	01/08/01	ND ¹	49,300	30,900	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
	04/03/01 ²	ND ¹	22,200	19,300	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
U-4	04/03/01	ND	ND	38.2	ND	ND	ND	ND	ND
U-5	04/03/01	ND	ND	55.4	ND	ND	ND	ND	ND

Table 2
Groundwater Analytical Results - Oxygenate Compounds
Tosco (Unocal) Service Station #4186
1771 First Street
Livermore, California

EXPLANATIONS:

TBA = Tertiary butyl alcohol
MTBE = Methyl tertiary butyl ether
DIPE = Di-isopropyl ether
ETBE = Ethyl tertiary butyl ether
TAME = Tertiary amyl methyl ether
EDB = 1,2-Dibromoethane
1,2-DCA = 1,2-Dichloroethane
(ppb) = Parts per billion
ND = Not Detected
-- = Not Analyzed

ANALYTICAL METHOD:

EPA Method 8260 for Oxygenate Compounds

¹ Detection limit raised. Refer to analytical reports.

² Laboratory report indicates this sample was analyzed outside of the EPA recommended holding time.

STANDARD OPERATING PROCEDURE - GROUNDWATER SAMPLING

Gettler-Ryan Inc. field personnel adhere to the following procedures for the collection and handling of groundwater samples prior to analysis by the analytical laboratory. Prior to sample collection, the type of analysis to be performed is determined. Loss prevention of volatile compounds is controlled and sample preservation for subsequent analysis is maintained.

Prior to well development, each well is monitored for the presence of free-phase hydrocarbons and the depth to water is recorded. Wells are then developed by alternately surging the well with the bailer, then purging the well with a pump to remove accumulated sediments and draw groundwater into the well. Development continues until the groundwater parameters (temperature, pH, and conductivity) have stabilized.

Prior to sampling, the presence or absence of free-phase hydrocarbons is determined using an interface probe. Product thickness, if present, is measured to the nearest 0.01 foot and is noted in the field notes. In addition, static water level measurements are collected with the interface probe and are also recorded in the field notes.

After water levels are collected and prior to sampling, temperature, pH and electrical conductivity are measured. If purging is to occur, each well is purged a minimum of three well casing volumes of water using pre-cleaned pumps (stack, suction, Grundfos), or polyvinyl chloride bailers. The measurements are taken a minimum of three times during the purging. Purging continues until these parameters stabilize.

Groundwater samples are collected using disposable bailers. The water samples are transferred from the bailer into appropriate containers. Pre-preserved containers, supplied by analytical laboratories, are used when possible. When pre-preserved containers are not available, the laboratory is instructed to preserve the sample as appropriate. Duplicate samples are collected for the laboratory to use in maintaining quality assurance/quality control standards. The samples are labeled to include the job number, sample identification, collection date and time, analysis, preservation (if any), and the sample collector's initials. The water samples are placed in a cooler, maintained at 4°C for transport to the laboratory. Once collected in the field, all samples are maintained under chain of custody until delivered to the laboratory.

The chain of custody document includes the job number, type of preservation, if any, analysis requested, sample identification, date and time collected, and the sample collector's name. The chain of custody is signed and dated (including time of transfer) by each person who receives or surrenders the samples, beginning with the field personnel and ending with the laboratory personnel.

A laboratory supplied trip blank accompanies each sampling set. For sampling sets greater than 20 samples, 5% trip blanks are included. The trip blank is analyzed for some or all of the same compounds as the groundwater samples.

As requested by Tosco Marketing Company, the purge water and decontamination water generated during sampling activities is transported to Tosco - San Francisco Area Refinery, located in Rodeo, California.

WELL MONITORING/SAMPLING FIELD DATA SHEET

Client/Facility # Tesco # 4186 Job#: 180181
 Address: 1771 First St. Date: 4/3/01
 City: Livermore, Ca Sampler: Vetter

Well ID: U-1 Well Condition: OK
 Well Diameter: 2 in. Hydrocarbon Thickness: 0.00 in. Amount Bailed (product/water): 0 (gal.)
 Total Depth: 34.05 ft.
 Depth to Water: 25.74 ft.

