GETTLER-RYAN INC.

TRANSMITTAL

TO: Mr. Thomas Peacock
ACHSA
1131 Harbor Bay Parkway, 2nd Floor
Alameda, California 94502

DATE: December 10, 1999
PROJ. #: 140165.08
SUBJECT: RBCA Addendum
Former Tosco 76 No. 1871
96 MacArthur Blvd.
Oakland, California

FROM:
David J. Vossler
Project Manager
Gettler-Ryan Inc.
7100 Redwood Blvd., Suite 104
Novato, California 94945

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[X] For Your Files

COMMENTS:
At the request of Tosco Marketing Company, and the project transfer from Juliet Shin, we are sending one copy of the referenced report. If you have any questions, please call me at (415) 893-1515.

cc: Mr. David B. De Witt, Tosco Marketing Company
Ms. Barbara Bee, 17 Soleto Avenue, Piedmont, California, 94611

99 DEC 22 AM 9:16
ENVIRONMENTAL PROTECTION

GETTLER-RYAN INC.

December 10, 1999

Mr. Thomas Peacock
Alameda County Health Services Agency
Division of Environmental Protection
1131 Harbor Bay Parkway, 2nd Floor
Alameda, California 94502

Subject: Addendum to the Risk Based Corrective Action Evaluation
Former Tosco Service Station No. 1871
96 MacArthur Boulevard, Oakland, California

Mr. Peacock:

At the request of Tosco Marketing Company (Tosco), Gettler-Ryan Inc. (GR) has prepared this letter and attachments to document additional Risk-Based Corrective Action (RBCA) evaluations. These RBCA evaluations were performed in response to letters from Alameda County Health Services Agency (ACHSA) dated September 10, 1999 and November 4, 1999, and as discussed with ACHSA during a telephone conversation on November 8, 1999. ACHSA requested that a revised RBCA evaluation be prepared to address potential risks at the private residence located adjacent to the Tosco property (Figures 1 and 2). This is an Addendum to the original RBCA Evaluations dated February 25, 1999, April 6, 1999 and April 19, 1999 and focuses on the adjacent residential property. The original RBCA evaluations were prepared for the planned subject site use as a commercial facility storing and dispensing petroleum products.

At the request of ACHSA, the analytical data for chemicals of concern (COC) used in this and previous evaluations were averaged using the arithmetic mean average method. Dissolved hydrocarbon concentrations from the last two monitoring events (1 year) for the on-site wells were used as requested by the ACHSA. In addition, groundwater Hydropunch sampling results, specifically for benzene and Methyl t-Butyl Ether (MtBE), from boring B-10 located adjacent to MW-1, and collected during the recent subsurface investigation were also averaged with groundwater data from MW-1. In this Addendum, the COC were evaluated with a conservative 95% Upper Control Limit (UCL) factor. This Addendum was prepared using previously submitted data sets and site parameters. Representative COC concentrations used are shown on the attached RBCA Input Screen 7, and the updated historical groundwater data are attached. The on-site soil data that was submitted in the previous RBCA evaluations has not changed.

The purpose of this Addendum is to evaluate the potential health risk to the adjacent residential property. The attached RBCA Summary Report listed as RBCA Worksheet 1.4 summarizes the potential and complete exposure pathways for the former Tosco site and adjacent residential property. This evaluation indicated that the soil exposure and dermal contact was not a factor, and thus, not an exposure pathway. Because of the uphill slope of the local topography, the subject residence is located approximately 8 feet in elevation higher than the former Tosco site, providing a larger soil zone between the residence and the hydrocarbons beneath the former Tosco site. Based on previous investigations, there are no groundwater receptors or surface water receptors within a 1/4-mile radius, nor are the former Tosco site or adjacent residence using local groundwater. GR and Tosco representatives had a conversation with Mr. Ravi Arulanantham of the Regional Water Quality Control Board-San Francisco region (RWQCB) on September 28, 1999, regarding future groundwater use in the Oakland area. Mr. Arulanantham indicated that groundwater in the area of the former Tosco site will not have any beneficial use or likely to be use for any future drinking water source. Therefore, groundwater contact and ingestion are not exposure pathways.

Complete potential exposure pathways identified at both locations, the Tosco site (commercial) and for the adjacent residence (residential) are from the volatilization of hydrocarbons from subsurface soils and groundwater to indoor air (enclosed spaces) and outdoor air. The RBCA evaluation data calculations for indoor air and outdoor air are summarized in the attached Worksheet 8.1. The RBCA program evaluates the potential health risk as Target Risk and are listed as 1.0E-4 for commercial and residential as 1.0E-6, with a Target Hazard Quotient as 1. These are the standard risk parameters and are the default values used by the RBCA program. In addition, program default values were used for the exposure calculations and risk evaluations. Site specific data were used as it was in the previous RBCA evaluations. The distance to the off-site receptor (adjacent residential property) for air exposure was estimated at 20 feet. These and additional parameters used in this evaluation are listed ion the attached RBCA Output Table 1.

RBCA Findings

Only two complete pathways were identified and evaluated (indoor air and outdoor air). Based on the RCBA evaluation established Site Specific Target Levels (SSTL) were not exceeded for either exposure pathway. A summary and discussion of these exposure pathways and discussion are presented below.

Tier 2 SSTL's for Air Inhalation (indoor/enclosed space)

This exposure pathway, volatilization of groundwater and soil to indoor air according to the RBCA program calculations was not exceeded. Only the indoor air from the former Tosco site was evaluated. The ASTM RBCA Program evaluation indicated that the indoor air pathway for the off-site residential property was not applicable (not an exposure pathway). These RBCA worksheets are attached in Attachment 2A. The average benzene concentration in soil of 6.4E-2 ppm is below the calculated SSTL of

2.1E+0, and the average benzene concentration for groundwater of 2.1E-1 ppm is below the calculated SSTL of 3.3E-1 ppm. SSTL's for the other COC are presented on RBCA Worksheet 9.3 (attached). Of these other COCs, MtBE with a representative concentration of 1.7E+1 ppm was calculated to have a SSTL of 2.9E+4 ppm.

Tier 2 SSTL's for Air Inhalation (outdoor space)

GR applied the soil and groundwater analytical data set for the RBCA evaluation regarding the air inhalation potential to the outdoor air. The RBCA program indicated that the SSTL's were higher than residual concentrations of BTEX and MtBE in soil beneath the former Tosco site. The average concentration of benzene in groundwater of 2.1E-1 ppm is also below the calculated SSTL of 4.3E+1 ppm. Based on a Tier 1 work sheet (attached) prepared by Mr. Ravi Arulanantham (Ravi Arulanantham and Gregory P. Brorby, September 1998; Preliminary Remediation Goals and Risk-Based Screening Levels), the Risk Based Screening Levels (RBSL) for MtBE Volatilization to outdoor air in residential cases is 330 ppm. The representative groundwater concentration for this site is 1.7E+1 ppm, which below the published Tier 1 RBSL for MtBE. The RBCA program evaluation indicated the risk-based target concentration was determined to be greater than the solubility for the other COCs evaluated.

Summary and Conclusions

This RBCA evaluation determined that the potential risk and complete exposure pathway at the site is primarily air volatilization from groundwater to indoor and outdoor air to on-site receptors. The only complete exposure pathway for the adjacent residentual property is volitilzation to outdoor air. Based on this evaluation and the documented RBSL for MtBE, there appears to be no risk to human health for on-site commercial use or for off-site residential habitation.

This evaluation was prepared with specific data for the purposes of evaluating the potential health risks associated with the adjacent residential property. In order to evaluate the off-site receptor, the on-site receptor had to be evaluated. This evaluation also provided validation for the on-site exposure pathway using the most current groundwater data. As seen in the attached RBCA worksheets, none of the exposure pathways have exceeded the SSTLs determined by the RBCA program, or the published Tier 1 RBSL for MtBE.

If you have any questions or comments regarding this document, please me at (415) 893-1515.

Sincerely
Gettler-Ryan Inc.