Volume Factor (VF)	2" = 0.17	3" = 0.38	4" = 0.66
	6" = 1.50	12" = 5.80	

8.31 x VF 0.17 = 1.41 x 3 (case volume) = Estimated Purge Volume: 4.5 (gal.)

Purge Equipment: Stack Disposable Bailer
 Sampling Equipment: Disposable Bailer Bailer
 Pressure Bailer
 Grab Sample
 Other: _____

Starting Time: 11:45 Weather Conditions: dia
 Sampling Time: 12:00 Water Color: brn. Odor: no
 Purging Flow Rate: 1 gpm Sediment Description: ss/T
 Did well de-water? no If yes, Time: _____ Volume: _____ (gal.)

Time	Volume (gal.)	pH	Conductivity (µmhos/cm)	Temperature (F)	D.O. (mg/L)	ORP (mV)	Alkalinity (ppm)
<u>11:47</u>	<u>1.5</u>	<u>7.60</u>	<u>795</u>	<u>66.9</u>			
<u>11:48</u>	<u>3</u>	<u>7.44</u>	<u>811</u>	<u>67.8</u>			
<u>11:50</u>	<u>4.5</u>	<u>7.41</u>	<u>817</u>	<u>68.4</u>			

LABORATORY INFORMATION

SAMPLE ID	# - CONTAINER	REFRIG.	PRESERV. TYPE	LABORATORY	ANALYSES	
					TPH/G	BTEX/MTOE
<u>U-1</u>	<u>3 x VOA VIAL</u>	<u>Y</u>	<u>HCL</u>	<u>SEQUOIA</u>		

COMMENTS: _____

WELL MONITORING/SAMPLING FIELD DATA SHEET

Client/ Facility # Tesco # 4186 Job #: 180181
 Address: 1771 First st. Date: 4/3/01
 City: Livermore, ca. Sampler: Vatter

Well ID: U-2 Well Condition: OK
 Well Diameter: 2 in. Hydrocarbon Thickness: 0.00 in. Amount Bailed (product/water): 0 (gal.)
 Total Depth: 33.20 ft. Volume Factor (VF):
 Depth to Water: 25.95 ft. 2" = 0.17 3" = 0.38 4" = 0.66
 6" = 1.50 12" = 5.80

7.25 x VF 0.17 = 1.23 x 3 (case volume) = Estimated Purge Volume: 4.0 (gal.)

Purge Equipment: Stack Disposable Bailer Bailer
 Sampling Equipment: Disposable Bailer Bailer
 Pressure Bailer
 Grab Sample
 Other: _____

Starting Time: 11:16 Weather Conditions: Clear
 Sampling Time: 11:30 Water Color: brn Odor: no
 Purging Flow Rate: 1 gpm. Sediment Description: slt
 Did well de-water? no If yes; Time: _____ Volume: _____ (gal.)

Time	Volume (gal.)	pH	Conductivity μ mhos/cm	Temperature $^{\circ}$ F	D.O. (mg/L)	ORP (mV)	Alkalinity (ppm)
<u>11:17</u>	<u>1</u>	<u>7.67</u>	<u>763</u>	<u>66.3</u>	_____	_____	_____
<u>11:19</u>	<u>2.5</u>	<u>7.53</u>	<u>780</u>	<u>67.4</u>	_____	_____	_____
<u>11:21</u>	<u>4</u>	<u>7.49</u>	<u>788</u>	<u>67.8</u>	_____	_____	_____

LABORATORY INFORMATION

SAMPLE ID	(#) - CONTAINER	REFRIG.	PRESERV. TYPE	LABORATORY	ANALYSES
<u>U-2</u>	<u>X VDA VIAL</u>	<u>Y</u>	<u>HCL</u>	<u>SEQUOIA</u>	<u>TPHG/BTEX/MTOE</u>

COMMENTS: _____

WELL MONITORING/SAMPLING FIELD DATA SHEET

Client/Facility # Tesco # 4186 Job#: 180181
 Address: 1771 First St. Date: 4/3/01
 City: Livermore, Ca Sampler: Variter

Well ID: U-3 Well Condition: OK
 Well Diameter: 2 in. Hydrocarbon Thickness: 0.00 in. Amount Bailed (product/water): 0 (gal.)
 Total Depth: 33.40 ft. Volume Factor (VF):
 Depth to Water: 24.98 ft. 2" = 0.17 3" = 0.38 4" = 0.66
6" = 1.50 12" = 5.80

8.42 x VF 0.17 = 1.43 x 3 (case volume) = Estimated Purge Volume: 4.5 (gal.)