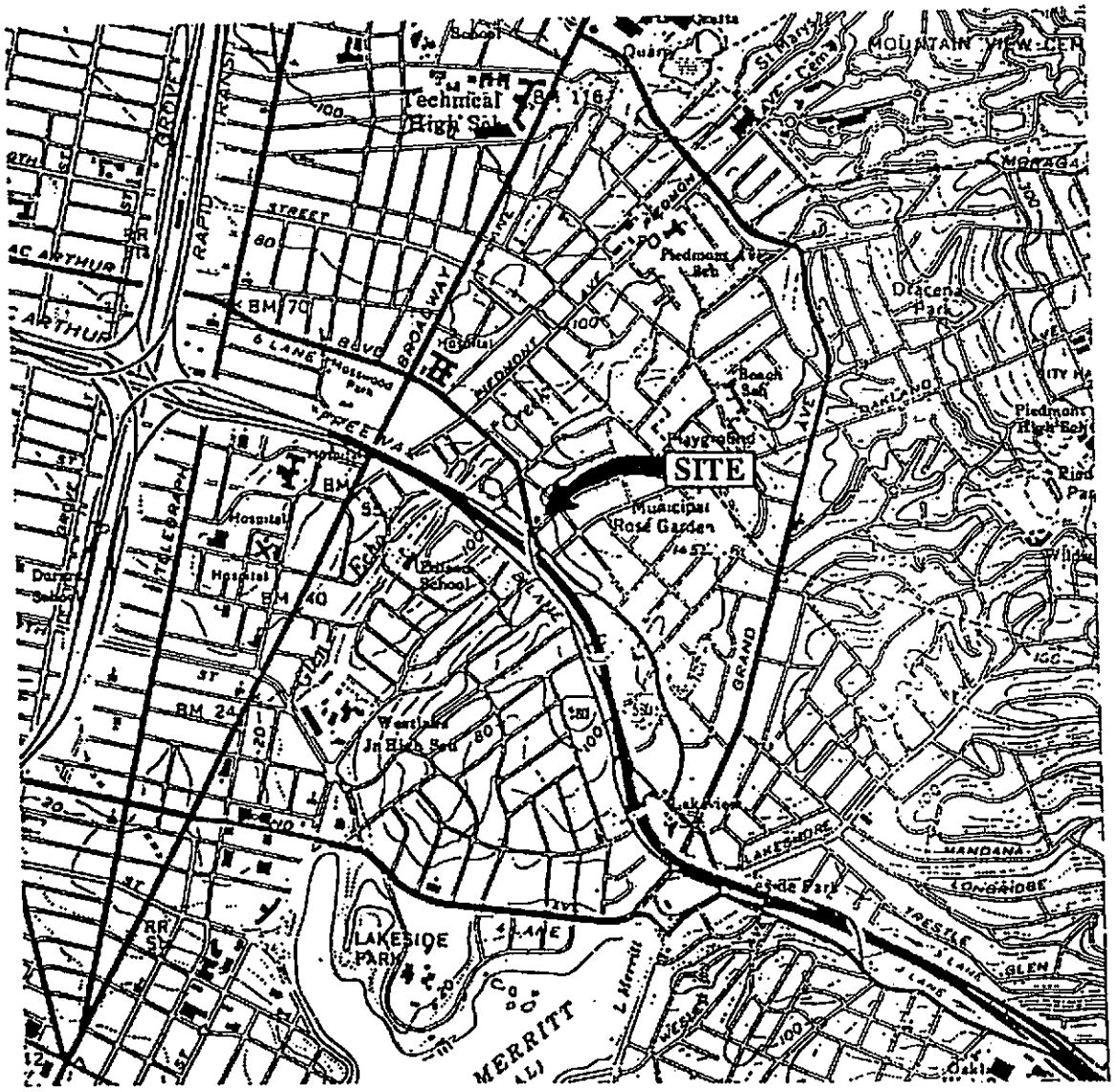
David J. Vossler
Project Manager

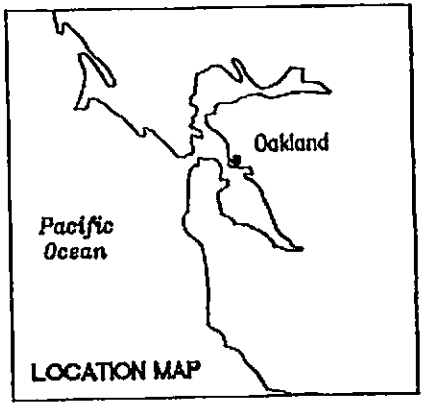
Stephen J. Carter, R.G. 5577
Senior Geologist

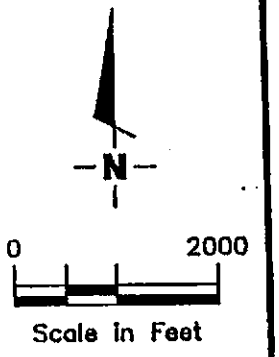
Figure 1	Vicinity Map
Figure 2	Site Plan

Attachment 1:	RBCA Input and Output Worksheets
Attachment 2:	Historical Data Backup
Attachment 3:	Tier 1 Look up Table for MtBE

Cc: Mr. David B. DeWitt, Tosco Marketing Company
Ms. Barbara Bee, Property Owner, 96 MacArthur Blvd., Oakland, Ca.







Base Map: USGS Topographic Map

FIGURE 1

Gettler - Ryan Inc.

6747 Sierra Ct., Suite J
Dublin, CA 94568
(925) 551-7555

VICINITY MAP
Former Tosco 76 Branded Facility No. 1871
96 MacArthur Boulevard
Oakland, California

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
140165		July, 1998	

EXPLANATION

- Groundwater monitoring well
- Soil Boring (Hollow-Stem Auger)
- Geoprobe
- Destroyed groundwater monitoring well
- Proposed groundwater monitoring well

B-4
B-6
B-5
HARRISON STREET
B-9
ON-RAMP
B-12
B-8
Approximate Property Boundary
B-10
MW-1
MW-3
MW-6
Former Dispenser Islands
MW-5
Residential Property
Former Underground Storage Tanks
MW-7
Former Station Building
MW-2
EB-3
EB-2
MW-4
MW-8
EB-1
Former Waste Oil Tank
MACARTHUR BOULEVARD
B-11
B-7
ON-RAMP TO SOUTHBOUND I-580 (ELEVATED)
SANTA CLARA AVENUE
ON-RAMP TO NORTHBOUND I-580 (ELEVATED)
INTERSTATE 80 (ELEVATED)
N
0
40
Scale in Feet

FIGURE 2

SITE PLAN
Former Tosco 76 Branded Facility No. 1871
96 MacArthur Boulevard
Oakland, California

REVISED DATE

Gettler - Ryan Inc.
6747 Sierra Ct., Suite J
Dublin, CA 94568
(925) 551-7555

JOB NUMBER 140165.08
REVIEWED BY
DATE 12/99

ATTACHMENT 1

RBCA Input and Output Work Sheets

RBCA

SUMMARY REPORT

☐ TIER 1 / ■ TIER 2 RBCA SITE EVALUATION

PREPARED FOR

Tosco Marketing Company
SITE NAME

96 MacArthur Boulevard, Oakland, California
LOCATION

Gettler-Ryan, Inc.
6747 Sierra Court, Suite J, Dublin, California
PREPARED BY

Noevember 9, 1999
DATE ISSUED

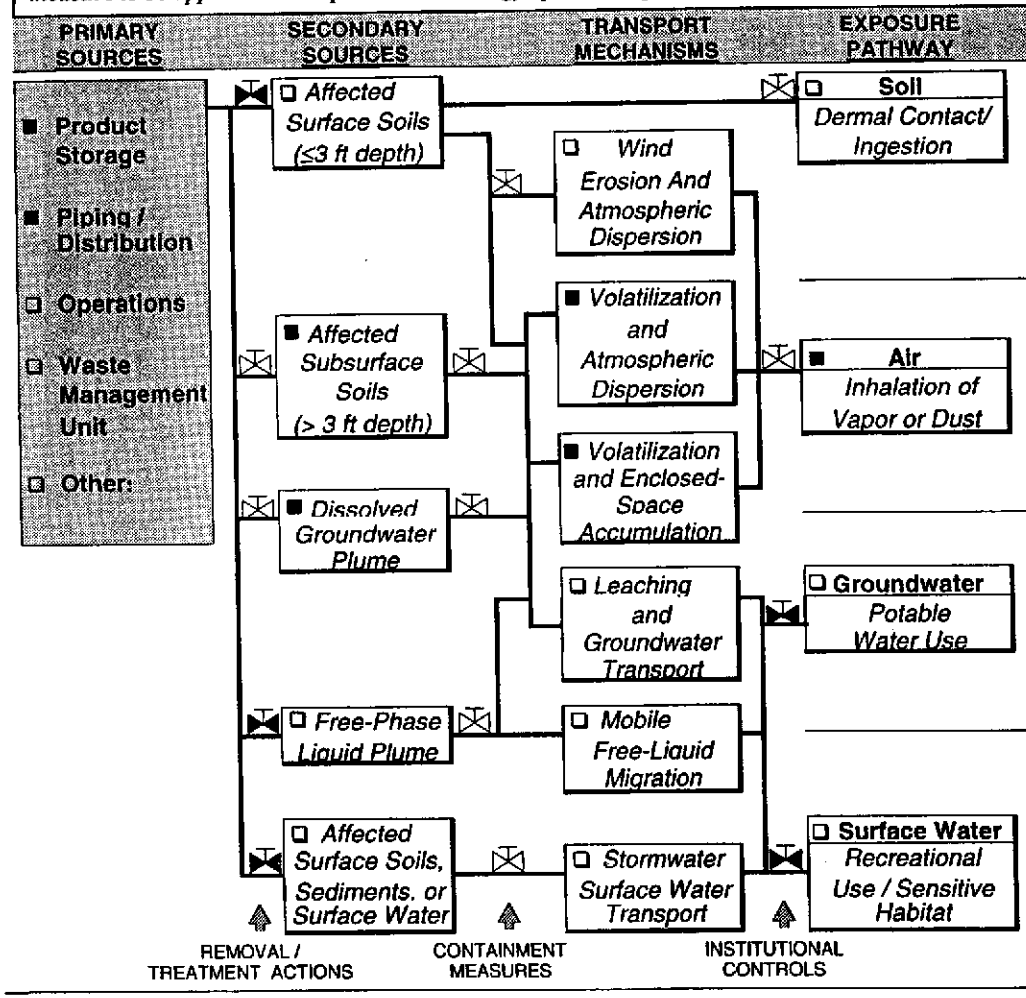
REVIEWED BY Stephen J. Carter, RG 5577

DATE November 9, 1999

Site Name: Former Tosco SS No. 1871 | Date Completed: November 9, 1999
Site Location: 96 MacArthur Blvd., Oakland, California | Completed By: Gettler-Ryan, Inc.

EXPOSURE CONTROL FLOWCHART

Instructions: *Identify remedial measures to be implemented to prevent exposure, as follows:* • Step 1 – *Baseline Exposure: Identify applicable sources, transport mechanisms, and receptors as shown on Worksheet 4.2 (■ = applicable to site).* • Step 2 – *Remedial Measures: Fill in shut-off valves (⋈) to indicate removal / treatment action, containment measure, or institutional controls to be used to "shut off" exposure pathway.* • Step 3 – *Remedial Technology Options: For each complete pathway, identify category of corrective measure to be applied and list possible technology options in space provided (see options list in RBCA Guidance Manual).*



Exposed Receptors

On-Site: □ Residential □ Non-Resid. □ N/A; □ Sensitive □ Recreation Habitat

Off-Site: □ Residential □ Non-Resid. □ N/A; □ Sensitive □ Recreation Habitat

□ Complete Pathway: ○ *Current* ○ *Potential*
⋈ Action Required: □ Yes □ No
If yes, list technology options for ⋈

Exposed Persons

On-Site: □ Residential ■ Non-Resid. □ N/A

Off-Site: ■ Residential □ Non-Resid. □ N/A

■ Complete Pathway: ○ *Current* ● *Potential*
⋈ Action Required: □ Yes ■ No
If yes, list technology options for ⋈

Groundwater Users

On-Site: □ Residential □ Non-Resid. □ N/A

Off-Site: □ Residential □ Non-Resid. □ N/A

□ Complete Pathway: ○ *Current* ○ *Potential*
⋈ Action Required: □ Yes □ No
If yes, list technology options for ⋈

Surface Water Users

On-Site: □ Residential □ Non-Resid. □ N/A; □ Sensitive □ Recreation Habitat

Off-Site: □ Residential □ Non-Resid. □ N/A; □ Sensitive □ Recreation Habitat

□ Complete Pathway: ○ *Current* ○ *Potential*
⋈ Action Required: □ Yes □ No
If yes, list technology options for ⋈

(■ OR ● OR ⋈ TO SELECT)

RBCA TIER 1/TIER 2 EVALUATION

Output Table 1

Site Name: Former Tosco (former Unocal) Site Identification: 140165.08
Site Location: 96 MacArthur Blvd., Oakland, CA Date Completed: 11/9/99
Completed By: David J. Vossler

Software: GSI RBCA Spreadsheet
Version: 1.0.1

NOTE: values which differ from Tier 1 default values are shown in bold italics and underlined.

Exposure Parameter	Definition (Units)	Residential Adult	Residential (1-6yrs)	Residential (1-16 yrs)	Commercial/Industrial Chronic	Commercial/Industrial Constrctn
ATc	Averaging time for carcinogens (yr)	70				
ATn	Averaging time for non-carcinogens (yr)	30	6	16	25	1
BW	Body Weight (kg)	70	15	35	70	
ED	Exposure Duration (yr)	30	6	16	25	1
t	Averaging time for vapor flux (yr)	30			25	1
EF	Exposure Frequency (days/yr)	350			250	180
EF.Derm	Exposure Frequency for dermal exposure	350			250	
IRgw	Ingestion Rate of Water (L/day)	2			1	
IRs	Ingestion Rate of Soil (mg/day)	100	200		50	100
IRadj	Adjusted soil ing. rate (mg-yr/kg-d)	1.1E+02			9.4E+01	
IRa.in	Inhalation rate indoor (m^3/day)	15			20	
IRa.out	Inhalation rate outdoor (m^3/day)	20			20	10
SA	Skin surface area (dermal) (cm^2)	5.8E+03		2.0E+03	5.8E+03	5.8E+03
SAadj	Adjusted dermal area (cm^2-yr/kg)	2.1E+03			1.7E+03	
M	Soil to Skin adherence factor	1				
AAFs	Age adjustment on soil ingestion	FALSE			FALSE	
AAFd	Age adjustment on skin surface area	FALSE			FALSE	
tox	Use EPA tox data for air (or PEL based)?	TRUE				
gwMCL?	Use MCL as exposure limit in groundwater?	FALSE				

Matrix of Exposed Persons to Complete Exposure Pathways		Residential	Commercial/Industrial Chronic	Commercial/Industrial Constrctn
Outdoor Air Pathways:				
SS.v	Volatiles and Particulates from Surface Soils	FALSE	FALSE	FALSE
S.v	Volatilization from Subsurface Soils	TRUE	TRUE	
GW.v	Volatilization from Groundwater	FALSE	TRUE	
Indoor Air Pathways:				
S.b	Vapors from Subsurface Soils	FALSE	TRUE	
GW.b	Vapors from Groundwater	FALSE	TRUE	
Soil Pathways:				
SS.d	Direct Ingestion and Dermal Contact	FALSE	FALSE	FALSE
Groundwater Pathways:				
GW.i	Groundwater Ingestion	FALSE	FALSE	
S.l	Leaching to Groundwater from all Soils	FALSE	FALSE	

Matrix of Receptor Distance and Location On- or Off-Site		Residential Distance	Residential On-Site	Commercial/Industrial Distance	Commercial/Industrial On-Site
GW	Groundwater receptor (cm)		FALSE		FALSE
S	Inhalation receptor (cm)	6.1E+02	FALSE		TRUE

Matrix of Target Risks		Individual	Cumulative
TRab	Target Risk (class A&B carcinogens)	1.0E-06	
TRc	Target Risk (class C carcinogens)	1.0E-05	
THQ	Target Hazard Quotient	1.0E+00	
Opt	Calculation Option (1, 2, or 3)	2	
Tier	RBCA Tier	2	