Purge Equipment: Disposable Bailer Stack Suction Grundfos Other: _____
 Sampling Equipment: Disposable Bailer Bailer Pressure Bailer Grab Sample Other: _____

Starting Time: 12:20 Weather Conditions: clear
 Sampling Time: 12:35 Water Color: grayish Odor: Y
 Purging Flow Rate: 1 gpm Sediment Description: soft
 Did well de-water? NO If yes: Time: _____ Volume: _____ (gal.)

Time	Volume (gal.)	pH	Conductivity μ mhos/cm	Temperature F	D.O. (mg/L)	ORP (mV)	Alkalinity (ppm)
<u>12:22</u>	<u>1.5</u>	<u>7.82</u>	<u>671</u>	<u>68.8</u>			
<u>12:23</u>	<u>3</u>	<u>7.67</u>	<u>694</u>	<u>68.3</u>			
<u>12:25</u>	<u>4.5</u>	<u>7.63</u>	<u>690</u>	<u>68.4</u>			

LABORATORY INFORMATION

SAMPLE ID	(#) - CONTAINER	REFRIG.	PRESERV. TYPE	LABORATORY	ANALYSES
<u>U-3</u>	<u>5 X VOA VIAL</u>	<u>Y</u>	<u>HCL</u>	<u>SEQUOIA</u>	<u>TPHG/BTEX/MTOE</u>

COMMENTS: _____

**WELL MONITORING/DEVELOPMENT
FIELD DATA SHEET**

Client/Facility: TOSCO # 4186 Job#: 180181
 Address: 1771 First St. Date: 4/3/01
 City: Livermore, CA Sampler: Vantka

Well ID: U-4 Well Condition: OK
 Well Diameter: 2 in. Hydrocarbon Thickness: 0.00 Ft. Amount Bailed (product/water): 0 (gal.)
 Total Depth: 48.30 ft.
 Depth to Water: 31.63 ft.

Volume Factor (VF)	2" = 0.17	3" = 0.38	4" = 0.66
	6" = 1.50	12" = 5.80	

$13.67 \times VF \ 0.17 = 2.32$ (case volume) = Estimated Purge Volume: 23.0 (gal.)

Purge Equipment: Disposable Bailer, Bailer, Stack, Suction, Grundfos, Other: _____
 Sampling Equipment: Disposable Bailer, Bailer, Pressure Bailer, Grab Sample, Other: _____

Starting Time: 9:55 Weather Conditions: clear
 Sampling Time: 10:55 Water Color: brn. Odor: no
 Purging Flow Rate: 1 gpm. Sediment Description: sand/silt
 Did well de-water? y If yes; Time: 10:11 Volume: 16 (gal.)

Time	Volume (gal.)	pH	Conductivity μ mhos/cm	Temperature $^{\circ}$ F	D.O. (mg/L)	ORP (mV)	Alkalinity (ppm)
9:57	2.5	7.89	708	68.8			
9:59	5	7.80	731	69.3			Very Turbid water (mud)
10:02	7.5	7.78	740	69.5			
10:05	10	7.73	749	69.7			cleared
10:08	12.5	7.70	755	69.8			
10:10	15	7.71	761	69.9			Turbid again (silt)
10:29	17.5	7.68	760	70.1			
10:32	20	7.59	768	69.3			clearing
10:34	22	7.57	766	69.5			
10:35	23	7.55	770	69.7			cleared

LABORATORY INFORMATION

SAMPLE ID	(#) - CONTAINER	REFRIG.	PRESERV. TYPE	LABORATORY	ANALYSES
U-4	5 VOA	Y	HCl	SEA401A	(TPH/G/BTEX/MTBE+) (16) oxy's + 1,2 DCA + EDR (8260)

COMMENTS: very slow recovery

WELL MONITORING/DEVELOPMENT FIELD DATA SHEET

Client/
Facility Tosco #4186
Address: 1771 First St.
City: Livermore, Ca.