Surface Parameters	Definition (Units)	Residential	Constrctn
A	Contaminated soil area (cm^2)	***1.9E+05***	
W	Length of affect. soil parallel to wind (cm)	***6.1E+02***	
W.gw	Length of affect. soil parallel to groundwater (cm)	***6.1E+02***	
Uair	Ambient air velocity in mixing zone (cm/s)	2.3E+02	
delta	Air mixing zone height (cm)	2.0E+02	
Lss	Thickness of affected surface soils (cm)	1.0E+02	
Pe	Particulate areal emission rate (g/cm^2/s)	6.9E-14	

Groundwater	Definition (Units)	Value
delta.gw	Groundwater mixing zone depth (cm)	2.0E+02
I	Groundwater infiltration rate (cm/yr)	3.0E+01
Ugw	Groundwater Darcy velocity (cm/yr)	***5.8E-01***
Ugw.tr	Groundwater seepage velocity (cm/yr)	***1.5E+00***
Ks	Saturated hydraulic conductivity(cm/s)	6.1E-07
grad	Groundwater gradient (cm/cm)	3.0E-02
Sw	Width of groundwater source zone (cm)	
Sd	Depth of groundwater source zone (cm)	
phi.eff	Effective porosity in water-bearing unit	3.8E-01
foc.sat	Fraction organic carbon in water-bearing unit	1.0E-03
BIO?	Is bioattenuation considered?	TRUE
BC	Biodegradation Capacity (mg/L)	

Soil	Definition (Units)	Value		
hc	Capillary zone thickness (cm)	5.0E+00		
hv	Vadose zone thickness (cm)	***4.0E+02***		
rho	Soil density (g/cm^3)	1.7		
foc	Fraction of organic carbon in vadose zone	0.01		
phi	Soil porosity in vadose zone	***0.41***		
Lgw	Depth to groundwater (cm)	***4.0E+02***		
Ls	Depth to top of affected subsurface soil (cm)	***4.0E+02***		
Lsubs	Thickness of affected subsurface soils (cm)	***7.6E+00***		
pH	Soil/groundwater pH	***6.93***		
		capillary	vadose	foundation
phi.w	Volumetric water content	***0.369***	***0.13***	***0.13***
phi.a	Volumetric air content	***0.041***	***0.28***	***0.28***

Building	Definition (Units)	Residential	Commercial
Lb	Building volume/area ratio (cm)	2.0E+02	3.0E+02
ER	Building air exchange rate (s^-1)	1.4E-04	2.3E-04
Lcrk	Foundation crack thickness (cm)	1.5E+01	
eta	Foundation crack fraction	***0.001***	

Transport Parameters	Definition (Units)	Residential	Commercial
Groundwater			
ax	Longitudinal dispersivity (cm)		
ay	Transverse dispersivity (cm)		
az	Vertical dispersivity (cm)		
Vapor			
dcy	Transverse dispersion coefficient (cm)	7.5E+01	
dcz	Vertical dispersion coefficient (cm)	5.2E+01	

REPRESENTATIVE COC CONCENTRATIONS IN SOURCE MEDIA

(Complete the following table)

CONSTITUENT	Representative COC Concentration in Groundwater value (mg/L)	note	in Surface Soil value (mg/kg)	note	in Subsurface Soil value (mg/kg)	note
Benzene	2.1E-1	mean			6.4E-2	UCL
Ethylbenzene	2.6E-2	mean			3.5E-2	UCL
Methyl t-Butyl Ether	1.7E+1	mean			1.1E+1	UCL
Toluene	9.7E-2	mean			2.7E-2	UCL
Xylene (mixed isomers)	8.1E-2	mean			8.7E-2	UCL

Site Name: Former Tosco (former Unocal) SS # 1871
Site Location: 96 MacArthur Blvd., Oakland, Ca.

Completed By: David J. Vossler
Date Completed: 11/9/1999

Site Name: Former Tosco (former Unocal) SS # 1871 Site Location: 96 MacArthur Blvd., Oakland, Ca. Completed By: David J. Vossler Date Completed: 11/9/1999

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAY IS ACTIVE)

SUBSURFACE SOILS: VAPOR INHALATION

Exposure Concentration

Constituents of Concern	1) Source Medium: Subsurface Soil Conc. (mg/kg)	2) NAF Value (m^3/kg) Receptor: On-Site Commercial	2) NAF Value (m^3/kg) Receptor: Off-Site Residential	3) Exposure Medium: Outdoor Air: POE Conc. (mg/m^3) (1) / (2): On-Site Commercial	3) Exposure Medium: Outdoor Air: POE Conc. (mg/m^3) (1) / (2): Off-Site Residential	4) Exposure Multiplier (IRxEFxED)/(BWxAT) (m^3/kg-day): On-Site Commercial	4) Exposure Multiplier (IRxEFxED)/(BWxAT) (m^3/kg-day): Off-Site Residential	5) Average Daily Intake Rate (mg/kg-day) (3) X (4): On-Site Commercial	5) Average Daily Intake Rate (mg/kg-day) (3) X (4): Off-Site Residential
Benzene	6.4E-2	4.5E+6	5.4E+6	1.4E-8	1.2E-8	7.0E-2	1.2E-1	1.0E-9	1.4E-9
Ethylbenzene	3.5E-2	4.5E+6	5.4E+6	7.8E-9	6.5E-9	2.0E-1	2.7E-1	1.5E-9	1.8E-9
Methyl t-Butyl Ether	1.1E+1	4.5E+6	5.4E+6	2.5E-6	2.1E-6	2.0E-1	2.7E-1	4.9E-7	5.7E-7
Toluene	2.7E-2	4.5E+6	5.4E+6	6.1E-9	5.1E-9	2.0E-1	2.7E-1	1.2E-9	1.4E-9
Xylene (mixed isomers)	8.7E-2	4.5E+6	5.4E+6	1.9E-8	1.6E-8	2.0E-1	2.7E-1	3.8E-9	4.4E-9

NOTE: ABS = Dermal absorption factor (dim); AF = Adherance factor (mg/cm^2); AT = Averaging time (days); BW = Body weight (kg); CF = Units conversion factor; ED = Exposure duration (yrs); EF = Exposure frequencey (days/yr); ET = Exposure time (hrs/day); IR = Inhalation rate (m^3/day); POE = Point of exposure; SA = Skin exposue area (cm^2/day)

Site Name: Former Tosco (former Unocal) SS # 1871 Site Location: 96 MacArthur Blvd., Oakland, Completed By: David J. Vossler Date Completed: 11/9/1999

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAY IS ACTIVE)

GROUNDWATER: VAPOR INHALATION

Constituents of Concern	Exposure Concentration 1) Source Medium: Groundwater Conc. (mg/L)	2) NAF Value (m^3/L) Receptor: On-Site Commercial		3) Exposure Medium: Outdoor Air; POE Conc. (mg/m^3) (1) / (2) On-Site Commercial		4) Exposure Multiplier: (IRxEFxED)/(BWxAT) (m^3/kg-day) On-Site Commercial		5) Average Daily Intake Rate: (mg/kg-day) (3) X (4) On-Site Commercial		TOTAL PATHWAY INTAKE (mg/kg-day) (Sum intake values from surface, subsurface & groundwater routes.) On-Site Commercial	Off-Site Residential
Benzene	2.1E-1	8.7E+4		2.4E-6		7.0E-2		1.7E-7		1.7E-7	1.4E-9
Ethylbenzene	2.6E-2	8.4E+4		3.1E-7		2.0E-1		6.1E-8		6.3E-8	1.8E-9
Methyl t-Butyl Ether	1.7E+1	2.0E+5		8.8E-5		2.0E-1		1.7E-5		1.8E-5	5.7E-7
Toluene	9.7E-2	8.7E+4		1.1E-6		2.0E-1		2.2E-7		2.2E-7	1.4E-9
Xylene (mixed isomers)	8.1E-2	9.3E+4		8.7E-7		2.0E-1		1.7E-7		1.7E-7	4.4E-9

NOTE:
ABS = Dermal absorption factor (dim)
AF = Adherance factor (mg/cm^2)
AT = Averaging time (days)
BW = Body weight (kg)
CF = Units conversion factor
ED = Exposure duration (yrs)
EF = Exposure frequencey (days/yr)
ET = Exposure time (hrs/day)
IR = Inhalation rate (m^3/day)
POE = Point of exposure
SA = Skin exposure area (cm^2/day)

Site Name: Former Tosco (former Unocal) SS Site Location: 96 MacArthur Blvd., Oakland, Ca. Completed By: David J. Vossler Date Completed: 11/9/1999 *1 OF 4*

TIER 2 PATHWAY RISK CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS (CHECKED IF PATHWAYS ARE ACTIVE)

Constituents of Concern	(1) EPA Carcinogenic Classification	CARCINOGENIC RISK: (2) Total Carcinogenic Intake Rate (mg/kg/day) On-Site Commercial	(2) Total Carcinogenic Intake Rate (mg/kg/day) Off-Site Residential	(3) Inhalation Slope Factor (mg/kg-day)^-1	(4) Individual COC Risk (2) x (3) On-Site Commercial	(4) Individual COC Risk (2) x (3) Off-Site Residential	TOXIC EFFECTS: (5) Total Toxicant Intake Rate (mg/kg/day) On-Site Commercial	(5) Total Toxicant Intake Rate (mg/kg/day) Off-Site Residential	(6) Inhalation Reference Dose (mg/kg-day)	(7) Individual COC Hazard Quotient (5) / (6) On-Site Commercial	(7) Individual COC Hazard Quotient (5) / (6) Off-Site Residential
Benzene	A	1.7E-7	1.4E-9	2.9E-2	4.9E-9	4.1E-11	4.7E-7	3.3E-9	1.7E-3	2.8E-4	1.9E-6
Ethylbenzene	D						6.3E-8	1.8E-9	2.9E-1	2.2E-7	6.2E-9
Methyl t-Butyl Ether							1.8E-5	5.7E-7	8.6E-1	2.1E-5	6.7E-7
Toluene	D						2.2E-7	1.4E-9	1.1E-1	1.9E-6	1.2E-8
Xylene (mixed isomers)	D						1.7E-7	4.4E-9	2.0E+0	8.7E-8	2.2E-9
Total Pathway Carcinogenic Risk =					**4.9E-9**	**4.1E-11**	***Total Pathway Hazard Index =***			**3.0E-4**	**2.6E-6**

Site Name: Former Tosco (former Unocal) SS # 1871 Site Location: 96 MacArthur Blvd., Oakland, Ca. Completed By: David J. Vossler Date Completed: 11/9/1999

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAY IS ACTIVE)

SUBSURFACE SOILS:

VAPOR INTRUSION TO BUILDINGS

Exposure Concentration

Constituents of Concern	1) Source Medium: Subsurface Soil Conc. (mg/kg)	2) NAF Value (m^3/kg) Receptor: On-Site Commercial	3) Exposure Medium: Indoor Air: POE Conc. (mg/m^3) (1) / (2): On-Site Commercial	4) Exposure Multiplier: (IRxEFxED)/(BWxAT) (m^3/kg-day): On-Site Commercial	5) Average Daily Intake Rate: (mg/kg-day) (3) X (4): On-Site Commercial
Benzene	6.4E-2	4.2E+3	1.5E-5	7.0E-2	1.1E-6
Ethylbenzene	3.5E-2	4.2E+3	8.3E-6	2.0E-1	1.6E-6
Methyl t-Butyl Ether	1.1E+1	4.2E+3	2.7E-3	2.0E-1	5.2E-4
Toluene	2.7E-2	4.2E+3	6.5E-6	2.0E-1	1.3E-6
Xylene (mixed isomers)	8.7E-2	4.2E+3	2.1E-5	2.0E-1	4.1E-6

NOTE: ABS = Dermal absorption factor (dim); AF = Adherance factor (mg/cm^2); AT = Averaging time (days); BW = Body weight (kg); CF = Units conversion factor; ED = Exposure duration (yrs); EF = Exposure frequency (days/yr); ET = Exposure time (hrs/day); IR = Inhalation rate (m^3/day); POE = Point of exposure; SA = Skin exposure area (cm^2/day)

Site Name: Former Tosco (former Unocal) SS # 1871 Site Location: 96 MacArthur Blvd., Oakland, Completed By: David J. Vossler Date Completed: 11/9/1999

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAY IS ACTIVE)

GROUNDWATER:

VAPOR INTRUSION TO BUILDINGS

Constituents of Concern	Exposure Concentration 1) Source Medium: Groundwater Conc. (mg/L)	2) NAF Value (m^3/L) Receptor: On-Site Commercial	3) Exposure Medium: Indoor Air: POE Conc. (mg/m^3) (1) / (2): On-Site Commercial	4) Exposure Multiplier (IRxEFxED)/(BWxAT) (m^3/kg-day): On-Site Commercial	5) Average Daily Intake Rate (mg/kg-day) (3) X (4): On-Site Commercial	TOTAL PATHWAY INTAKE (mg/kg-day) (Sum intake values from subsurface & groundwater routes.): On-Site Commercial
Benzene	2.1E-1	6.7E+2	3.1E-4	7.0E-2	2.2E-5	2.3E-5
Ethylbenzene	2.6E-2	5.7E+2	4.6E-5	2.0E-1	8.9E-6	1.1E-5
Methyl t-Butyl Ether	1.7E+1	6.5E+3	2.7E-3	2.0E-1	5.2E-4	1.0E-3
Toluene	9.7E-2	6.3E+2	1.5E-4	2.0E-1	3.0E-5	3.1E-5
Xylene (mixed isomers)	8.1E-2	6.6E+2	1.2E-4	2.0E-1	2.4E-5	2.8E-5

NOTE: ABS = Dermal absorption factor (dim); AF = Adherance factor (mg/cm^2); AT = Averaging time (days); BW = Body weight (kg); CF = Units conversion factor; ED = Exposure duration (yrs); EF = Exposure frequencey (days/yr); ET = Exposure time (hrs/day); IR = Inhalation rate (m^3/day); POE = Point of exposure; SA = Skin exposure area (cm^2/day)

Site Name: Former Tosco (former Unocal) SS Site Location: 96 MacArthur Blvd., Oakland, Ca. Completed By: David J. Vossler Date Completed: 11/9/1999 *2 OF 4*

TIER 2 PATHWAY RISK CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAYS ARE ACTIVE)

Constituents of Concern	(1) EPA Carcinogenic Classification	CARCINOGENIC RISK: (2) Total Carcinogenic Intake Rate (mg/kg/day) On-Site	Commercial	(3) Inhalation Slope Factor (mg/kg-day)^-1	(4) Individual COC Risk (2) x (3) On-Site	Commercial	TOXIC EFFECTS: (5) Total Toxicant Intake Rate (mg/kg/day) On-Site	Commercial	(6) Inhalation Reference Dose (mg/kg-day)	(7) Individual COC Hazard Quotient (5) / (6) On-Site	Commercial
Benzene	A		2.3E-5	2.9E-2		6.6E-7		6.4E-5	1.7E-3		3.7E-2
Ethylbenzene	D							1.1E-5	2.9E-1		3.7E-5
Methyl t-Butyl Ether								1.0E-3	8.6E-1		1.2E-3
Toluene	D							3.1E-5	1.1E-1		2.8E-4
Xylene (mixed isomers)	D							2.8E-5	2.0E+0		1.4E-5

Total Pathway Carcinogenic Risk = 0.0E+0 6.6E-7

Total Pathway Hazard Index = 0.0E+0 3.9E-2

RBCA SITE ASSESSMENT | **Tier 2 Worksheet 8.3**

Site Name: Former Tosco (former Unocal) SS # 1871 — Completed By: David J. Vossler
Site Location: 96 MacArthur Blvd., Oakland, Ca. — Date Completed: 11/9/1999

TIER 2 BASELINE RISK SUMMARY TABLE

	BASELINE CARCINOGENIC RISK					BASELINE TOXIC EFFECTS				
	Individual COC Risk		Cumulative COC Risk		Risk Limit(s) Exceeded?	Hazard Quotient		Hazard Index		Toxicity Limit(s) Exceeded?
EXPOSURE PATHWAY	Maximum Value	Target Risk	Total Value	Target Risk		Maximum Value	Applicable Limit	Total Value	Applicable Limit	
OUTDOOR AIR EXPOSURE PATHWAYS										
Complete:	4.9E-9	1.0E-6	4.9E-9	N/A	☐	2.8E-4	1.0E+0	3.0E-4	N/A	☐
INDOOR AIR EXPOSURE PATHWAYS										
Complete:	6.6E-7	1.0E-6	6.6E-7	N/A	☐	3.7E-2	1.0E+0	3.9E-2	N/A	☐
SOIL EXPOSURE PATHWAYS										
Complete:	NC	1.0E-6	NC	N/A	■	NC	1.0E+0	NC	N/A	■
GROUNDWATER EXPOSURE PATHWAYS										
Complete:	NC	1.0E-6	NC	N/A	■	NC	1.0E+0	NC	N/A	■
CRITICAL EXPOSURE PATHWAY (Select Maximum Values From Complete Pathways)										
	6.6E-7	1.0E-6	6.6E-7	N/A	☐	3.7E-2	1.0E+0	3.9E-2	N/A	☐

RBCA SITE ASSESSMENT | **Tier 2 Worksheet 9.2**

Site Name: Former Tosco (former Unocal) SS # 1871
Site Location: 96 MacArthur Blvd., Oakland, Ca.