Job#: 180181
Date: 4/3/01
Sampler: Vartkes

Well ID U-5

Well Condition: OK

Well Diameter 2 in.

Hydrocarbon Thickness: 0.00 Ft. Amount Bailed (product/water): 5 (gal.)

Total Depth 47.20 ft.

Volume Factor (VF)	2" = 0.17	3" = 0.38	4" = 0.66
	6" = 1.50	12" = 5.80	

Depth to Water 31.75 ft.

18.45 x VF 0.17 = 2.62 x ¹⁰ (case volume) = Estimated Purge Volume: 27.0 (gal.)

Purge Equipment: Disposable Bailer
Bailer
Stack
Suction
Grundfos
Other: _____

Sampling Equipment: Disposable Bailer
Bailer
Pressure Bailer
Grab Sample
Other: _____

Starting Time: 8:35

Weather Conditions: clear

Sampling Time: 9:35

Water Color: brn. Odor: no

Purging Flow Rate: 1-1.5 gpm.

Sediment Description: Silt

Did well de-water? y

If yes; Time: 8:48 Volume: 18 (gal.)

Time	Volume (gal.)	pH	Conductivity μ mhos/cm	Temperature $^{\circ}$ F	D.O. (mg/L)	ORP (mV)	Alkalinity (ppm)
8:37	2.5	8.06	707	67.2	a little Turbid (Silt)		
8:39	5	7.98	722	67.5			
8:40	7.5	7.87	731	67.9	cleared up		
8:42	10	7.73	736	68.2			
8:44	12.5	7.70	743	68.5			
8:46	15	7.64	750	68.8			
8:47	17.5	7.59	756	69.0			
9:05	21	7.58	740	68.7			
9:08	24	7.55	742	69.1			
9:12	27	7.51	741	69.3			

LABORATORY INFORMATION

SAMPLE ID	(#) - CONTAINER	REFRIG.	PRESERV. TYPE	LABORATORY	ANALYSES
U-5	5 VOAs	Y	HCl	SE&401A	(TPHE/BTEX/MTBE) (6)Oxys+1,2DCA+EDX(8260)

COMMENTS: slow recovery



Sequoia Analytical

1551 Industrial Road
San Carlos, CA 94070-4111
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April 18, 2001

Deanna Harding
Gettler-Ryan/Geostrategies(1)
6747 Sierra Court, Suite J
Dublin, CA 94568
RE: Tosco(1) / L104025

Enclosed are the results of analyses for samples received by the laboratory on 04/03/01. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Latonya Pelt
Project Manager

CA ELAP Certificate Number 2360



Gettler-Ryan/Geostrategies(1)
6747 Sierra Court, Suite J
Dublin CA, 94568

Project: Tosco(1)
Project Number: Unocal SS#4186
Project Manager: Deanna Harding

Reported:
04/18/01 13:53

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
TB-LB	L104025-01	Water	04/03/01 00:00	04/03/01 19:25
U-1	L104025-02	Water	04/03/01 12:00	04/03/01 19:25
U-2	L104025-03	Water	04/03/01 11:30	04/03/01 19:25
U-3	L104025-04	Water	04/03/01 12:35	04/03/01 19:25
U-4	L104025-05	Water	04/03/01 10:55	04/03/01 19:25
U-5	L104025-06	Water	04/03/01 09:35	04/03/01 19:25

Gettler-Ryan/Geostrategies(1)
6747 Sierra Court, Suite J
Dublin CA, 94568

Project: Tosco(1)
Project Number: Unocal SS#4186
Project Manager: Deanna Harding

Reported:
04/18/01 13:53

Total Purgeable Hydrocarbons (C6-C12), BTEX and MTBE by DHS LUFT
Sequoia Analytical - San Carlos