Completed By: David J. Vossler
Date Completed: 11/9/1999

SUBSURFACE SOIL SSTL VALUES (> 3.3 FT BGS)

Target Risk (Class A & B) 1.0E-6
Target Risk (Class C) 1.0E-5
Target Hazard Quotient 1.0E+0

☐ MCL exposure limit?
☐ PEL exposure limit?

Calculation Option: 2
(Two-directional vert. dispersion)

SSTL Results For Complete Exposure Pathways ("x" if Complete)

CONSTITUENTS OF CONCERN		Representative Concentration	Soil Leaching to Groundwater			X	Soil Volatilization to Indoor Air	X	Soil Volatilization to Outdoor Air		Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	Name	(mg/kg)	Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)		Residential: (on-site)		Residential: 20 feet	Commercial: (on-site)	(mg/kg)	"■" If yes	Only if "yes" left
71-43-2	Benzene	6.4E-2	NA	NA	NA		NA		2.1E+0	>Res	>Res	2.1E+0	☐	<1
100-41-4	Ethylbenzene	3.5E-2	NA	NA	NA		NA		>Res	>Res	>Res	>Res	☐	<1
1634-04-4	Methyl t-Butyl Ether	1.1E+1	NA	NA	NA		NA		>Res	>Res	>Res	>Res	☐	<1
108-88-3	Toluene	2.7E-2	NA	NA	NA		NA		>Res	>Res	>Res	>Res	☐	<1
1330-20-7	Xylene (mixed isomers)	8.7E-2	NA	NA	NA		NA		>Res	>Res	>Res	>Res	☐	<1

>Res indicates risk-based target concentration greater than constituent residual saturation value

Software: GSI RBCA Spreadsheet
Version: 1.0.1

Serial: G-225-ZRX-486

RBCA SITE ASSESSMENT

Tier 2 Worksheet 9.3

Site Name: Former Tosco (former Unocal) SS # 1871
Site Location: 96 MacArthur Blvd., Oakland, Ca.

Completed By: David J. Vossler
Date Completed: 11/9/1999

GROUNDWATER SSTL VALUES

Target Risk (Class A & B) 1.0E-6
Target Risk (Class C) 1.0E-5
Target Hazard Quotient 1.0E+0

☐ MCL exposure limit?
☐ PEL exposure limit?

Calculation Option: 2
(Two-directional vert. dispersion)

SSTL Results For Complete Exposure Pathways ("x" If Complete)

CONSTITUENTS OF CONCERN		Representative Concentration	Groundwater Ingestion			X Groundwater Volatilization to Indoor Air		X Groundwater Volatilization to Outdoor Air		Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	Name	(mg/L)	Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)	Residential: (on-site)	Commercial: (on-site)	Residential (on-site)	Commercial: (on-site)	(mg/L	"■" If yes	Only if "yes" left
71-43-2	Benzene	2.1E-1	NA	NA	NA	NA	3.3E-1	NA	4.3E+1	3.3E-1	☐	<1
100-41-4	Ethylbenzene	2.6E-2	NA	NA	NA	NA	>Sol	NA	>Sol	>Sol	☐	<1
1634-04-4	Methyl t-Butyl Ether	1.7E+1	NA	NA	NA	NA	2.9E+4	NA	>Sol	2.9E+4	☐	<1
108-88-3	Toluene	9.7E-2	NA	NA	NA	NA	3.7E+2	NA	>Sol	3.7E+2	☐	<1
1330-20-7	Xylene (mixed isomers)	8.1E-2	NA	NA	NA	NA	>Sol	NA	>Sol	>Sol	☐	<1

>Sol indicates risk-based target concentration greater than constituent solubility

Software: GSI RBCA Spreadsheet
Version: 1.0.1

Serial: G-225-ZRX-486

ATTACHMENT 2

Historical Data Backup

Table 1

Groundwater Monitoring Data and Analytical Results

Tosco (Former Unocal) Service Station #1871

96 MacArthur Boulevard

Oakland, California

Well ID/ TOC*	Date	DTW (ft.)	GWE (msl)	TPH(G) (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
MW-1	11/03/92	--	--	260,000	2,300	4,600	3,700	17,000	--
	01/25/93	--	--	120,000	2,100	4,600	4,900	22,000	--
81.18	04/29/93	13.71	67.47	100,000	850	2,000	4,300	19,000	--
	07/16/93	14.51	66.67	29,000	590	560	980	4,200	--
	10/19/93	15.20	65.98	67,000	1,400	2,600	2,900	5,000	--
	01/20/94	15.17	66.01	92,000	1,200	3,000	3,400	17,000	--
	04/13/94	14.44	66.74	51,000	1,000	2,600	3,200	15,000	--
	07/13/94	14.88	66.30	35,000	550	150	1,400	5,700	--
	10/10/94	15.55	65.63	52,000	1,000	810	3,300	12,000	--
	01/10/95	12.44	68.74	810	16	18	59	250	--
	04/17/95	12.68	68.50	48,000	880	530	2,500	11,000	--
	07/24/95	13.97	67.21	48,000	1,500	420	2,700	9,700	--
	10/23/95	14.85	66.33	47,000	780	210	2,100	11,000	270
	01/18/96	14.21	66.97	30,000	1,500	500	3,500	13,000	2,400
86.24	04/18/96	13.40	72.84	66,000	2,700	2,200	3,100	13,000	57,000
	07/24/96	14.15	72.09	5,600	2,100	ND	160	160	24,000
	10/24/96	14.85	71.39	110,000	7,500	8,000	3,300	14,000	58,000
	01/28/97	11.25	74.99	94,000	7,700	19,000	3,100	15,000	120,000
	07/29/97	14.67	71.57	ND	ND	ND	ND	ND	70,000
	01/14/98	12.27	73.97	85,000	6,100	10,000	3,000	17,000	110,000
	07/01/98	14.32	71.92	110,000	8,700	12,000	2,700	15,000	110,000
	06/18/99	**13.93**	**72.31**	**49,000**	**6,900**	**6,500**	**380**	**12,000**	**72,000/47,000[4]**
MW-2	11/03/92	--	--	140	2.2	ND	ND	2.0	--
	01/25/93	--	--	2,100	56	1.1	90	140	--
76.61	04/29/93	9.73	66.88	1,500	290	ND	33	11	--
	07/16/93	10.17	66.44	510[1]	17	0.60	3.2	2.5	--
	10/19/93	11.18	65.43	670	24	1.1	7.7	23	--
	01/20/94	11.12	65.49	820	97	ND	12	ND	--
	04/13/94	10.12	66.49	550	71	ND	5.1	1.3	--
	07/13/94	10.86	65.75	2,000	490	ND	17	13	--
	10/10/94	11.48	65.13	2,300	340	ND	25	ND	--
	01/10/95	8.71	67.90	850	3.8	ND	8.5	1.3	--
	04/17/95	8.90	67.71	1,300	4.7	ND	8.3	1.2	--