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TB-LB (L104025-01) Water Sampled: 04/03/01 00:00 Received: 04/03/01 19:25									
Purgeable Hydrocarbons as Gasoline	ND	50.0	ug/l	1	1040048	04/13/01	04/13/01	DHS LUFT	
Benzene	ND	0.500	"	"	"	"	"	"	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	0.500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	5.00	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		76.3 %	70-130		"	"	"	"	
U-1 (L104025-02) Water Sampled: 04/03/01 12:00 Received: 04/03/01 19:25									
Purgeable Hydrocarbons as Gasoline	ND	50.0	ug/l	1	1040048	04/13/01	04/13/01	DHS LUFT	
Benzene	ND	0.500	"	"	"	"	"	"	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	0.500	"	"	"	"	"	"	
Methyl tert-butyl ether	55.1	5.00	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		75.4 %	70-130		"	"	"	"	
U-2 (L104025-03) Water Sampled: 04/03/01 11:30 Received: 04/03/01 19:25									
Purgeable Hydrocarbons as Gasoline	ND	50.0	ug/l	1	1040048	04/13/01	04/13/01	DHS LUFT	
Benzene	ND	0.500	"	"	"	"	"	"	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	0.500	"	"	"	"	"	"	
Methyl tert-butyl ether	30.2	5.00	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		78.7 %	70-130		"	"	"	"	

Gettler-Ryan/Geostrategies(1)
 6747 Sierra Court, Suite J
 Dublin CA, 94568

Project: Tosco(1)
 Project Number: Unocal SS#4186
 Project Manager: Deanna Harding

Reported:
 04/18/01 13:53

Total Purgeable Hydrocarbons (C6-C12), BTEX and MTBE by DHS LUFT
Sequoia Analytical - San Carlos

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
U-3 (L104025-04) Water Sampled: 04/03/01 12:35 Received: 04/03/01 19:25									
Purgeable Hydrocarbons as Gasoline	5390	500	ug/l	10	1040049	04/13/01	04/13/01	DHS LUFT	P-01
Benzene	660	5.00	"	"	"	"	"	"	
Toluene	10.8	5.00	"	"	"	"	"	"	
Ethylbenzene	304	5.00	"	"	"	"	"	"	
Xylenes (total)	356	5.00	"	"	"	"	"	"	
Methyl tert-butyl ether	15200	500	"	100	"	"	"	"	M-04
<i>Surrogate: a,a,a-Trifluorotoluene</i>		86.3 %	70-130		"	"	"	"	
U-4 (L104025-05) Water Sampled: 04/03/01 10:55 Received: 04/03/01 19:25									
Purgeable Hydrocarbons as Gasoline	ND	50.0	ug/l	1	1040048	04/13/01	04/13/01	DHS LUFT	
Benzene	ND	0.500	"	"	"	"	"	"	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	0.500	"	"	"	"	"	"	
Methyl tert-butyl ether	37.8	5.00	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		77.1 %	70-130		"	"	"	"	
U-5 (L104025-06) Water Sampled: 04/03/01 09:35 Received: 04/03/01 19:25									
Purgeable Hydrocarbons as Gasoline	ND	50.0	ug/l	1	1040048	04/13/01	04/13/01	DHS LUFT	
Benzene	ND	0.500	"	"	"	"	"	"	
Toluene	0.728	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	0.993	0.500	"	"	"	"	"	"	
Methyl tert-butyl ether	54.8	5.00	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		80.2 %	70-130		"	"	"	"	

Gettler-Ryan/Geostrategies(1)
6747 Sierra Court, Suite J
Dublin CA, 94568

Project: Tosco(1)
Project Number: Unocal SS#4186
Project Manager: Deanna Harding

Reported:
04/18/01 13:53

Volatile Organic 8 Oxygenated Compounds by EPA Method 8260B
Sequoia Analytical - San Carlos