Table 1

Groundwater Monitoring Data and Analytical Results

Tosco (Former Unocal) Service Station #1871

96 MacArthur Boulevard

Oakland, California

Well ID/ TOC*	Date	DTW (ft.)	GWE (msl)	TPH(G) (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
MW-2	07/24/95	9.94	66.67	960	20	ND	4.2	6.2	--
(cont)	10/23/95	10.70	65.91	ND	ND	ND	ND	ND	19
	01/18/96	10.11	66.50	900	300	86	7.6	18	4,300
81.66	04/18/96	9.27	72.39	18,000	3,600	680	890	4,100	19,000
	07/24/96	10.02	71.64	100,000	13,000	21,000	2,700	16,000	120,000
	10/24/96	10.78	70.88	800	110	17	11	20	20,000
	01/28/97	7.70	73.96	45,000	2,400	2,900	2,000	7,600	29,000
	07/29/97	10.28	71.38	ND	1.2	0.72	0.63	0.62	17,000
	01/14/98	8.63	73.03	14,000	1,000	150	790	3,300	23,000
	07/01/98	9.53	72.13	2,700	100	ND[3]	180	78	7,100
	06/18/99	**DESTROYED**	--	--	--	--	--	--	--
MW-3	11/03/92	--	--	2,100	120	15	38	200	--
	01/25/93	--	--	2,300	80	1	55	52	-
77.48	04/29/93	11.37	66.11	4,500	1,700	ND	200	140	--
	07/16/93	12.09	65.39	4,000[1]	1,100	28	52	70	--
	10/19/93	12.69	64.79	3,800	42	ND	50	56	--
	01/20/94	12.65	64.83	4,200	11	ND	21	15	--
	04/13/94	12.02	65.46	4,200	210	ND	36	53	--
	07/13/94	12.46	65.02	1,800[2]	16	16	ND	21	--
	10/10/94	12.98	64.50	4,300	11	ND	12	ND	--
	01/10/95	10.42	67.06	310	4.6	ND	3.5	2.1	--
	04/17/95	10.42	67.06	7,800	ND	4.6	300	450	--
	07/24/95	11.76	65.72	3,200	170	ND	22	16	--
	10/23/95	12.50	64.98	3,900	55	ND	19	11	4,500
	01/18/96	11.79	65.69	2,200	270	33	26	18	5,500
82.55	04/18/96	11.30	71.25	6,000	1,800	ND	100	230	48,000
	07/24/96	12.17	70.38	ND	2,500	ND	ND	ND	71,000
	10/24/96	12.65	69.90	3,800	660	ND	15	ND	65,000
	01/28/97	9.50	73.05	4,400	250	13	87	47	54,000
	07/29/97	11.99	70.56	ND	3,500	ND	220	ND	75,000
	01/14/98	10.30	72.25	ND[3]	430	ND[3]	100	380	37,000
	07/01/98	11.70	70.85	ND[3]	430	ND[3]	ND[3]	ND[3]	45,000
	06/18/99	**DESTROYED**	--	--	--	--	--	--	--

Table 1

Groundwater Monitoring Data and Analytical Results

Tosco (Former Unocal) Service Station #1871

96 MacArthur Boulevard

Oakland, California

Well ID/ TOC*	Date	DTW (ft.)	GWE (msl)	TPH(G) (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
MW-4									
82.04	04/18/96	9.83	72.21	ND	630	ND	ND	ND	18,000
	07/24/96	10.47	71.57	ND	ND	ND	ND	5.2	3,900
	10/24/96	11.14	70.90	ND	ND	ND	ND	ND	6,300
	01/28/97	7.94	74.10	1,200	490	ND	17	6.8	16,000
	07/29/97	10.86	71.18	50	1.5	0.61	0.73	0.78	15,000
	01/14/98	8.73	73.31	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]	5,200
	07/01/98	10.51	71.53	ND	ND	ND	ND	ND	640
	06/18/99	**DESTROYED**	--	--	--	--	--	--	--
MW-5									
81.80	04/18/96	9.65	72.15	31,000	5,500	1,400	1,700	8,100	66,000
	07/24/96	10.80	71.00	32,000	6,400	ND	1,600	6,100	120,000
	10/24/96	11.40	70.40	17,000	6,900	ND	970	130	84,000
	01/28/97	7.76	74.04	19,000	6,100	62	82	310	160,000
	07/29/97	11.58	70.22	ND	ND	ND	ND	ND	71,000
	01/14/98	9.08	72.72	ND[3]	3,600	ND[3]	ND[3]	ND[3]	80,000
	07/01/98	11.25	70.55	6,400	2,100	21	120	330	61,000
	06/18/99	**DESTROYED**	--	--	--	--	--	--	--
MW-6									
78.91	**06/18/99**	**9.30**	**69.61**	**2,100**	**21**	**29**	**ND[3]**	**47**	**97,000/71,000[4]**
MW-7									
79.92	**06/18/99**	**8.70**	**71.22**	**ND**	**ND**	**ND**	**ND**	**ND**	**16,000/13,000[4]**
MW-8									
80.96	**06/18/99**	**9.10**	**71.86**	**ND**	**ND**	**ND**	**ND**	**ND**	**290/160[4]**

Table 1

Groundwater Monitoring Data and Analytical Results

Tosco (Former Unocal) Service Station #1871

96 MacArthur Boulevard

Oakland, California

Well ID/ TOC*	Date	DTW *(ft.)*	GWE *(msl)*	TPH(G) *(ppb)*	B *(ppb)*	T *(ppb)*	E *(ppb)*	X *(ppb)*	MTBE *(ppb)*
Trip Blank									
TB-LB	01/14/98	--	--	ND	ND	ND	ND	ND	ND
	07/01/98	--	--	ND	ND	ND	ND	ND	ND
	06/18/99	**--**	**--**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**

Table 1

Groundwater Monitoring Data and Analytical Results

Tosco (Former Unocal) Service Station #1871

96 MacArthur Boulevard

Oakland, California

EXPLANATIONS:

Groundwater monitoring data and laboratory analytical results prior to January 14, 1998, were compiled from reports prepared by MPDS Services, Inc.

TOC = Top of Casing elevation
DTW = Depth to Water
(ft.) = Feet
GWE = Groundwater Elevation
(msl) = Referenced relative to 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 were re-surveyed by Kier & Wright in May, 1996, per City of Oakland Benchmark No. 2310, a cut square in concrete curb at mid point of return at the northeast corner of El Dorado and Fairmont Street. (Elevation = 77.53 feet msl).

1 Laboratory report indicates the presence of discrete peaks not indicative of gasoline.
2 Laboratory report indicates the hydrocarbons detected appeared to be a gasoline and non-gasoline mixture.
3 Detection limit raised. Refer to analytical results.
4 MTBE by EPA Method 8260.

Table 2

Groundwater Analytical Results

Tosco (Former Unocal) Service Station #1871
96 MacArthur Boulevard
Oakland, California

Well ID	Date	TPH(D) *(ppb)*	TOG *(ppb)*	HVOC *(ppb)*	SVOC *(ppb)*
MW-1	06/18/99	--	--	ND	--
MW-4	04/18/96	110[1]	ND	ND	--
	07/24/96	ND	ND	ND	ND
	10/24/96	ND	ND	ND	ND[2]
	01/28/97	210[3]	ND	ND	ND[4]
	07/29/97	ND	ND	ND	ND
	01/14/98	ND	ND	ND	ND
	07/01/98	ND	ND	ND	ND
	06/18/99	DESTROYED	--	--	--
MW-6	06/18/99	--	--	ND	--
MW-7	06/18/99	--	--	ND	--
MW-8	06/18/99	--	--	ND	ND[5]

EXPLANATIONS:

Groundwater analytical results prior to January 14, 1998, were compiled from reports prepared by MPDS Services, Inc.

TPH(D) = Total Petroleum Hydrocarbons as Diesel
TOG = Total Oil and Grease
HVOC = Halogenated Volatile Organic Compounds by EPA Method 8010
SVOC = Semi-Volatile Organic Compounds by EPA Method 8270
ppb = Parts per billion
-- = Not Analyzed
ND = Not Detected

1 Laboratory report indicates the hydrocarbons detected did not appear to contain diesel.
2 Bis (2-ethylhexyl) phthalate was detected at a concentration of 14 ppb.
3 Laboratory report indicates the hydrocarbons detected appeared to be a diesel and non-diesel mixture.
4 Naphthalene was detected at a concentration of 17 ppb.
5 All SVOCs were ND except for Bis(2-ethylhexy)phthalate at 11 ppb.

All EPA Method 8010 and 8270 constituents were ND, unless noted.

Table 3

Groundwater Analytical Results - Oxygenate Compounds

Tosco (Former Unocal) Service Station #1871
96 MacArthur Boulevard
Oakland, California

Well ID	Date	Ethanol (ppb)	TBA (ppb)	MTBE (ppb)	DIPE (ppb)	ETBE (ppb)	TAME (ppb)	EDB (ppb)	1,2-DCA (ppb)
MW-1	06/18/99	ND[1]	ND[1]	47,000	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]
MW-6	06/18/99	ND[1]	ND[1]	71,000	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]
MW-7	06/18/99	ND[1]	ND[1]	13,000	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]
MW-8	06/18/99	ND[1]	ND[1]	160	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]

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
-- = Not Analyzed
ND = Not Detected

ANALYTICAL METHOD:

EPA Method 8260 for Oxygenate Compounds

[1] Detection limit raised. Refer to analytical results.

TABLE 4 - GRAB GROUND WATER SAMPLE CHEMICAL ANALYTICAL DATA
Tosco 76 Branded Facility No. 1871
96 MacArthur Avenue
Oakland, California

Sample Location and ID	Sample Depth (feet)	Date Collected	TPHg (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl-benzene (ppm)	Xylenes (ppm)	MTBE by 8020/8260 (ppm)
Boring B-4								
B-4 (10.5)	10.5	6/1/99	ND	ND	ND	ND	ND	ND/ND
Boring B-5								
B-5 (11.35)	11.35	6/1/99	ND	ND	ND	ND	ND	ND/ND
Boring B-6								
B-6 (11.7)	11.7	6/1/99	ND	0.54	ND	ND	ND	ND/ND
Boring B-7								
B-7 (10)	10	6/1/99	ND	ND	ND	ND	ND	2,300/3,000
Boring B-8								
B-8 (8.5)	8.5	6/1/99	ND	ND	ND	ND	ND	ND/ND
Boring B-9								
B-9 (13.5)	13.5	6/1/99	ND	ND	ND	ND	ND	ND/ND
Boring B-10								
B-10 (15.2)	15.2	6/3/99	95,000	10,000	14,000	3,900	11,000	220,000/270,000
Boring B-11								
B-11 (16.2)	16.2	6/3/99	ND	ND	ND	ND	ND	14,000/15,000
Boring B-12								
B-12 (19.5)	19.5	6/4/99	ND	ND	ND	ND	ND	ND/ND

EXPLANATION:
feet = feet below ground surface
ppb = parts per billion
ND = nondetectable, NA = not analyzed

ANALYTICAL METHODS:
TPHg = Total Petroleum Hydrocarbons as gasoline according to EPA Method 8015 Modified.
BTEX = Benzene, Toluene, Ethylbenzene, and Xylenes according to EPA Method 8020.
MTBE = Methyl t-Butyl Ether according to EPA Methods 8020/ 8260.

ANALYTICAL LABORATORY:
Sequoia Analytical (ELAP #1210 & #1271)

TABLE 5 - SOIL CHEMICAL ANALYTICAL DATA
Tosco 76 Branded Facility No. 1871
96 MacArthur Avenue
Oakland, California

Sample Location and ID	Sample Depth (feet)	Date Collected	TPHg (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl-benzene (ppm)	Xylenes (ppm)	MTBE by 8020 (ppm)
Boring B-4								
B-4 (9)	9	6/1/99	ND	ND	ND	ND	ND	ND
Boring B-5								
B-5 (10.5)	10.5	6/1/99	ND	ND	ND	ND	ND	ND
Boring B-6								
B-6 (11.4)	11.4	6/1/99	ND	ND	ND	ND	ND	ND
Boring B-7								
B-7 (9.5)	9.5	6/1/99	ND	ND	ND	ND	ND	ND
Boring B-8								
B-8 (8)	8	6/1/99	ND	0.0066	0.0096	ND	ND	0.053
Boring B-9								
B-9 (13)	13	6/1/99	ND	ND	0.0075	ND	0.011	0.062
Boring B-10								
B-10 (14)	14	6/1/99	170	0.24	1.1	1.9	14	1
Boring B-11								
B-11 (14)	14	6/3/99	ND	0.0058	0.015	ND	0.015	1.1
B-11 (29)	29	6/3/99	ND	0.014	0.046	ND	0.018	0.25
Boring B-12								
B-12 (11.5)	11.5	6/4/99	ND	ND	ND	ND	ND	ND
B-12 (25.5)	25.5	6/4/99	ND	ND	ND	ND	ND	ND
Boring MW-6								
MW-6 (11)	11	6/4/99	210	1.6	7.3	6.4	25	3.3
MW-6 (15.5)	15.5	6/4/99	1.1	0.014	0.048	0.029	0.12	0.31
MW-6 (20.5)	20.5	6/4/99	ND	ND	ND	ND	ND	0.062
MW-6 (24)	24	6/4/99	ND	ND	ND	ND	0.017	0.18

TABLE 5 - SOIL CHEMICAL ANALYTICAL DATA - (Continued)
Tosco 76 Branded Facility No. 1871
96 MacArthur Avenue
Oakland, California

Sample Location and ID	Sample Depth (feet)	Date Collected	TPHg (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl-benzene (ppm)	Xylenes (ppm)	MTBE by 8020 (ppm)
Boring MW-7								
MW-7 (10.5)	10.5	6/10/99	ND	ND	ND	ND	ND	0.21
Boring MW-8								
MW-8 (10.5)	10.5	6/4/99	ND	ND	ND	ND	ND	0.18
Comp S1*		6/4/99	ND	ND	ND	ND	0.019	0.27

EXPLANATION:
feet = feet below ground surface
ppm = parts per million
ND = nondetectable, NA = not analyzed
* Total lead was detected at a concentration of 7.6 ppm.

ANALYTICAL METHODS:
TPHg = Total Petroleum Hydrocarbons as gasoline according to EPA Method 8015 Modified.
BTEX = Benzene, Toluene, Ethylbenzene, and Xylenes according to EPA Method 8020.
MTBE = Methyl t-Butyl Ether according to EPA Methods 8020/ 8260.

ANALYTICAL LABORATORY:
Sequoia Analytical (ELAP #1271)

ATTACHMENT 3

Tier 1 Look up Table for MtBE

TABLE RBSL-1
EXAMPLE TIER 1 LOOK UP TABLE
PRELIMINARY REMEDIATION GOALS OR RISK-BASED SCREENING LEVELS

Exposure Pathway	Receptor/ Scenario	Target Level	Methyl t-Butyl Ether
Soil PRG (mg/kg)	Residential	TR = $1x10^{-6}$	19
		THQ = 1	510
	Commercial/ Industrial	TR = $1x10^{-6}$	42
		THQ = 1	7300
Ambient Air PRG ($\mu g/m^3$)	Residential	TR = $1x10^{-6}$	3.9
		THQ = 1	3100
	Commercial/ Industrial	TR = $1x10^{-6}$	8.4
		THQ = 1	4400
Soil RBSL - Volatilization to Ambient Air (mg/kg)	Residential	TR = $1x10^{-6}$	420
		THQ = 1	$>C_{sat}$ [1]
	Commercial/ Industrial	TR = $1x10^{-6}$	590
		THQ = 1	$>C_{sat}$
Soil RBSL - Volatilization to Indoor Air (mg/kg)	Residential	TR = $1x10^{-6}$	0.52
		THQ = 1	330
	Commercial/ Industrial	TR = $1x10^{-6}$	1.3
		THQ = 1	700
Groundwater RBSL – Volatilization to Ambient Air (mg/L)	Residential	TR = $1x10^{-6}$	330
		THQ = 1	$>S$ [2]
	Commercial/ Industrial	TR = $1x10^{-6}$	560
		THQ = 1	>S
Groundwater RBSL – Volatilization to Indoor Air (mg/L)	Residential	TR = $1x10^{-6}$	2.2
		THQ = 1	1400
	Commercial/ Industrial	TR = $1x10^{-6}$	7.0
		THQ = 1	3600
Soil RBSL - Leaching to Groundwater (mg/kg)	Residential	TR = $1x10^{-6}$	0.12
		THQ = 1	0.84
	Commercial/ Industrial	TR = $1x10^{-6}$	0.39
		THQ = 1	2.4
	NA [3]	WQO = 0.005 mg/L	0.012

1. Greater than theoretical soil saturation concentration.
2. Greater than solubility in water.
3. Not applicable