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
U-3 (L104025-04) Water Sampled: 04/03/01 12:35 Received: 04/03/01 19:25									I-02
Ethanol	ND	167000	ug/l	166.67	1040057	04/17/01	04/18/01	EPA 8260B	
1,2-Dibromoethane	ND	333	"	"	"	"	"	"	
1,2-Dichloroethane	ND	333	"	"	"	"	"	"	
Di-isopropyl ether	ND	333	"	"	"	"	"	"	
Ethyl tert-butyl ether	ND	333	"	"	"	"	"	"	
Methyl tert-butyl ether	19300	333	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	333	"	"	"	"	"	"	
Tert-butyl alcohol	22200	16700	"	"	"	"	"	"	
<i>Surrogate: 1,2-Dichloroethane-d4</i>		95.6 %	76-114		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		105 %	88-110		"	"	"	"	
U-4 (L104025-05) Water Sampled: 04/03/01 10:55 Received: 04/03/01 19:25									
Ethanol	ND	1000	ug/l	1	1040017	04/05/01	04/05/01	EPA 8260B	
1,2-Dibromoethane	ND	2.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	2.00	"	"	"	"	"	"	
Di-isopropyl ether	ND	2.00	"	"	"	"	"	"	
Ethyl tert-butyl ether	ND	2.00	"	"	"	"	"	"	
Methyl tert-butyl ether	38.2	2.00	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	2.00	"	"	"	"	"	"	
Tert-butyl alcohol	ND	100	"	"	"	"	"	"	
<i>Surrogate: 1,2-Dichloroethane-d4</i>		92.4 %	76-114		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		101 %	88-110		"	"	"	"	
U-5 (L104025-06) Water Sampled: 04/03/01 09:35 Received: 04/03/01 19:25									
Ethanol	ND	1000	ug/l	1	1040017	04/05/01	04/05/01	EPA 8260B	
1,2-Dibromoethane	ND	2.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	2.00	"	"	"	"	"	"	
Di-isopropyl ether	ND	2.00	"	"	"	"	"	"	
Ethyl tert-butyl ether	ND	2.00	"	"	"	"	"	"	
Methyl tert-butyl ether	55.4	2.00	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	2.00	"	"	"	"	"	"	
Tert-butyl alcohol	ND	100	"	"	"	"	"	"	
<i>Surrogate: 1,2-Dichloroethane-d4</i>		91.8 %	76-114		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		98.0 %	88-110		"	"	"	"	

Gettler-Ryan/Geostrategies(1)
 6747 Sierra Court, Suite J
 Dublin CA, 94568

Project: Tosco(1)
 Project Number: Unocal SS#4186
 Project Manager: Deanna Harding

Reported:
 04/18/01 13:53

Total Purgeable Hydrocarbons (C6-C12), BTEX and MTBE by DHS LUFT - Quality Control
Sequoia Analytical - San Carlos

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1040048 - EPA 5030B (P/T)										
Blank (1040048-BLK1) Prepared & Analyzed: 04/13/01										
Purgeable Hydrocarbons as Gasoline	ND	50.0	ug/l							
Benzene	ND	0.500	"							
Toluene	ND	0.500	"							
Ethylbenzene	ND	0.500	"							
Xylenes (total)	ND	0.500	"							
Methyl tert-butyl ether	ND	5.00	"							
Surrogate: a,a,a-Trifluorotoluene	7.96		"	10.0		79.6	70-130			
LCS (1040048-BS1) Prepared & Analyzed: 04/13/01										
Benzene	8.49	0.500	ug/l	10.0		84.9	70-130			
Toluene	8.65	0.500	"	10.0		86.5	70-130			
Ethylbenzene	8.49	0.500	"	10.0		84.9	70-130			
Xylenes (total)	25.8	0.500	"	30.0		86.0	70-130			
Surrogate: a,a,a-Trifluorotoluene	8.26		"	10.0		82.6	70-130			
LCS (1040048-BS2) Prepared & Analyzed: 04/13/01										
Purgeable Hydrocarbons as Gasoline	263	50.0	ug/l	250		105	70-130			
Surrogate: a,a,a-Trifluorotoluene	9.63		"	10.0		96.3	70-130			
Matrix Spike (1040048-MS1) Source: L104025-05 Prepared & Analyzed: 04/13/01										
Purgeable Hydrocarbons as Gasoline	229	50.0	ug/l	250	ND	91.6	60-140			
Surrogate: a,a,a-Trifluorotoluene	7.92		"	10.0		79.2	70-130			
Matrix Spike Dup (1040048-MSD1) Source: L104025-05 Prepared & Analyzed: 04/13/01										
Purgeable Hydrocarbons as Gasoline	267	50.0	ug/l	250	ND	107	60-140	15.3	25	
Surrogate: a,a,a-Trifluorotoluene	9.18		"	10.0		91.8	70-130			

Gettler-Ryan/Geostrategies(1)
6747 Sierra Court, Suite J
Dublin CA, 94568

Project: Tosco(1)
Project Number: Unocal SS#4186
Project Manager: Deanna Harding

Reported:
04/18/01 13:53

Total Purgeable Hydrocarbons (C6-C12), BTEX and MTBE by DHS LUFT - Quality Control
Sequoia Analytical - San Carlos

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1040049 - EPA 5030B (P/T)										
Blank (1040049-BLK1) Prepared & Analyzed: 04/13/01										
Purgeable Hydrocarbons as Gasoline	ND	50.0	ug/l							
Benzene	ND	0.500	"							
Toluene	ND	0.500	"							
Ethylbenzene	ND	0.500	"							
Xylenes (total)	ND	0.500	"							
Methyl tert-butyl ether	ND	5.00	"							
Surrogate: a,a,a-Trifluorotoluene	10.3		"	10.0		103	70-130			
LCS (1040049-BS1) Prepared & Analyzed: 04/13/01										
Benzene	10.0	0.500	ug/l	10.0		100	70-130			
Toluene	9.91	0.500	"	10.0		99.1	70-130			
Ethylbenzene	10.1	0.500	"	10.0		101	70-130			
Xylenes (total)	30.4	0.500	"	30.0		101	70-130			
Surrogate: a,a,a-Trifluorotoluene	10.4		"	10.0		104	70-130			
LCS (1040049-BS2) Prepared & Analyzed: 04/13/01										
Purgeable Hydrocarbons as Gasoline	226	50.0	ug/l	250		90.4	70-130			
Surrogate: a,a,a-Trifluorotoluene	11.4		"	10.0		114	70-130			
Matrix Spike (1040049-MS1) Source: L104038-04 Prepared & Analyzed: 04/13/01										
Purgeable Hydrocarbons as Gasoline	255	50.0	ug/l	250	ND	102	60-140			
Surrogate: a,a,a-Trifluorotoluene	11.4		"	10.0		114	70-130			
Matrix Spike Dup (1040049-MSD1) Source: L104038-04 Prepared & Analyzed: 04/13/01										
Purgeable Hydrocarbons as Gasoline	240	50.0	ug/l	250	ND	96.0	60-140	6.06	25	
Surrogate: a,a,a-Trifluorotoluene	11.3		"	10.0		113	70-130			

Gettler-Ryan/Geostrategies(1)
6747 Sierra Court, Suite J
Dublin CA, 94568

Project: Tosco(1)
Project Number: Unocal SS#4186
Project Manager: Deanna Harding

Reported:
04/18/01 13:53

Volatile Organic 8 Oxygenated Compounds by EPA Method 8260B - Quality Control
Sequoia Analytical - San Carlos

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 1040017 - EPA 5030B [P/T]

Blank (1040017-BLK1)

Prepared & Analyzed: 04/05/01

Ethanol	ND	1000	ug/l							
1,2-Dibromoethane	ND	2.00	"							
1,2-Dichloroethane	ND	2.00	"							
Di-isopropyl ether	ND	2.00	"							
Ethyl tert-butyl ether	ND	2.00	"							
Methyl tert-butyl ether	ND	2.00	"							
Tert-amyl methyl ether	ND	2.00	"							
Tert-butyl alcohol	ND	100	"							
<i>Surrogate: 1,2-Dichloroethane-d4</i>	48.0		"	50.0		96.0	76-114			
<i>Surrogate: Toluene-d8</i>	52.7		"	50.0		105	88-110			

LCS (1040017-BS1)

Prepared & Analyzed: 04/05/01

Methyl tert-butyl ether	44.5	2.00	ug/l	50.0		89.0	70-130			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	45.8		"	50.0		91.6	76-114			
<i>Surrogate: Toluene-d8</i>	51.2		"	50.0		102	88-110			

Matrix Spike (1040017-MS1)

Source: L104025-05

Prepared & Analyzed: 04/05/01

Methyl tert-butyl ether	80.0	2.00	ug/l	50.0	38.2	83.6	60-140			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	47.0		"	50.0		94.0	76-114			
<i>Surrogate: Toluene-d8</i>	51.7		"	50.0		103	88-110			

Matrix Spike Dup (1040017-MSD1)

Source: L104025-05

Prepared & Analyzed: 04/05/01

Methyl tert-butyl ether	79.3	2.00	ug/l	50.0	38.2	82.2	60-140	0.879	25	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	47.6		"	50.0		95.2	76-114			
<i>Surrogate: Toluene-d8</i>	51.1		"	50.0		102	88-110			

Batch 1040057 - EPA 5030B [P/T]

Blank (1040057-BLK1)

Prepared & Analyzed: 04/17/01

Ethanol	ND	1000	ug/l							
1,2-Dibromoethane	ND	2.00	"							
1,2-Dichloroethane	ND	2.00	"							
Di-isopropyl ether	ND	2.00	"							
Ethyl tert-butyl ether	ND	2.00	"							
Methyl tert-butyl ether	ND	2.00	"							
Tert-amyl methyl ether	ND	2.00	"							
Tert-butyl alcohol	ND	100	"							

Sequoia Analytical - San Carlos

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Gettler-Ryan/Geostrategies(1)
 6747 Sierra Court, Suite J
 Dublin CA, 94568

Project: Tosco(1)
 Project Number: Unocal SS#4186
 Project Manager: Deanna Harding

Reported:
 04/18/01 13:53

Volatile Organic 8 Oxygenated Compounds by EPA Method 8260B - Quality Control
Sequoia Analytical - San Carlos

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 1040057 - EPA 5030B [P/T]

Blank (1040057-BLK1)

Prepared & Analyzed: 04/17/01

Surrogate: 1,2-Dichloroethane-d4	48.8		ug/l	50.0		97.6	76-114			
Surrogate: Toluene-d8	50.7		"	50.0		101	88-110			

LCS (1040057-BS1)

Prepared & Analyzed: 04/17/01

Methyl tert-butyl ether	53.2	2.00	ug/l	50.0		106	70-130			
Surrogate: 1,2-Dichloroethane-d4	48.2		"	50.0		96.4	76-114			
Surrogate: Toluene-d8	48.7		"	50.0		97.4	88-110			

Matrix Spike (1040057-MS1)

Source: L104095-05

Prepared & Analyzed: 04/17/01

Methyl tert-butyl ether	181	2.00	ug/l	50.0	119	124	60-140			
Surrogate: 1,2-Dichloroethane-d4	48.7		"	50.0		97.4	76-114			
Surrogate: Toluene-d8	50.9		"	50.0		102	88-110			

Matrix Spike Dup (1040057-MSD1)

Source: L104095-05

Prepared & Analyzed: 04/17/01

Methyl tert-butyl ether	171	2.00	ug/l	50.0	119	104	60-140	5.68	25	
Surrogate: 1,2-Dichloroethane-d4	49.2		"	50.0		98.4	76-114			
Surrogate: Toluene-d8	49.9		"	50.0		99.8	88-110			

Gettler-Ryan/Geostrategies(1)
6747 Sierra Court, Suite J
Dublin CA, 94568

Project: Tosco(1)
Project Number: Unocal SS#4186
Project Manager: Deanna Harding

Reported:
04/18/01 13:53

Notes and Definitions

I-02 This sample was analyzed outside of the EPA recommended holding time.

M-04 MTBE was reported from second analysis.

P-01 Chromatogram Pattern: Gasoline C6-C12

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference