GETTLER-RYAN INC.

1120

9 MAR 8 AM 9:15

April 6, 1999

Ms. Juliet Shin
Alameda County Health Services Agency
Division of Environmental Protection
1131 Harbor Bay Parkway, 2nd Floor
Alameda, California 94502

Subject: Additional Risk Based Corrective Action Evaluations
Former Tosco Service Station No. 1871
96 MacArthur Boulevard, Oakland, California

Ms. Shin:

At the request of the Alameda County Health Services Agency (ACHSA), Gettler-Ryan Inc. (GR) has prepared this letter and attachments to document additional Risk-Based Corrective Action (RBCA) evaluations. During our telephone conversation on March 16, 1999, Ms. Madhulla Logan and you requested that the RBCA evaluation be modified to reflect the ACHSA comments discussed in our telephone conversation regarding the GR RBCA Evaluation dated February 25, 1999.

The first request was to use the soil data, although located in the subsurface (>3 feet below grade), in the surface soils evaluation for the construction worker Risk Based Screening Levels (RBSLs). The soil data used in this evaluation included analytical data from the waste oil and underground storage tank (UST) excavations, and product piping trenches, soil borings EB-1, EB-2 and EB-3, and from monitoring wells MW-1 through MW-5. These samples were collected between 3 and 10 feet below ground surface (bgs). The RBCA evaluation Output Worksheets and associated analytical concentrations used in the evaluation are attached in Attachment 1.

near proposed treatment

The second request was to evaluate the air inhalation potential using soil analytical data from the waste oil excavation, soil borings EB-1 through EB-3 and monitoring well MW-4; and groundwater (grab samples) analytical data from the waste oil excavation, soil borings EB-1 through EB-3, and MW-4 (using an arithmetic mean average concentrations from the last year of data). The RBCA evaluation Output Worksheets and associated data tables with analytical concentrations used in the evaluation are attached in Attachment 2.

(415) 693-1517 fax

6747 Sierra Court, Suite J • Dublin, California 94568 • (925) 551-7555

RBCA Findings

RBSL's for Construction Worker: Modified Evaluation

GR applied the requested soil analytical data for a modified RBCA evaluation in order to establish RBSLs for construction workers. Two Chemicals of Concern (COC) were identified, benzene at a RSBL concentration of 1.1E+2 parts per million (ppm), and Methyl t-Butyl Ether (MtBE) at a RBSL concentration of 2.4E+2 ppm. These calculated RBSLs are higher than the current site conditions (based on the mean concentrations of benzene and MtBE). Worksheet 6.1 lists the RBCA evaluation RBSL's for this modified evaluation.

RBSL's for Air Inhalation (indoor/enclosed space) Modified Data Set

GR applied the requested modified soil and groundwater analytical data set for the RBCA evaluation regarding the air inhalation potential. One exposure pathway, volatilization of groundwater to indoor air, was identified and RBSL's calculated. As shown in Worksheet 6.3 presented in Attachment 2, the COC for this pathway is benzene with a RBSL concentration of 4.6E+2 ppm. The representative concentration of benzene, based on the RBCA modeling program and the given data set is 3.0E-3 ppm, less than the RBSL.

Summary

Based on these two RBCA modified evaluations and the one previously submitted on February 25, 1999, the potential risk at the site is primarily air volatilization from groundwater to indoor air. The RBCA evaluation does illustrate that the representative concentrations are below the calculated RBSLs and therefore do not pose a health risk based on the ASTM E-1739 "Standard Guide for Risk-Based Corrective Action Applied at Petroleum Sites" approved model. The construction worker pathway is also "complete" based on the modified data set (soil analytical data from below 3 feet bgs and the capillary fringe). The site is will be developed into another petroleum fuel storage and dispensing facility. The potential exposure to a construction worker will be minimal and limited to the time that the underground construction is conducted. The construction workers that will be employed should be properly trained and familiar with the exposure to petroleum hydrocarbons and implement appropriate precautionary measures.

The primary and secondary sources of petroleum hydrocarbons have been removed from the site. The analytical data used in this evaluation are conservative and considered to be the worst case scenario. With the removal of the source of hydrocarbons, the residual concentrations should naturally attenuate and continue to decrease any potential risk to the property occupant.

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
Senior Geologist
R.G. No. 5577

REGISTERED GEOLOGIST
STEPHEN J. CARTER
No. 5577
STATE OF CALIFORNIA

Attachments: Attachment 1: RBCA Output/Worksheets-Construction Worker
Attachment 2: RBCA Output/Worksheets-Potential Air Inhalation (Modified Data Set)

Cc: Mr. David B. DeWitt, Tosco Marketing Company
Ms. Barbara Bee, Property Owner

GETTLER-RYAN INC.

January 28, 1999

Ms. Juliet Shin
Alameda County Health Agency
Division of Environmental Protections
1131 Harbor Bay Parkway, 2nd Floor
Alameda, California 94502

Re: Status Report for Former Tosco/76 Products Service Station No. 1871
96 MacArthur Boulevard, Oakland.

Dear Ms. Shin:

This letter is written to update you on the status of planned environmental work to be conducted at the site. In May 1998, all underground tanks and surface improvements were removed from the site. Additional contaminated soil was removed to the limits feasible. Four monitor wells (MW-2 through MW-5) were destroyed for the purposes of anticipated redevelopment of the property, but these wells will be replaced by three ACHCS approved wells in the City of Oakland right-of-way along MacArthur Boulevard. These wells are part of the approved Work Plan, which call for additional off-site wells/geoprobe locations as well as a Risk-Based Corrective Action (RBCA) evaluation of the site.

At the present time, Tosco, through its consultant, Gettler-Ryan, Inc. (GR) is in the process of completing the off-site access process and obtaining encroachment permits for the offsite work. Since this is an unpredictable process, we are requesting an extension of the reporting deadline. At your suggestion, we propose to complete the tasks in phases in the following manner:

- The initial RBCA evaluation to be submitted for your review by February 26, 1999. This evaluation will include several "runs" intended to test the sensitivity of input parameters. Discussion will concentrate on the most likely scenario.
- Installation of the replacement wells and geoprobe test borings in those areas under the jurisdiction of the City of Oakland. At present, the encroachment permit applications have been filed and the fees paid. We are in the process of obtaining the additional required information (Owner's permission, insurance and legal description of property) for the City of Oakland. We anticipate securing this permission within a month, to be followed by the actual well installation and summary report. Target completion date: March 31, 1999.

- Installation of GeoProbe installation in areas administered by California Department of Transportation (CalTrans). Our past experience has shown CalTrans' response to be quite variable. We intend to complete this process and install the necessary wells, Geoprobes and prepare reports within three months. Target completion date: April 30, 1999.

In the event these off-site access processes take longer than planned, we will request your help in expediting the necessary permits. If you have any questions or need further details on the site status, please call me at (415) 893-1515.

Sincerely,
Gettler-Ryan Inc.

David J. Vossler
Project Manager

Cc: Mr. David B. DeWitt, Tosco marketing Company, San Ramon, Ca.

ATTACHMENT 1

Construction Worker: Modified Output files with Associated Analytical Tables

RBCA TIER 1/TIER 2 EVALUATION

Output Table 1

Site Name: Former Tosco (former Unocal) Job Identification: 140165.05
Site Location: 96 MacArthur Blvd., Oakland, CA Date Completed: 11/23/98
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)?	***FALSE***				
gwMCL?	Use MCL as exposure limit in groundwater?	TRUE				

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	TRUE	TRUE
S.v	Volatilization from Subsurface Soils	FALSE	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	TRUE
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)		TRUE		TRUE
S	Inhalation receptor (cm)		TRUE		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)	1	
Tier	RBCA Tier	1	

Surface Parameters	Definition (Units)	Residential	Constrctn
A	Contaminated soil area (cm^2)	***2.8E+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)	***3.4E+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)	***3.4E+02***		
Ls	Depth to top of affected subsurface soil (cm)	***2.7E+02***		
Lsubs	Thickness of affected subsurface soils (cm)	***6.9E+01***		
pH	Soil/groundwater pH	***6.93***		
		capillary	vadose	foundation
phi.w	Volumetric water content	***0.369***	0.13	0.12
phi.a	Volumetric air content	***0.041***	***0.28***	0.26

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	0.01	

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)		
dcz	Vertical dispersion coefficient (cm)		

RBCA CHEMICAL DATABASE

Physical Property Data

CAS Number	Constituent	type	Molecular Weight (g/mole) MW	ref	Diffusion Coefficients in air (cm2/s) Dair	ref	in water (cm2/s) Dwat	ref	log (Koc) or log(Kd) (@ 20 - 25 C) log(l/kg)	ref	Henry's Law Constant (@ 20 - 25 C) (atm-m3) mol	(unitless)	ref	Vapor Pressure (@ 20 - 25 C) (mm Hg)	ref	Solubility (@ 20 - 25 C) (mg/L)	ref	acid pKa	base pKb	ref
71-43-2	Benzene	A	78.1	5	9.30E-02	A	1.10E-05	A	1.58	A	5.29E-03	2.20E-01	A	9.52E+01	4	1.75E+03	A			
100-41-4	Ethylbenzene	A	106.2	5	7.60E-02	A	8.50E-06	A	1.98	A	7.69E-03	3.20E-01	A	1.00E+01	4	1.52E+02	5			
1634-04-4	Methyl t-Butyl Ether	O	88.146	5	7.92E-02	6	9.41E-05	7	1.08	A	5.77E-04	2.40E-02		2.49E+02		4.80E+04	A			
108-88-3	Toluene	A	92.4	5	8.50E-02	A	9.40E-06	A	2.13	A	6.25E-03	2.60E-01	A	3.00E+01	4	5.15E+02	29			
1330-20-7	Xylene (mixed isomers)	A	106.2	5	7.20E-02	A	8.50E-06	A	2.38	A	6.97E-03	2.90E-01	A	7.00E+00	4	1.98E+02	5			

Site Name: Former Tosco (former Unocal) SS Site Location: 96 MacArthur Blvd., Oakl Completed By: David J. Vossler Date Completed: 11/23/1998

Software version: 1.0.1

RBCA CHEMICAL DATABASE

Toxicity Data

CAS Number	Constituent	Reference Dose (mg/kg/day) Oral RfD_oral	ref	Inhalation RfD_inhal	ref	Slope Factors 1/(mg/kg/day) Oral SF_oral	ref	Inhalation SF_inhal	ref	EPA Weight of Evidence	Is Constituent Carcinogenic ?
71-43-2	Benzene	-		1.70E-03	R	2.90E-02	A	2.90E-02	A	A	TRUE
100-41-4	Ethylbenzene	1.00E-01	A	2.86E-01	A	-		-		D	FALSE
1634-04-4	Methyl t-Butyl Ether	5.00E-03	R	8.57E-01	R	-		-			FALSE
108-88-3	Toluene	2.00E-01	A,R	1.14E-01	A,R	-		-		D	FALSE
1330-20-7	Xylene (mixed isomers)	2.00E+00	A,R	2.00E+00	A	-		-		D	FALSE

Site Name: Former Tosco (former UnocaSite Location: 96 MacArthur Blvd., OaCompleted By: David J. Vossler Date Completed: 11/23/1998

Software version: 1.0.1

RBCA CHEMICAL DATABASE

Miscellaneous Chemical Data

CAS Number	Constituent	Maximum Contaminant Level MCL (mg/L)	Maximum Contaminant Level reference	Permissible Exposure Limit PEL/TLV (mg/m3)	ref	Relative Absorption Factors Oral	Relative Absorption Factors Dermal	Detection Limits Groundwater (mg/L)	ref	Detection Limits Soil (mg/kg)	ref	Half Life (First-Order Decay) (days) Saturated	Half Life (First-Order Decay) (days) Unsaturated	ref
71-43-2	Benzene	5.00E-03	52 FR 25690	3.20E+00	OSHA	1	0.5	0.002	C	0.005	S	720	720	H
100-41-4	Ethylbenzene	7.00E-01	56 FR 3526 (30 Jan 91)	4.34E+02	ACGIH	1	0.5	0.002	C	0.005	S	228	228	H
1634-04-4	Methyl t-Butyl Ether			1.44E+02	ACGIH	1	0.5					360	180	H
108-88-3	Toluene	1.00E+00	56 FR 3526 (30 Jan 91)	1.47E+02	ACGIH	1	0.5	0.002	C	0.005	S	28	28	H
1330-20-7	Xylene (mixed isomers)	1.00E+01	56 FR 3526 (30 Jan 91)	4.34E+02	ACGIH	1	0.5	0.005	C	0.005	S	360	360	H

Site Name: Former Tosco (former UnocaSite Location: 96 MacArthur Blvd., Oakland, Ca. Completed By: David J. Vossler Date Completed: 11/23/1998

Software version: 1.0.1

REPRESENTATIVE COC CONCENTRATIONS IN SOURCE MEDIA

(Complete the following table)

CONSTITUENT	Representative COC Concentration					
	in Groundwater		in Surface Soil		in Subsurface Soil	
	value (mg/L)	note	value (mg/kg)	note	value (mg/kg)	note
Benzene	3.4E-3	mean	1.0E-2	mean	1.6E-2	mean
Ethylbenzene	1.7E-3	mean	1.2E-2	mean	1.9E-2	mean
Methyl t-Butyl Ether	8.0E-3	mean	8.3E-1	mean	4.9E+0	mean
Toluene	1.9E-3	mean	1.3E-2	mean	1.8E-2	mean
Xylene (mixed isomers)	2.5E-3	mean	1.6E-2	mean	3.6E-2	mean

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

Completed By: David J. Vossler
Date Completed: 11/23/1998

RBCA SITE ASSESSMENT

EXPOSURE LIMITS IN GROUNDWATER AND AIR

CONSTITUENT	Exposure Limits Applied to Receptors	
	Groundwater (MCL) (mg/L)	Air (Comm. only) (PEL/TLV) (mg/m^3)
Benzene	5.0E-3	3.2E+0
Ethylbenzene	7.0E-1	4.3E+2
Methyl t-Butyl Ether		1.4E+2
Toluene	1.0E+0	1.5E+2
Xylene (mixed isomers)	1.0E+1	4.3E+2

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

Completed By: David J. Vossler
Date Completed: 11/23/1998

Site Name: Former Tosco (formerl Unocal) SS # 1871 Site Location: 96 MacArthur Blvd., Oakland, Ca. Completed By: David J. Vossler Date Completed: 11/23/1998

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

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

SURFACE SOILS: VAPOR AND DUST INHALATION Constituents of Concern	Exposure Concentration 1) Source Medium Surface Soil Conc. (mg/kg)	2) NAF Value (m^3/kg) 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	
Benzene	1.0E-2	3.4E+5		2.9E-8		7.0E-2		2.0E-9	
Ethylbenzene	1.2E-2	3.4E+5		3.5E-8		2.0E-1		6.8E-9	
Methyl t-Butyl Ether	8.3E-1	3.4E+5		2.4E-6		2.0E-1		4.7E-7	
Toluene	1.3E-2	3.4E+5		3.8E-8		2.0E-1		7.4E-9	
Xylene (mixed isomers)	1.6E-2	3.4E+5		4.6E-8		2.0E-1		9.0E-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 # 1871 Site Location: 96 MacArthur Blvd., Oakland, Ca. Completed By: David J. Vossler Date Completed: 11/23/1998

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

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

SUBSURFACE SOILS: VAPOR INHALATION

Constituents of Concern	Exposure Concentration 1) Source Medium: Subsurface Soil Conc. (mg/kg)	2) NAF Value (m^3/kg) 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	
Benzene	1.6E-2	5.0E+5		3.1E-8		7.0E-2		2.2E-9	
Ethylbenzene	1.9E-2	5.0E+5		3.8E-8		2.0E-1		7.4E-9	
Methyl t-Butyl Ether	4.9E+0	5.0E+5		9.7E-6		2.0E-1		1.9E-6	
Toluene	1.8E-2	5.0E+5		3.7E-8		2.0E-1		7.2E-9	
Xylene (mixed isomers)	3.6E-2	5.0E+5		7.3E-8		2.0E-1		1.4E-8	

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: 11/23/1998

TIER 1 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	
Benzene	3.4E-3	8.4E+4		4.0E-8		7.0E-2		2.8E-9		7.0E-9	
Ethylbenzene	1.7E-3	8.2E+4		2.1E-8		2.0E-1		4.2E-9		1.8E-8	
Methyl t-Butyl Ether	8.0E-3	1.7E+5		4.7E-8		2.0E-1		9.2E-9		2.4E-6	
Toluene	1.9E-3	8.4E+4		2.3E-8		2.0E-1		4.4E-9		1.9E-8	
Xylene (mixed isomers)	2.5E-3	9.1E+4		2.8E-8		2.0E-1		5.5E-9		2.9E-8	

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: 11/23/1998

TIER 1 PATHWAY RISK CALCULATION

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

Constituents of Concern	CARCINOGENIC RISK (1) EPA Carcinogenic Classification	(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	7.0E-9		2.9E-2	2.0E-10		2.0E-8		1.7E-3	1.2E-5	
Ethylbenzene	D						1.8E-8		2.9E-1	6.4E-8	
Methyl t-Butyl Ether							2.4E-6		8.6E-1	2.8E-6	
Toluene	D						1.9E-8		1.1E-1	1.7E-7	
Xylene (mixed isomers)	D						2.9E-8		2.0E+0	1.4E-8	

Total Pathway Carcinogenic Risk = 2.0E-10 | 0.0E+0

Total Pathway Hazard Index = 1.5E-5 | 0.0E+0

Site Name: Former Tosco (former Unocal) SS # 1871 Site Location: 96 MacArthur Blvd., Oakland, Ca. Completed By: David J. Vossler Date Completed: 11/23/1998

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

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

SUBSURFACE SOILS:
VAPOR INTRUSION TO BUILDINGS

Constituents of Concern	Exposure Concentration 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	1.6E-2		4.7E+2		3.3E-5		7.0E-2		2.3E-6
Ethylbenzene	1.9E-2		4.7E+2		4.1E-5		2.0E-1		8.0E-6
Methyl t-Butyl Ether	4.9E+0		4.7E+2		1.0E-2		2.0E-1		2.0E-3
Toluene	1.8E-2		4.7E+2		3.9E-5		2.0E-1		7.7E-6
Xylene (mixed isomers)	3.6E-2		4.7E+2		7.8E-5		2.0E-1		1.5E-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 # 1871 Site Location: 96 MacArthur Blvd., Oakland, Completed By: David J. Vossler Date Completed: 11/23/1998

TIER 1 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	3.4E-3	1.4E+2	2.3E-5	7.0E-2	1.6E-6	4.0E-6
Ethylbenzene	1.7E-3	1.3E+2	1.3E-5	2.0E-1	2.6E-6	1.1E-5
Methyl t-Butyl Ether	8.0E-3	8.5E+2	9.4E-6	2.0E-1	1.8E-6	2.0E-3
Toluene	1.9E-3	1.4E+2	1.4E-5	2.0E-1	2.7E-6	1.0E-5
Xylene (mixed isomers)	2.5E-3	1.5E+2	1.7E-5	2.0E-1	3.3E-6	1.9E-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: 11/23/1998

TIER 1 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		4.0E-6	2.9E-2		1.2E-7		1.1E-5	1.7E-3		6.6E-3
Ethylbenzene	D							1.1E-5	2.9E-1		3.7E-5
Methyl t-Butyl Ether								2.0E-3	8.6E-1		2.4E-3
Toluene	D							1.0E-5	1.1E-1		9.1E-5
Xylene (mixed isomers)	D							1.9E-5	2.0E+0		9.3E-6
Total Pathway Carcinogenic Risk =					0.0E+0	1.2E-7	***Total Pathway Hazard Index =***			0.0E+0	9.1E-3

Site Name: Former Tosco (forme Site Location: 96 MacArthur Blvd., Oakland, Ca. Completed By: David J. Vc Date Completed: 11/23/1998

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

SOIL EXPOSURE PATHWAYS ☐ (CHECKED IF PATHWAY IS ACTIVE)

SURFACE SOILS OR SEDIMENTS:

DERMAL CONTACT

Constituents of Concern	Exposure Concentration 1) Source Medium: Surface Soil Conc. (mg/kg)	2) Exposure Multiplier (SAxAFxABSxCFxEFxED)/(BWxAT) (kg/kg-day): On-Site Residential	2) Exposure Multiplier: On-Site Commercial	3) Average Daily Intake Rate (mg/kg-day) (1) x (2): On-Site Residential	3) Average Daily Intake Rate: On-Site Commercial
Benzene	1.0E-2				
Ethylbenzene	1.2E-2				
Methyl t-Butyl Ether	8.3E-1				
Toluene	1.3E-2				
Xylene (mixed isomers)	1.6E-2				

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 = Intake rate (mg/day); POE = Point of exposure; SA = Skin exposure area (cm^2/day)

Site Name: Former Tosco (former U Site Location: 96 MacArthur Blvd., Oakland Completed By: David J. Vossler Date Completed: 11/23/1998

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

SOIL EXPOSURE PATHWAYS ☒ (CHECKED IF PATHWAY IS ACTIVE)

SURFACE SOILS OR SEDIMENTS:

INGESTION

Constituents of Concern	Exposure Concentration: 1) Source Medium — Surface Soil Conc. (mg/kg)	2) Exposure Multiplier (IRxCFxEFxED)/(BWxAT) (kg/kg-day) — On-Site Residential	2) Exposure Multiplier — On-Site Commercial	3) Average Daily Intake Rate (mg/kg-day) (1) x (2) — On-Site Residential	3) Average Daily Intake Rate — On-Site Commercial	TOTAL PATHWAY INTAKE (mg/kg-day) (Sum intake values from dermal & ingestion routes.) — On-Site Residential	TOTAL PATHWAY INTAKE — On-Site Commercial
Benzene	1.0E-2						
Ethylbenzene	1.2E-2						
Methyl t-Butyl Ether	8.3E-1						
Toluene	1.3E-2						
Xylene (mixed isomers)	1.6E-2						

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

Site Name: Former Tosco (former Unocal) SS Site Location: 96 MacArthur Blvd., Oakland, Ca. Completed By: David J. Vossler Date Completed: 11/23/1998 *3 OF 4*

TIER 1 PATHWAY RISK CALCULATION

SOIL 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 Residential	(2) Total Carcinogenic Intake Rate (mg/kg/day) On-Site Commercial	(3) Oral Slope Factor (mg/kg-day)^-1	(4) Individual COC Risk (2) x (3) On-Site Residential	(4) Individual COC Risk (2) x (3) On-Site Commercial	TOXIC EFFECTS: (5) Total Toxicant Intake Rate (mg/kg/day) On-Site Residential	(5) Total Toxicant Intake Rate (mg/kg/day) On-Site Commercial	(6) Oral Reference Dose (mg/kg-day)	(7) Individual COC Hazard Quotient (5) / (6) On-Site Residential	(7) Individual COC Hazard Quotient (5) / (6) On-Site Commercial
Benzene	A			2.9E-2							
Ethylbenzene	D								1.0E-1		
Methyl t-Butyl Ether									5.0E-3		
Toluene	D								2.0E-1		
Xylene (mixed isomers)	D								2.0E+0		
Total Pathway Carcinogenic Risk =					0.0E+0	0.0E+0	*Total Pathway Hazard Index =*			0.0E+0	0.0E+0

Site Name: Former Tosco (former U Site Location: 96 MacArthur Blvd., Oakland, Ca. Completed By: David J. Vossler Date Completed: 11/23/1998

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

GROUNDWATER EXPOSURE PATHWAYS ☐ (CHECKED IF PATHWAY IS ACTIVE)

SOIL: LEACHING TO GROUNDWATER/ GROUNDWATER INGESTION

Constituents of Concern	Exposure Concentration 1) Source Medium: Soil Concentration (mg/kg)	2) NAF Value (L/kg) Receptor		3) Exposure Medium: Groundwater: POE Conc. (mg/L) (1)/(2)		4) Exposure Multiplier: (IRxEFxED)/(BWxAT) (L/kg-day)		5) Average Daily Intake Rate: (mg/kg-day) (3) x (4)	
Benzene	1.6E-2								
Ethylbenzene	1.9E-2								
Methyl t-Butyl Ether	4.9E+0								
Toluene	1.8E-2								
Xylene (mixed isomers)	3.6E-2								

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 = Intake rate (L/day); POE = Point of exposure; SA = Skin exposure area (cm^2/day)

Site Name: Former Tosco (former U Site Location: 96 MacArthur Blvd., Oakland, Ca. Completed By: David J. Vossler Date Completed: 11/23/1998

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

GROUNDWATER EXPOSURE PATHWAYS ☐ (CHECKED IF PATHWAY IS ACTIVE)

GROUNDWATER: INGESTION

Constituents of Concern	Exposure Concentration: 1) Source Medium — Groundwater Conc. (mg/L)	2) NAF Value (dim) — Receptor		3) Exposure Medium — Groundwater: POE Conc. (mg/L) (1)*(2)		4) Exposure Multiplier — (IRxEFxED)/(BWxAT) (L/kg-day)		5) Average Daily Intake Rate — (mg/kg-day) (3) x (4)		MAX. PATHWAY INTAKE (mg/kg-day) *(Maximum intake of active pathways soil leaching & groundwater routes.)*	
Benzene	3.4E-3										
Ethylbenzene	1.7E-3										
Methyl t-Butyl Ether	8.0E-3										
Toluene	1.9E-3										
Xylene (mixed isomers)	2.5E-3										

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 = Intake rate (L/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: 11/23/1998

TIER 1 PATHWAY RISK CALCULATION

GROUNDWATER EXPOSURE PATHWAYS ☐ (CHECKED IF PATHWAYS ARE ACTIVE)

Constituents of Concern	(1) EPA Carcinogenic Classification	CARCINOGENIC RISK: (2) Total Carcinogenic Intake Rate (mg/kg/day)		(3) Oral Slope Factor (mg/kg-day)^-1	(4) Individual COC Risk (2) x (3)		TOXIC EFFECTS: (5) Total Toxicant Intake Rate (mg/kg/day)		(6) Oral Reference Dose (mg/kg-day)	(7) Individual COC Hazard Quotient (5) / (6)	
Benzene	A			2.9E-2							
Ethylbenzene	D								1.0E-1		
Methyl t-Butyl Ether									5.0E-3		
Toluene	D								2.0E-1		
Xylene (mixed isomers)	D								2.0E+0		

Total Pathway Carcinogenic Risk = 0.0E+0 | 0.0E+0

Total Pathway Hazard Index = 0.0E+0 | 0.0E+0

RBCA SITE ASSESSMENT | **Tier 1 Worksheet 8.3**

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

Completed By: David J. Vossler
Date Completed: 11/23/1998

TIER 1 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:	2.0E-10	1.0E-6	2.0E-10	N/A	☐	1.2E-5	1.0E+0	1.5E-5	N/A	☐
INDOOR AIR EXPOSURE PATHWAYS										
Complete:	1.2E-7	1.0E-6	1.2E-7	N/A	☐	6.6E-3	1.0E+0	9.1E-3	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)										
	1.2E-7	1.0E-6	1.2E-7	N/A	☐	6.6E-3	1.0E+0	9.1E-3	N/A	☐

RBCA SITE ASSESSMENT | **Tier 1 Worksheet 6.1**

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

Completed By: David J. Vossler
Date Completed: 11/23/1998

SURFACE SOIL RBSL 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: 1

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

CONSTITUENTS OF CONCERN		Representative Concentration		Soil Leaching to Groundwater			X	Inhalation of Volatiles and Particulates	X	Construction Worker	Applicable RBSL	RBSL Exceeded ?	Required CRF
CAS No.	Name	(mg/kg)	Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)	Residential: (on-site)	Commercial: (on-site)(PEL)		Commercial: (on-site) (PEL)	(mg/kg)	"■" if yes	Only if "yes" left
71-43-2	Benzene	1.0E-2	NA	NA	NA	NA	>Res		1.1E+2	1.1E+2	☐	<1
100-41-4	Ethylbenzene	1.2E-2	NA	NA	NA	NA	>Res		>Res	>Res	☐	<1
1634-04-4	Methyl t-Butyl Ether	8.3E-1	NA	NA	NA	NA	>Res		2.4E+2	2.4E+2	☐	<1
108-88-3	Toluene	1.3E-2	NA	NA	NA	NA	>Res		>Res	>Res	☐	<1
1330-20-7	Xylene (mixed isomers)	1.6E-2	NA	NA	NA	NA	>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

.01 ppm

KEI-P94-0601.R1
September 13, 1994

TABLE 1

SUMMARY OF LABORATORY ANALYSES
SOIL

Date	Sample	Depth (feet)	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes	TOG
8/03/94	WO1(9)	9	97♦	46	0.12	0.11	0.12	0.47	1,400
	WO1(14)*	14	--	--	--	--	--	--	ND
	WOSW1	9	--	--	--	--	--	--	160
	WOSW2	9	1,400♦	960	2.2	2.6	9.5	22	17,000
	WOSW3	9	--	--	--	--	--	--	2,200
	WOSW4	9	--	--	--	--	--	--	2,400

Date	Sample	Bromoform	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-dichlorobenzene
8/03/94	WO1(9)**	ND	22	ND	ND
	WOSW2**	220	1,800	63	540

Sample	Acenaphthene	Anthracene	Benzo(a)anthracene	Benzo(b)fluoranthene
WO1(9)	6,500	9,900	5,300	5,000
WOSW2	3,300	6,100	4,000	3,300

Sample	Benzo(a)pyrene	Chrysene	Dibenzofuran	Fluoranthene	Fluorene
WO1(9)	4,300	7,500	3,400	25,000	6,600
WOSW2	2,900	4,800	ND	15,000	3,800

Sample	2-Methylnaphthalene	Naphthalene	Phenanthrene	Pyrene
WO1(9)	8,500	4,700	38,000	24,000
WOSW2	28,000	10,000	22,000	14,000

TABLE 1 (Continued)

SUMMARY OF LABORATORY ANALYSES
SOIL

Date	Sample	Cadmium	Chromium	Lead	Nickel	Zinc
8/03/94	WO1(9)	ND	28	21	31	34
	WOSW2	1.2	33	39	35	42

* All EPA method 8270 constituents were non-detectable.

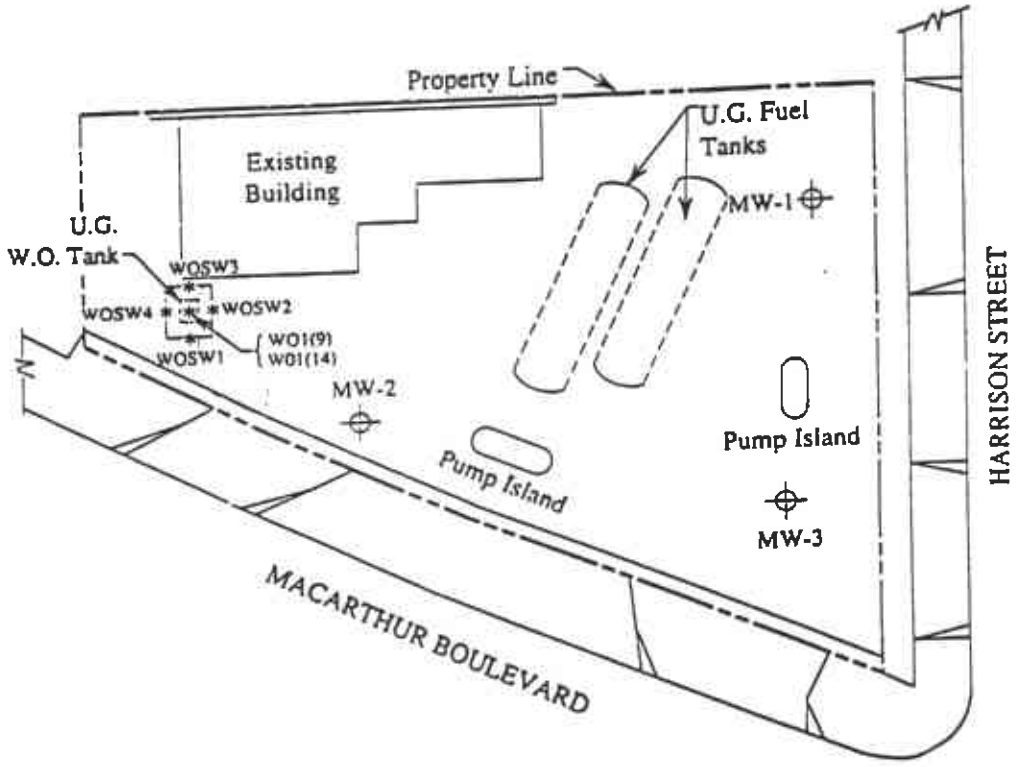
** All other EPA methods 8010 and 8270 constituents were non-detectable.

♦ Sequoia Analytical Laboratory reported that the hydrocarbons detected appeared to be a diesel and non-diesel mixture.

-- Indicates analysis was not performed.

ND = Non-detectable.

Results are in milligrams per kilogram (mg/kg), except for EPA methods 8010 and 8270 constituents, which were reported in micrograms per kilogram (µg/kg).



LEGEND

⊕ Monitoring well

* Sample point location

0 30 60

Approx. scale feet

SITE PLAN

KAPREALIAN ENGINEERING INCORPORATED

UNOCAL SERVICE STATION # 1871
96 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

FIGURE 1

Table 1 - Chemical Analytical Data

Former Tosco 76 Branded Facility No. 1871
96 Mac Arthur Boulevard
Oakland, California

Sample ID	Date Collected	Sample Depth (feet)	TPHg (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl-Benzene (ppm)	Xylenes (ppm)	MTBE (ppm)	TPHd (ppm)	O&G (ppm)	HVOCs (ppm)	SVOCs (ppm)
GASOLINE UST PIT EXCAVATION (SOIL)												
SW1	5/11/98	11.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	1.9	NR	NR	NR	NR
SW2	5/11/98	11.5	<1.0	0.031	<0.0050	<0.0050	0.015	3.8	NR	NR	NR	NR
SW3	5/11/98	11.5	2,000	9.7	29	38	150	16	NR	NR	NR	NR
SW4	5/11/98	11.5	1,800	5.5	82	49	290	15	NR	NR	NR	NR
SW3-5	5/12/98	11.0	5.0[4]	0.049	0.051	0.050	0.20	6.6	NR	NR	NR	NR
SW4-5	5/12/98	11.0	<1.0	0.080	<0.0050	<0.0050	0.039	12	NR	NR	NR	NR
GASOLINE UST PIT EXCAVATION (WATER)												
Water-FT	5/11/98	NA	620	<0.0005	18	13	83	<0.0025	NR	NR	NR	NR
WASTE OIL UST PIT EXCAVATION (SOIL)												
WO1	5/11/98	11.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<1.0	140	ND	ND
WASTE OIL UST PIT EXCAVATION (WATER)												
Water-WO	5/11/98	NA	0.090[4]	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	0.890[7]	<1.0	ND[2]	ND
PRODUCT PUMP ISLANDS (SOIL)												
P1	5/11/98	4.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	0.74	NR	NR	NR	NR
P2	5/11/98	4.0	15[3]	<0.0050	0.056	0.10	0.19	<0.050	NR	NR	NR	NR
HOIST EXCAVATIONS (SOIL)												
H-1[1]	5/12/98	8.0	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
H-2[1]	5/12/98	8.0	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
DISPOSAL CHARACTERIZATION SAMPLE (SOIL FROM WASTE OIL UST PIT)												
WO SP1	5/12/98	NA	<1.0	<0.0050	<0.0050	<0.0050	0.014	NR	6.8[5]	110	ND	ND[6]

Table 1 - Chemical Analytical Data

Former Tosco 76 Branded Facility No. 1871
96 Mac Arthur Boulevard
Oakland, California

Sample ID	Date Collected	TPHg (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl-Benzene (ppm)	Xylenes (ppm)	Total Lead (ppm)
DISPOSAL CHARACTERIZATION SAMPLES							
SP1 (A-D)	5/12/98	<1.0	<0.0050	<0.0050	<0.0050	0.015	19
SP1 (E-H)	5/12/98	170[3]	2.9	0.74	0.78	3.2	2.2
SP1 (I-L)	5/12/98	60	1.5	5.5	6.6	27	5.9
SP1 (M-P)	5/12/98	380	1.6	5.6	7.5	34	4.6
SP1 (Q-T)	5/12/98	50	0.32	0.90	0.81	3.5	4.9
SP1 (U-X)	5/12/98	1,200	9.0	26	28	100	2.1
SP1 (Y,Z,1,2)	5/12/98	130	0.94	2.8	2.3	12	3.5
SP1 (3,4,5,6)	5/12/98	13[4]	0.36	0.57	0.22	0.92	1.9

Sample ID	Date Collected	Lead (ppm)	Chromium (ppm)	Nickel (ppm)	Zinc (ppm)	Cadmium (ppm)
WO1	5/11/98	1.0	18	21	61	<0.50
WO SP1	5/12/98	3.0	30	56	57	<0.50
Water-WO	5/11/98	<0.020	0.053	0.055	0.065	<0.010

EXPLANATION:

ND = none detected
NA = not applicable
ppm = parts per million
NR = analysis not requested
MTBE = methyl tert-butyl ether

ANALYTICAL LABORATORY:

Sequoia Analytical (ELAP # 1271)

Table 1 - Chemical Analytical Data

Former Tosco 76 Branded Facility No. 1871

96 Mac Arthur Boulevard

Oakland, California

NOTES:

[1] = TPH as hydraulic fluid was non-detectable.

[2] = None of the analytes detected except bromodichloromethane (0.0058 ppm), chloroform (0.014 ppm), dibromochloromethane (0.0019 ppm), 1,4-dichlorobenzene (0.00089 ppm 1,2-dichlorobenzene (0.0028 ppm), and tetrachloroethene (0.0017 ppm).

[3] = Laboratory reports indicates gasoline and unidentified hydrocarbons >C8

[4] = Laboratory reports indicates gasoline and discrete peaks

[5] = Laboratory reports indicates unidentified hydrocarbons >C16

[6] = Non of the analytes detected except for phenanthrene (0.350 ppm), pyrene (0.380 ppm), and fluoranthene (0380 ppm).

[7] = Laboratory reports indicates unidentified hydrocarbons <C14

ANALYTICAL METHODS:

TPHg = Total Petroleum Hydrocarbons as gasoline according to EPA Method 8015 Modified.

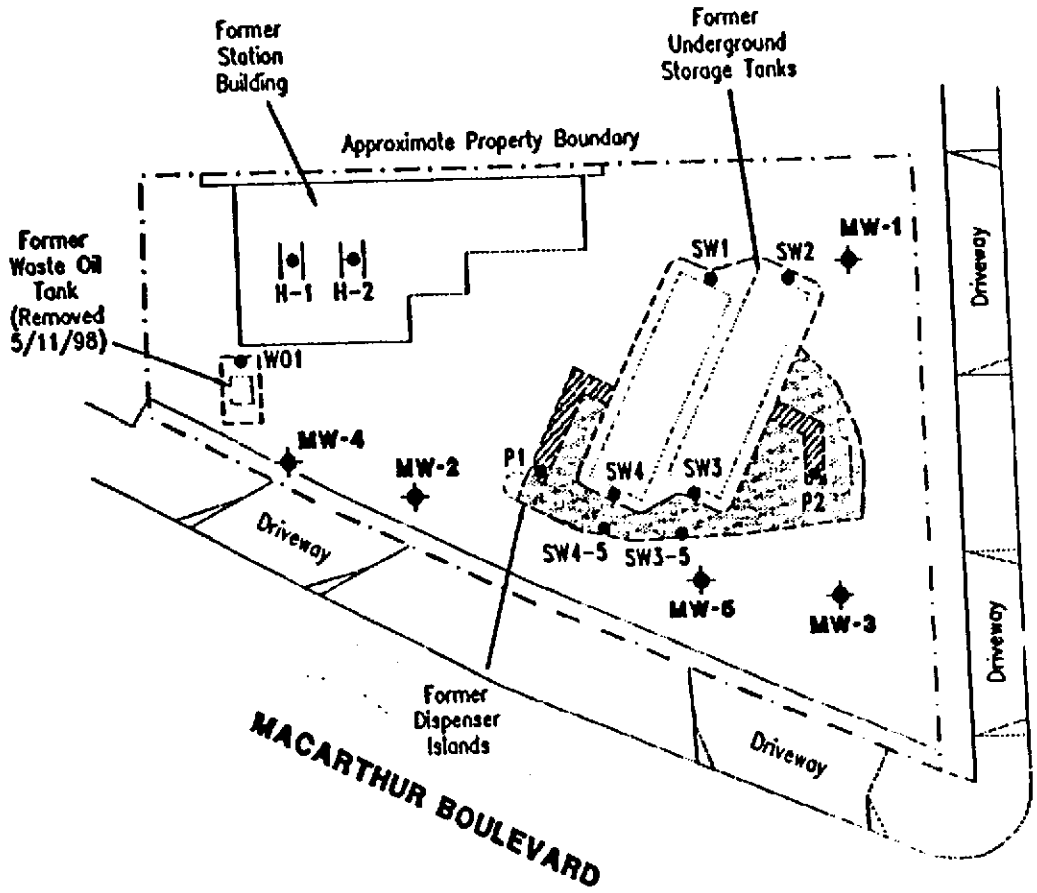
TPHd = Total Petroleum Hydrocarbons as diesel according to EPA Method 8015 Modified.

O&G = Total recoverable petroleum oil according to Standard Methods 5520 E&F(Gravimetric).

HVOCs = Halogenated volatile organic compounds according to EPA Method 8010.

SVOCs = Semi-volatile organic compounds according to EPA Method 8270.

Metals = EPA Method 6010.



EXPLANATION

- Groundwater monitoring well
- Soil sample location
- Product piping trench
- Tank excavation
- Over excavation

N

0 30

Scale in Feet

Source: Figure Modified From Drawing Provided By MPDS Services, Inc.

FIGURE 2

Gettler - Ryan Inc.

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

SITE PLAN/SOIL SAMPLE LOCATION MAP
Former Tosco 76 Branded Facility No. 1871
96 MacArthur Boulevard
Oakland, California

JOB NUMBER 140165.02

REVIEWED BY

DATE July, 1998

REVISED DATE

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (650) 364-9600, FAX (650) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (925) 988-9600, FAX (925) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100
1455 McDowell Blvd. North, Ste. D, Petaluma, CA 94954, (707) 792-1865, FAX (707) 792-0342

Gettler Ryan/Geostrategies
6747 Sierra Court Suite J
Dublin, CA 94568

Attention: Barbara Sieminsk

Client Proj. ID: Unocal #140165.01
Sample Descript: EB3-9.5
Matrix: SOLID
Analysis Method: 8015Mod/8020
Lab Number: 9809D14-01

Sampled: 09/16/98
Received: 09/18/98
Extracted: 09/23/98
Analyzed: 09/24/98
Reported: 09/29/98

QC Batch Number: GC092398BTEXEXA
Instrument ID: GCHP22

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit mg/Kg	Sample Results mg/Kg
TPPH as Gas	1.0	N.D.
Methyl t-Butyl Ether	0.025	N.D.
Benzene	0.0050	N.D.
Toluene	0.0050	N.D.
Ethyl Benzene	0.0050	N.D.
Xylenes (Total)	0.0050	N.D.
Chromatogram Pattern:		

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	105
4-Bromofluorobenzene	60	140	98

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Tod Granicher
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (650) 364-9600, FAX (650) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (925) 988-9600, FAX (925) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100
1455 McDowell Blvd. North, Ste. D, Petaluma, CA 94954, (707) 792-1865, FAX (707) 792-0342

Gettler Ryan/Geostrategies
6747 Sierra Court, Ste. J
Dublin, CA 94568
Attention: Barbara Siminski

Client Project ID: Uncoal #141065.01

QC Sample Group: 9809D14

Reported: Sep 29, 1998

QUALITY CONTROL DATA REPORT

Matrix:	Solid
Method:	EPA 8015
Analyst:	N.H.
ANALYTE	Gasoline

QC Batch #: GC092398BTEXEXA

Sample No.:	9809891-15
Date Prepared:	9/23/98
Date Analyzed:	9/23/98
Instrument I.D.#:	GCHP01
Sample Conc., mg/Kg:	N.D.
Conc. Spiked, mg/Kg:	5.0
Matrix Spike, mg/Kg:	6.5
% Recovery:	130
Matrix Spike Duplicate, mg/Kg:	4.5
% Recovery:	90
Relative % Difference:	36
RPD Control Limits:	0-25

LCS Batch#: GC092398BTEXEXA

Date Prepared:	9/23/98
Date Analyzed:	9/23/98
Instrument I.D.#:	GCHP01
Conc. Spiked, mg/Kg:	5.0
Recovery, mg/Kg:	5.9
LCS % Recovery:	118

Percent Recovery Control Limits:

MS/MSD	60-140
LCS	70-130

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Tod Granicher
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (650) 364-9600, FAX (650) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (925) 988-9600, FAX (925) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100
1455 McDowell Blvd. North, Ste. D, Petaluma, CA 94954, (707) 792-1865, FAX (707) 792-0342

Gettler Ryan/Geostrategies
6747 Sierra Court Suite J
Dublin, CA 94568
Attention: Barbara Sieminsk

Client Proj. ID: Unocal #140165.01

Lab Proj. ID: 9809D14

Received: 09/18/98

Reported: 09/29/98

LABORATORY NARRATIVE

In order to properly interpret this report, it must be reproduced in its entirety. This report contains a total of 4 pages including the laboratory narrative, sample results, quality control, and related documents as required (cover page, COC, raw data, etc.).

SEQUOIA ANALYTICAL

Tod Granicher
Project Manager

UNOCAL 76

☑ 680 Chesapeake Drive • Redwood City, CA 94063 • (415) 364-9600
☐ 819 Striker Ave., Suite 8 • Sacramento, CA 95834 • (916) 921-9600
☐ 404 N. Wiget Lane • Walnut Creek, CA 94598 • (510) 988-9600
☐ 18939 120th Ave., N.E., Suite 101 • Bothell, WA 98011 • (206) 481-9200
☐ East 11115 Montgomery, Suite B • Spokane, WA 99206 • (509) 924-9200
☐ 15055 S.W. Sequoia Pkwy, Suite 110 • Portland, OR 97222 • (503) 624-9800

Consultant Company: Gettler - Ryan Inc	Project Name: 96 MacArthur Blvd, Oakland, Job # 140165.01
Address: 6747 Sierra Ct, Ste J	~~UNOCAL~~ Project Manager: Tina Berry
City: Dublin State: CA Zip Code: 94568	AFE #:
Telephone: (925) 551-7555 FAX #: (925) 551-7888	Site #, City, State: 1871, Oakland, CA
Report To: Barbara Sieminski Sampler: Barbara Sieminski	QC Data: ☑ Level D (Standard) ☐ Level C ☐ Level B ☐ Level A

Pink - Client

Turnaround Time: ☑ 10 Work Days ☐ 5 Work Days ☐ 3 Work Days ☐ 2 Work Days ☐ 1 Work Day ☐ 2-8 Hours

CODE: ☐ Misc. ☐ Detect. ☐ Eval. ☐ Remed. ☐ Demol. ☐ Closure

☐ Drinking Water ☐ Waste Water ☐ Other

Analyses Requested

Client Sample I.D.	Date/Time Sampled	Matrix Desc.	# of Cont.	Cont. Type	Laboratory Sample #	TPHgas/BTEX/MTBE	Comments
1. EB3-9.5	09/16/98	Soil	1	tube	61	X	
2.							
3.							
4.							
5.							
6.							SP 18 6 3
7.							
8.							
9.							
10.							

Yellow - Laboratory

White - Laboratory

Relinquished By: Barbara Sieminski	Date: 09/18/98	Time: 1440	Received By: Charles Cromstock	Date: 9-18-98	Time: 1440
Relinquished By: Charles Cromstock	Date: 9-18-98	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By Lab:	Date: 9/18/98	Time: 1834

Were Samples Received in Good Condition? ☑ Yes ☐ No Samples on Ice? ☑ Yes ☐ No Method of Shipment FS Page __ of __

To be completed upon receipt of report:

1) Were the analyses requested on the Chain of Custody reported? ☐ Yes ☐ No If no, what analyses are still needed? _____

2) Was the report issued within the requested turnaround time? ☐ Yes ☐ No If no, what was the turnaround time? _____

Approved by: _____ Signature: _____ Company: _____ Date: _____

TABLE 3: Summary of Soil Analyses: Monitoring Wells
UNOCAL Service Station No. 1871, Oakland, California

Sample Designation	Date Sampled	Depth (feet bgs)	TPH-G	BTEX Distinction			
				Benzene	Toluene	Ethylbenzene	Xylenes
MW-1(5-6.5')	10/5/92	5-6.5	ND	ND	ND	ND	ND
MW-1(8.5-10')	10/5/92	8.5-10	ND	ND	ND	ND	ND
MW-1(13.5-15')	10/5/92	13.5-15	ND	ND	ND	ND	ND
MW-2(3.5-5')	10/5/92	3.5-5	ND	ND	ND	ND	ND
MW-2(8.5-10')	10/5/92	8.5-10	ND	ND	ND	ND	ND
MW-3(4-5.5')	10/6/92	4-5.5	ND	ND	ND	ND	ND
MW-3(9-10.5')	10/6/92	9-10.5	ND	ND	0.0088	ND	0.0060
MW-3(12-13.5')	10/6/92	12-13.5	4.2	0.079	0.010	0.16	0.26
MW-3(13.5-15')	10/6/92	13.5-15	10	0.040	0.013	0.40	0.73

FOOTNOTES

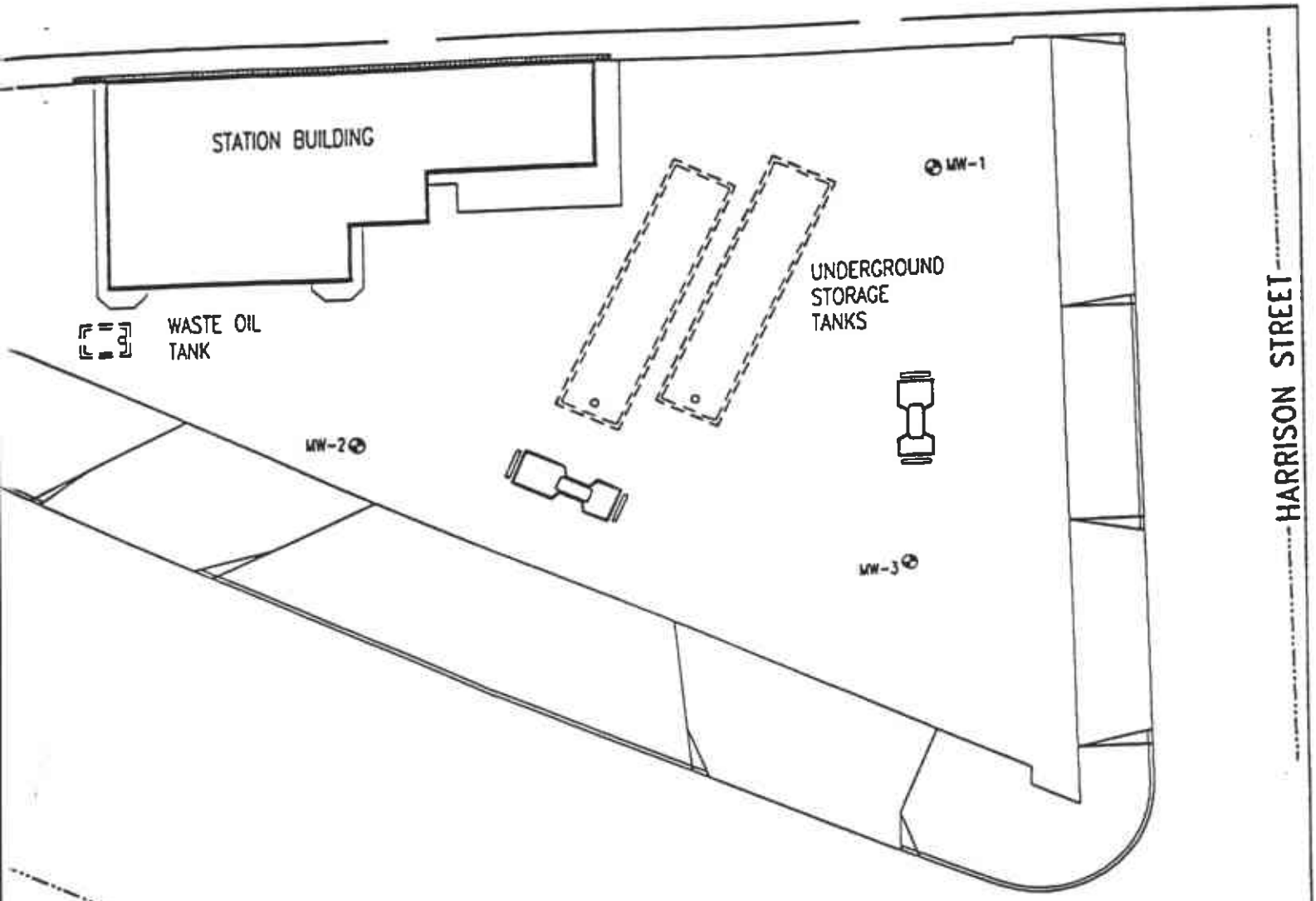
All concentrations reported in mg/kg (ppm)

TPH-G = Total Purgeable Petroleum Hydrocarbons (USEPA Method 8015)

BTEX Distinction (USEPA Method 8020)

ND = Not Detected (for detection limits see laboratory reports in Appendix C)

bgs = Below ground surface



EXPLANATION:

- MW-1 — MONITORING WELL LOCATION AND DESIGNATION
- UNDERGROUND STORAGE TANK
- FILL PORT
- EXISTING PUMP ISLAND

0' 20' 40'

APPROXIMATE SCALE

SOURCE:

MAP MODIFIED FROM BLUEPRINT PROVIDED BY UNOCAL 76, 04/92.

COMPILED BY:	P.S.
PREPARED BY:	R.P.
PROJECT MNGR.	P.S.
DATE:	12/92
SCALE:	AS SHOWN
PROJECT NO.	2700JW

ROUX ASSOCIATES

PREPARED FOR: UNOCAL 76

TITLE: LOCATION OF MONITORING WELLS

UNOCAL SERVICE STATION NO. 1871

FIGURE 4

KEI-P94-0601.R4
May 17, 1996

TABLE 4

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected by KEI on March 20, 1996)

Sample Number	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Ethyl-benzene	Xylenes	TOG	EPA Method 8010 Constituents	EPA Method 8270 Constituents
EB1(5)	ND	ND	ND	ND	ND	ND	ND	ND[2]	ND
EB1(10)	ND	ND	ND	ND	ND	ND	ND	ND	ND
EB2(5)	ND	ND	ND	ND	ND	ND	ND	ND	ND
EB2(10)	73[1]	5.7	ND	0.0094	ND	0.035	540	ND	ND[5]
MW4(5)	1.1[1]	ND	ND	ND	0.0052	0.019	ND	ND[3]	ND
MW4(9.5)	350[1]	24	ND	0.74	0.15	0.48	1,000	ND[4]	ND[6]
MW5(5)	--	ND	ND	ND	ND	ND	--	--	--
MW5(9)	--	ND	0.023	ND	ND	ND	--	--	--

NOTE: The soil samples were collected at the depths below grade indicated in the ( ) of the respective sample number.

ND = Non-detectable.

-- Indicates analysis was not performed.

Results are in milligrams per kilogram (mg/kg), unless otherwise indicated.

TABLE 4 (Continued)

SUMMARY OF LABORATORY ANALYSES
SOIL

FOOTNOTES

(1) Sequoia Analytical Laboratory reported that the extractable hydrocarbons detected were "unidentified hydrocarbons."

(2) 1,1-dichloroethene was detected at a concentration of 6.0 micrograms per kilogram (µg/kg).

(3) 1,1-dichloroethene and tetrachloroethene were detected at concentrations of 11 and 8.7 µg/kg, respectively.

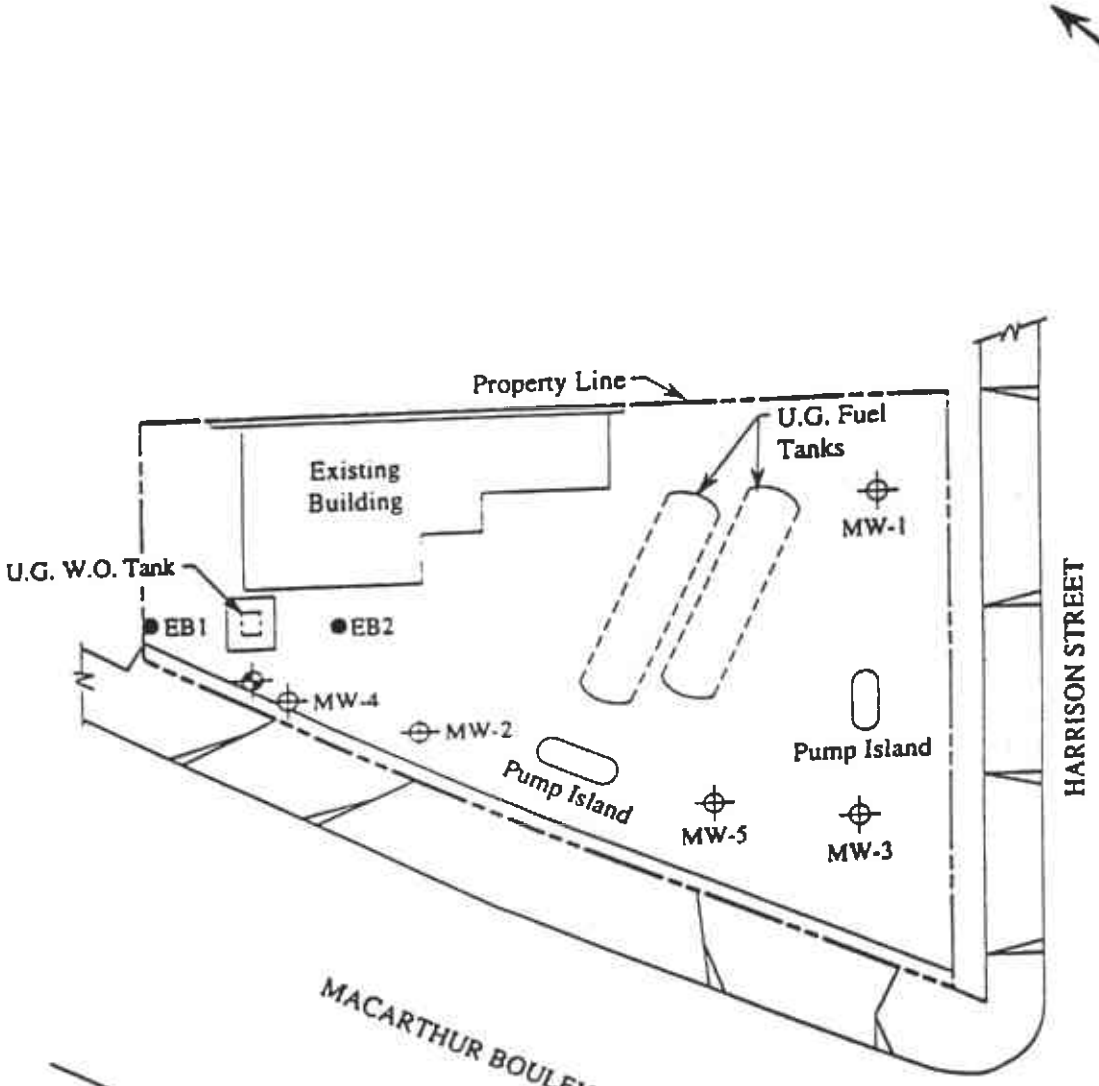
(4) 1,2-dichlorobenzene and 1,4-dichlorobenzene were detected at concentrations of 37 and 12 µg/kg, respectively.

(5) All EPA method 8270 constituents were non-detectable, except for the following five compounds:

Compound	Concentration (µg/kg)
Benzo(k)fluoranthene	190
Chrysene	180
Fluoranthene	610
Phenanthrene	100
Pyrene	690

(6) All EPA method 8270 constituents were non-detectable, except for the following 11 compounds:

Compound	Concentration (µg/kg)	Compound	Concentration (µg/kg)
Acenaphthene	170	Fluoranthene	860
Anthracene	350	Fluorene	190
Benzo(a)anthracene	260	Naphthalene	150
Benzo(b)fluoranthene	240	Phenanthrene	1,300
Benzo(a)pyrene	160	Pyrene	960
Chrysene	290		



LEGEND

- Monitoring well
- Monitoring well (attempted MW4 location)
- Exploratory boring

0 30 60

Approx. scale feet

EXPLORATORY BORING AND MONITORING WELL LOCATION MAP

KAPREALIAN ENGINEERING INCORPORATED

UNOCAL SERVICE STATION # 1871
96 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

FIGURE 3

ATTACHMENT 2

Air Inhalation: Modified Data Set

RBCA TIER 1/TIER 2 EVALUATION

Output Table 1

Site Name: Former Tosco (former Unocal) Station
Site Location: 96 MacArthur Blvd., Oakland, CA
Job Identification: 140165.05
Date Completed: 11/23/98
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)?	***FALSE***				
gwMCL?	Use MCL as exposure limit in groundwater?	TRUE				

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	TRUE
S.v	Volatilization from Subsurface Soils	FALSE	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	TRUE
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)		TRUE		TRUE
S	Inhalation receptor (cm)		TRUE		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)	1	
Tier	RBCA Tier	1	

Surface Parameters	Definition (Units)	Residential	Constrctn
A	Contaminated soil area (cm^2)	***2.8E+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)	***3.4E+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)	***3.4E+02***		
Ls	Depth to top of affected subsurface soil (cm)	***2.7E+02***		
Lsubs	Thickness of affected subsurface soils (cm)	***6.9E+01***		
pH	Soil/groundwater pH	***6.93***		
		capillary	vadose	foundation
phi.w	Volumetric water content	***0.369***	0.13	0.12
phi.a	Volumetric air content	***0.041***	***0.28***	0.26

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	0.01	

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)		
dcz	Vertical dispersion coefficient (cm)		

RBCA CHEMICAL DATABASE

Miscellaneous Chemical Data

CAS Number	Constituent	Maximum Contaminant Level MCL (mg/L)	Maximum Contaminant Level reference	Permissible Exposure Limit PEL/TLV (mg/m3)	PEL/TLV ref	Relative Absorption Factors Oral	Relative Absorption Factors Dermal	Detection Limits Groundwater (mg/L)	Groundwater ref	Detection Limits Soil (mg/kg)	Soil ref	Half Life (First-Order Decay) (days) Saturated	Half Life (First-Order Decay) (days) Unsaturated	ref
71-43-2	Benzene	5.00E-03	52 FR 25690	3.20E+00	OSHA	1	0.5	0.002	C	0.005	S	720	720	H
100-41-4	Ethylbenzene	7.00E-01	56 FR 3526 (30 Jan 91)	4.34E+02	ACGIH	1	0.5	0.002	C	0.005	S	228	228	H
1634-04-4	Methyl t-Butyl Ether			1.44E+02	ACGIH	1	0.5					360	180	H
108-88-3	Toluene	1.00E+00	56 FR 3526 (30 Jan 91)	1.47E+02	ACGIH	1	0.5	0.002	C	0.005	S	28	28	H
1330-20-7	Xylene (mixed isomers)	1.00E+01	56 FR 3526 (30 Jan 91)	4.34E+02	ACGIH	1	0.5	0.005	C	0.005	S	360	360	H

Site Name: Former Tosco (former UnocaSite Location: 96 MacArthur Blvd., Oakland, Ca. Completed By: David J. Vossler Date Completed: 11/23/1998

Software version: 1.0.1

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	3.0E-3	mean			1.6E-2	mean
Ethylbenzene	1.3E-3	mean			1.9E-2	mean
Methyl t-Butyl Ether	7.2E-3	mean			4.9E+0	mean
Toluene	1.5E-3	mean			1.8E-2	mean
Xylene (mixed isomers)	2.1E-3	mean			3.6E-2	mean

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

Completed By: David J. Vossler
Date Completed: 11/23/1998

RBCA SITE ASSESSMENT	Input Screen 9.4

GROUNDWATER DAF VALUES

(Enter DAF values in the grey area of the following table)

CONSTITUENT	Dilution Attenuation Factor (DAF) in Groundwater	
	Residential Receptor	Comm./Ind. Receptor
Benzene	1.0E+0	1.0E+0
Ethylbenzene	1.0E+0	1.0E+0
Methyl t-Butyl Ether	1.0E+0	1.0E+0
Toluene	1.0E+0	1.0E+0
Xylene (mixed isomers)	1.0E+0	1.0E+0

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

Completed By: David J. Vossler
Date Completed: 11/23/1998

RBCA SITE ASSESSMENT | **Input Screen 9.1**

CONSTITUENT HALF-LIFE VALUES

(Complete the following table)

CONSTITUENT	Half-Life of Constituent (day)
Benzene	720
Ethylbenzene	228
Methyl t-Butyl Ether	360
Toluene	28
Xylene (mixed isomers)	360

Site Name: Former Tosco (former Unocal) Completed By: David J. Vossler
Site Location: 96 MacArthur Blvd., Oaklan Date Completed: 11/23/1998

RBCA SITE ASSESSMENT

EXPOSURE LIMITS IN GROUNDWATER AND AIR

CONSTITUENT	Exposure Limits Applied to Receptors	
	Groundwater (MCL) (mg/L)	Air (Comm. only) (PEL/TLV) (mg/m^3)
Benzene	5.0E-3	3.2E+0
Ethylbenzene	7.0E-1	4.3E+2
Methyl t-Butyl Ether		1.4E+2
Toluene	1.0E+0	1.5E+2
Xylene (mixed isomers)	1.0E+1	4.3E+2

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

Completed By: David J. Vossler
Date Completed: 11/23/1998

Site Name: Former Tosco (former Unocal) SS # 1871 Site Location: 96 MacArthur Blvd., Oakland, Ca. Completed By: David J. Vossler Date Completed: 11/23/1998

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

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

SURFACE SOILS: VAPOR AND DUST INHALATION

Constituents of Concern	Exposure Concentration 1) Source Medium: Surface Soil Conc. (mg/kg)	2) NAF Value (m^3/kg) Receptor		3) Exposure Medium: Outdoor Air: POE Conc. (mg/m^3) (1) / (2)		4) Exposure Multiplier: (IRxEFxED)/(BWxAT) (m^3/kg-day)		5) Average Daily Intake Rate: (mg/kg-day) (3) X (4)	
Benzene	0.0E+0								
Ethylbenzene	0.0E+0								
Methyl t-Butyl Ether	0.0E+0								
Toluene	0.0E+0								
Xylene (mixed isomers)	0.0E+0								

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 # 1871 Site Location: 96 MacArthur Blvd., Oakland, Ca. Completed By: David J. Vossler Date Completed: 11/23/1998

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

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

SUBSURFACE SOILS: VAPOR INHALATION

Constituents of Concern	Exposure Concentration 1) Source Medium: Subsurface Soil Conc. (mg/kg)	2) NAF Value (m^3/kg) 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	
Benzene	1.6E-2	5.0E+5		3.1E-8		7.0E-2		2.2E-9	
Ethylbenzene	1.9E-2	5.0E+5		3.8E-8		2.0E-1		7.4E-9	
Methyl t-Butyl Ether	4.9E+0	5.0E+5		9.7E-6		2.0E-1		1.9E-6	
Toluene	1.8E-2	5.0E+5		3.7E-8		2.0E-1		7.2E-9	
Xylene (mixed isomers)	3.6E-2	5.0E+5		7.3E-8		2.0E-1		1.4E-8	

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: 11/23/1998

TIER 1 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	
Benzene	3.0E-3	8.4E+4		3.6E-8		7.0E-2		2.5E-9		4.7E-9	
Ethylbenzene	1.3E-3	8.2E+4		1.6E-8		2.0E-1		3.2E-9		1.1E-8	
Methyl t-Butyl Ether	7.2E-3	1.7E+5		4.2E-8		2.0E-1		8.2E-9		1.9E-6	
Toluene	1.5E-3	8.4E+4		1.8E-8		2.0E-1		3.5E-9		1.1E-8	
Xylene (mixed isomers)	2.1E-3	9.1E+4		2.4E-8		2.0E-1		4.6E-9		1.9E-8	

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: 11/23/1998

TIER 1 PATHWAY RISK CALCULATION

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

	CARCINOGENIC RISK						TOXIC EFFECTS				
Constituents of Concern	(1) EPA Carcinogenic Classification	(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		(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	4.7E-9		2.9E-2	1.4E-10		1.3E-8		1.7E-3	7.8E-6	
Ethylbenzene	D						1.1E-8		2.9E-1	3.7E-8	
Methyl t-Butyl Ether							1.9E-6		8.6E-1	2.2E-6	
Toluene	D						1.1E-8		1.1E-1	9.4E-8	
Xylene (mixed isomers)	D						1.9E-8		2.0E+0	9.4E-9	

Total Pathway Carcinogenic Risk = 1.4E-10 | 0.0E+0

Total Pathway Hazard Index = 1.0E-5 | 0.0E+0

Site Name: Former Tosco (former Unocal) SS # 1871 Site Location: 96 MacArthur Blvd., Oakland, Ca. Completed By: David J. Vossler Date Completed: 11/23/1998

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

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

SUBSURFACE SOILS: **Exposure Concentration**

VAPOR INTRUSION TO BUILDINGS

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	1.6E-2	4.7E+2	3.3E-5	7.0E-2	2.3E-6
Ethylbenzene	1.9E-2	4.7E+2	4.1E-5	2.0E-1	8.0E-6
Methyl t-Butyl Ether	4.9E+0	4.7E+2	1.0E-2	2.0E-1	2.0E-3
Toluene	1.8E-2	4.7E+2	3.9E-5	2.0E-1	7.7E-6
Xylene (mixed isomers)	3.6E-2	4.7E+2	7.8E-5	2.0E-1	1.5E-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 # 1871 Site Location: 96 MacArthur Blvd., Oakland, Completed By: David J. Vossler Date Completed: 11/23/1998

TIER 1 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	3.0E-3	1.4E+2	2.1E-5	7.0E-2	1.5E-6	3.8E-6
Ethylbenzene	1.3E-3	1.3E+2	1.0E-5	2.0E-1	2.0E-6	9.9E-6
Methyl t-Butyl Ether	7.2E-3	8.5E+2	8.4E-6	2.0E-1	1.6E-6	2.0E-3
Toluene	1.5E-3	1.4E+2	1.1E-5	2.0E-1	2.1E-6	9.8E-6
Xylene (mixed isomers)	2.1E-3	1.5E+2	1.4E-5	2.0E-1	2.8E-6	1.8E-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 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 Site Location: 96 MacArthur Blvd., Oakland, Ca. Completed By: David J. Vossler Date Completed: 11/23/1998

TIER 1 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	3.8E-6	2.9E-2	1.1E-7	1.1E-5	1.7E-3	6.3E-3
Ethylbenzene	D				9.9E-6	2.9E-1	3.5E-5
Methyl t-Butyl Ether					2.0E-3	8.6E-1	2.4E-3
Toluene	D				9.8E-6	1.1E-1	8.6E-5
Xylene (mixed isomers)	D				1.8E-5	2.0E+0	9.0E-6
Total Pathway Carcinogenic Risk =				0.0E+0 1.1E-7	***Total Pathway Hazard Index =***		0.0E+0 8.8E-3

Site Name: Former Tosco (forme Site Location: 96 MacArthur Blvd., Oakland, Ca. Completed By: David J. Vc Date Completed: 11/23/1998

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

SOIL EXPOSURE PATHWAYS ☐ (CHECKED IF PATHWAY IS ACTIVE)

SURFACE SOILS OR SEDIMENTS: **Exposure Concentration**

DERMAL CONTACT

Constituents of Concern	1) Source Medium: Surface Soil Conc. (mg/kg)	2) Exposure Multiplier (SAxAFxABSxCFxEFxED)/(BWxAT) (kg/kg-day): On-Site Residential	2) Exposure Multiplier: On-Site Commercial	3) Average Daily Intake Rate (mg/kg-day) (1) x (2): On-Site Residential	3) Average Daily Intake Rate: On-Site Commercial
Benzene	0.0E+0				
Ethylbenzene	0.0E+0				
Methyl t-Butyl Ether	0.0E+0				
Toluene	0.0E+0				
Xylene (mixed isomers)	0.0E+0				

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 = Intake rate (mg/day); POE = Point of exposure; SA = Skin exposure area (cm^2/day)

Site Name: Former Tosco (former U Site Location: 96 MacArthur Blvd., Oakland Completed By: David J. Vossler Date Completed: 11/23/1998

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

SOIL EXPOSURE PATHWAYS ☐ (CHECKED IF PATHWAY IS ACTIVE)

SURFACE SOILS OR SEDIMENTS:

INGESTION

Constituents of Concern	Exposure Concentration: 1) Source Medium — Surface Soil Conc. (mg/kg)	2) Exposure Multiplier (IRxCFxEFxED)/(BWxAT) (kg/kg-day) — On-Site Residential	2) Exposure Multiplier — On-Site Commercial	3) Average Daily Intake Rate (mg/kg-day) (1) x (2) — On-Site Residential	3) Average Daily Intake Rate — On-Site Commercial	TOTAL PATHWAY INTAKE (mg/kg-day) (Sum intake values from dermal & ingestion routes.) — On-Site Residential	TOTAL PATHWAY INTAKE — On-Site Commercial
Benzene	0.0E+0						
Ethylbenzene	0.0E+0						
Methyl t-Butyl Ether	0.0E+0						
Toluene	0.0E+0						
Xylene (mixed isomers)	0.0E+0						

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 = Intake rate (mg/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: 11/23/1998 *3 OF 4*

TIER 1 PATHWAY RISK CALCULATION

SOIL 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 Residential	On-Site Commercial	(3) Oral Slope Factor (mg/kg-day)^-1	(4) Individual COC Risk (2) x (3) On-Site Residential	On-Site Commercial	TOXIC EFFECTS: (5) Total Toxicant Intake Rate (mg/kg/day) On-Site Residential	On-Site Commercial	(6) Oral Reference Dose (mg/kg-day)	(7) Individual COC Hazard Quotient (5) / (6) On-Site Residential	On-Site Commercial
Benzene	A			2.9E-2							
Ethylbenzene	D								1.0E-1		
Methyl t-Butyl Ether									5.0E-3		
Toluene	D								2.0E-1		
Xylene (mixed isomers)	D								2.0E+0		
Total Pathway Carcinogenic Risk =					0.0E+0	0.0E+0	***Total Pathway Hazard Index =***			0.0E+0	0.0E+0

Site Name: Former Tosco (former U Site Location: 96 MacArthur Blvd., Oakland, Ca. Completed By: David J. Vossler Date Completed: 11/23/1998

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

GROUNDWATER EXPOSURE PATHWAYS ☐ (CHECKED IF PATHWAY IS ACTIVE)

SOIL: LEACHING TO GROUNDWATER/ GROUNDWATER INGESTION

Constituents of Concern	Exposure Concentration 1) Source Medium: Soil Concentration (mg/kg)	2) NAF Value (L/kg) Receptor		3) Exposure Medium: Groundwater: POE Conc. (mg/L) (1)/(2)		4) Exposure Multiplier: (IRxEFxED)/(BWxAT) (L/kg-day)		5) Average Daily Intake Rate: (mg/kg-day) (3) x (4)	
Benzene	1.6E-2								
Ethylbenzene	1.9E-2								
Methyl t-Butyl Ether	4.9E+0								
Toluene	1.8E-2								
Xylene (mixed isomers)	3.6E-2								

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 = Intake rate (L/day); POE = Point of exposure; SA = Skin exposure area (cm^2/day)

Site Name: Former Tosco (former U Site Location: 96 MacArthur Blvd., Oakland, Ca. Completed By: David J. Vossler Date Completed: 11/23/1998

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

GROUNDWATER EXPOSURE PATHWAYS ☐ (CHECKED IF PATHWAY IS ACTIVE)

GROUNDWATER: INGESTION

Constituents of Concern	Exposure Concentration 1) Source Medium: Groundwater Conc. (mg/L)	2) NAF Value (dim): Receptor		3) Exposure Medium: Groundwater: POE Conc. (mg/L) (1)X(2)		4) Exposure Multiplier: (IRxEFxED)/(BWxAT) (L/kg-day)		5) Average Daily Intake Rate: (mg/kg-day) (3) x (4)		MAX. PATHWAY INTAKE (mg/kg-day) *(Maximum intake of active pathways soil leaching & groundwater routes.)*	
Benzene	3.0E-3										
Ethylbenzene	1.3E-3										
Methyl t-Butyl Ether	7.2E-3										
Toluene	1.5E-3										
Xylene (mixed isomers)	2.1E-3										

NOTE: ABS = Dermat 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 = Intake rate (L/day); POE = Point of exposure; SA = Skin exposure area (cm^2/day)

RBCA SITE ASSESSMENT | **Tier 1 Worksheet 8.2**

Site Name: Former Tosco (former Unocal) SS Site Location: 96 MacArthur Blvd., Oakland, Ca. Completed By: David J. Vossler Date Completed: 11/23/1998

TIER 1 PATHWAY RISK CALCULATION

GROUNDWATER EXPOSURE PATHWAYS ☐ (CHECKED IF PATHWAYS ARE ACTIVE)

	CARCINOGENIC RISK					TOXIC EFFECTS				
Constituents of Concern	(1) EPA Carcinogenic Classification	(2) Total Carcinogenic Intake Rate (mg/kg/day)		(3) Oral Slope Factor (mg/kg-day)^-1	(4) Individual COC Risk (2) x (3)		(5) Total Toxicant Intake Rate (mg/kg/day)		(6) Oral Reference Dose (mg/kg-day)	(7) Individual COC Hazard Quotient (5) / (6)	
Benzene	A			2.9E-2							
Ethylbenzene	D								1.0E-1		
Methyl t-Butyl Ether									5.0E-3		
Toluene	D								2.0E-1		
Xylene (mixed isomers)	D								2.0E+0		
Total Pathway Carcinogenic Risk =					0.0E+0	0.0E+0	***Total Pathway Hazard Index =***			0.0E+0	0.0E+0

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

Completed By: David J. Vossler
Date Completed: 11/23/1998

TIER 1 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:	1.4E-10	1.0E-6	1.4E-10	N/A	☐	7.8E-6	1.0E+0	1.0E-5	N/A	☐
INDOOR AIR EXPOSURE PATHWAYS										
Complete:	1.1E-7	1.0E-6	1.1E-7	N/A	☐	6.3E-3	1.0E+0	8.8E-3	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)										
	1.1E-7	1.0E-6	1.1E-7	N/A	☐	6.3E-3	1.0E+0	8.8E-3	N/A	☐

RBCA SITE ASSESSMENT | **Tier 1 Worksheet 6.2**

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

Completed By: David J. Vossler
Date Completed: 11/23/1998

SUBSURFACE SOIL RBSL 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: 1

RBSL 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 RBSL	RBSL Exceeded ?	Required CRF
CAS No.	Name	(mg/kg)	Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)		Residential: (on-site)	Commercial: (on-site) (PEL)		Residential: (on-site)	Commercial: (on-site)(PEL)	(mg/kg)	■ If yes	Only if "yes" left
71-43-2	Benzene	1.6E-2	NA	NA	NA		NA	>Res		NA	>Res	>Res	☐	<1
100-41-4	Ethylbenzene	1.9E-2	NA	NA	NA		NA	>Res		NA	>Res	>Res	☐	<1
1634-04-4	Methyl t-Butyl Ether	4.9E+0	NA	NA	NA		NA	>Res		NA	>Res	>Res	☐	<1
108-88-3	Toluene	1.8E-2	NA	NA	NA		NA	>Res		NA	>Res	>Res	☐	<1
1330-20-7	Xylene (mixed isomers)	3.6E-2	NA	NA	NA		NA	>Res		NA	>Res	>Res	☐	<1

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

Software: GSI RBCA Spreadsheet Serial: G-225-ZRX-486
Version: 1.0.1

016

RBCA SITE ASSESSMENT

Tier 1 Worksheet 6.3

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

Completed By: David J. Vossler
Date Completed: 11/23/1998

GROUNDWATER RBSL 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: 1

RBSL 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 RBSL	RBSL Exceeded ?	Required CRF
CAS No.	Name	(mg/L)	Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)		Residential: (on-site)	Commercial: (on-site) (PEL)		Residential (on-site)	Commercial: (on-site) (PEL)	(mg/L	"■" If yes	Only if "yes" left
71-43-2	Benzene	3.0E-3	NA	NA	NA		NA	4.6E+2		NA	>Sol	4.6E+2	☐	<1
100-41-4	Ethylbenzene	1.3E-3	NA	NA	NA		NA	>Sol		NA	>Sol	>Sol	☐	<1
1634-04-4	Methyl t-Butyl Ether	7.2E-3	NA	NA	NA		NA	>Sol		NA	>Sol	>Sol	☐	<1
108-88-3	Toluene	1.5E-3	NA	NA	NA		NA	>Sol		NA	>Sol	>Sol	☐	<1
1330-20-7	Xylene (mixed isomers)	2.1E-3	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

KEI-P94-0601.R1
September 13, 1994

TABLE 1

SUMMARY OF LABORATORY ANALYSES
SOIL

Date	Sample	Depth (feet)	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes	TOG
8/03/94	WO1(9)	9	97♦	46	0.12	0.11	0.12	0.47	1,400
	WO1(14)*	14	--	--	--	--	--	--	ND
	WOSW1	9	--	--	--	--	--	--	160
	WOSW2	9	1,400♦	960	2.2	2.6	9.5	22	17,000
	WOSW3	9	--	--	--	--	--	--	2,200
	WOSW4	9	--	--	--	--	--	--	2,400

only sump left in place

Date	Sample	Bromoform	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-dichlorobenzene
8/03/94	WO1(9)**	ND	22	ND	ND
	WOSW2**	220	1,800	63	540

	Acenaphthene	Anthracene	Benzo(a)anthracene	Benzo(b)fluoranthene
WO1(9)	6,500	9,900	5,300	5,000
WOSW2	3,300	6,100	4,000	3,300

	Benzo(a)pyrene	Chrysene	Dibenzofuran	Fluoranthene	Fluorene
WO1(9)	4,300	7,500	3,400	25,000	6,600
WOSW2	2,900	4,800	ND	15,000	3,800

	2-Methylnaphthalene	Naphthalene	Phenanthrene	Pyrene
WO1(9)	8,500	4,700	38,000	24,000
WOSW2	28,000	10,000	22,000	14,000

TABLE 1 (Continued)

SUMMARY OF LABORATORY ANALYSES
SOIL

Date	Sample	Cadmium	Chromium	Lead	Nickel	Zinc
8/03/94	WO1(9)	ND	28	21	31	34
	WOSW2	1.2	33	39	35	42

* All EPA method 8270 constituents were non-detectable.

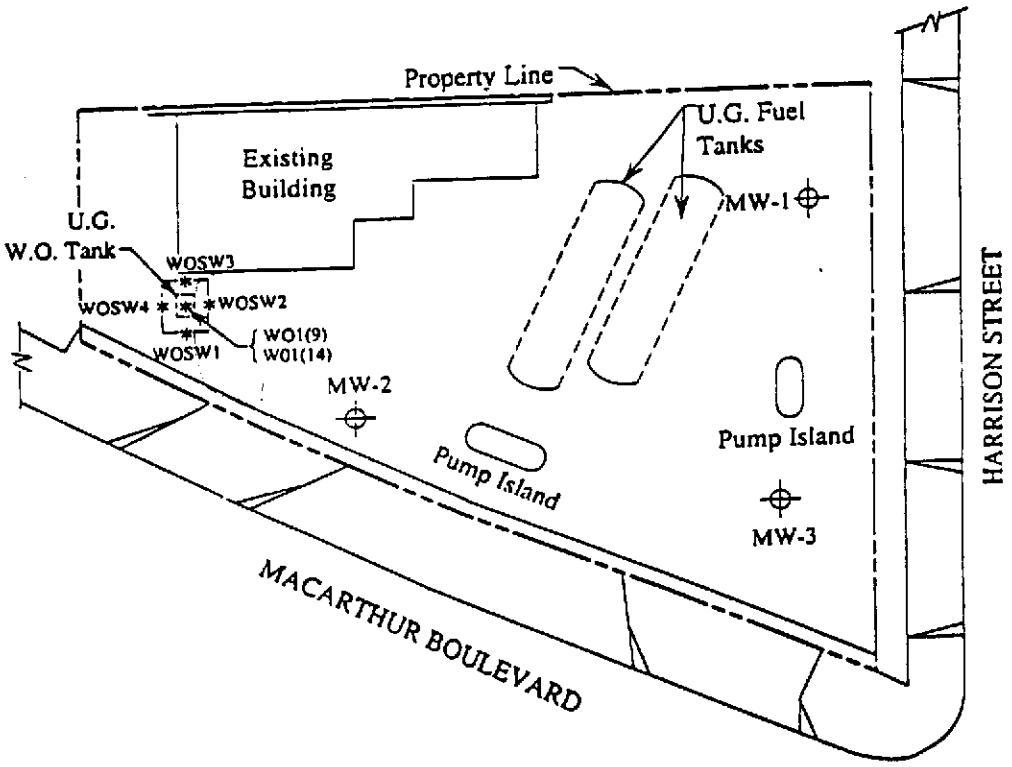
** All other EPA methods 8010 and 8270 constituents were non-detectable.

♦ Sequoia Analytical Laboratory reported that the hydrocarbons detected appeared to be a diesel and non-diesel mixture.

-- Indicates analysis was not performed.

ND = Non-detectable.

Results are in milligrams per kilogram (mg/kg), except for EPA methods 8010 and 8270 constituents, which were reported in micrograms per kilogram (µg/kg).



LEGEND

⊕ Monitoring well

* Sample point location

0 30 60

Approx. scale feet

SITE PLAN

KAPREALIAN ENGINEERING INCORPORATED

UNOCAL SERVICE STATION # 1871
96 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

FIGURE 1

Table 1 - Chemical Analytical Data

Former Tosco 76 Branded Facility No. 1871
96 Mac Arthur Boulevard
Oakland, California

Sample ID	Date Collected	Sample Depth (feet)	TPHg (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl-Benzene (ppm)	Xylenes (ppm)	MTBE (ppm)	TPHd (ppm)	O&G (ppm)	HVOCs (ppm)	SVOCs (ppm)
GASOLINE UST PIT EXCAVATION (SOIL)												
SW1	5/11/98	11.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	1.9	NR	NR	NR	NR
SW2	5/11/98	11.5	<1.0	0.031	<0.0050	<0.0050	0.015	3.8	NR	NR	NR	NR
SW3	5/11/98	11.5	2,000	9.7	29	38	150	16	NR	NR	NR	NR
SW4	5/11/98	11.5	1,800	5.5	82	49	290	15	NR	NR	NR	NR
SW3-5	5/12/98	11.0	5.0[4]	0.049	0.051	0.050	0.20	6.6	NR	NR	NR	NR
SW4-5	5/12/98	11.0	<1.0	0.080	<0.0050	<0.0050	0.039	12	NR	NR	NR	NR
GASOLINE UST PIT EXCAVATION (WATER)												
Water-FT	5/11/98	NA	620	<0.0005	18	13	83	<0.0025	NR	NR	NR	NR
WASTE OIL UST PIT EXCAVATION (SOIL)												
WO1	5/11/98	11.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<1.0	140	ND	ND
WASTE OIL UST PIT EXCAVATION (WATER)												
Water-WO	5/11/98	NA	0.090[4]	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	0.890[7]	<1.0	ND[2]	ND
PRODUCT PUMP ISLANDS (SOIL)												
P1	5/11/98	4.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	0.74	NR	NR	NR	NR
P2	5/11/98	4.0	15[3]	<0.0050	0.056	0.10	0.19	<0.050	NR	NR	NR	NR
HOIST EXCAVATIONS (SOIL)												
H-1[1]	5/12/98	8.0	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
H-2[1]	5/12/98	8.0	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
DISPOSAL CHARACTERIZATION SAMPLE (SOIL FROM WASTE OIL UST PIT)												
WO SP1	5/12/98	NA	<1.0	<0.0050	<0.0050	<0.0050	0.014	NR	6.8[5]	110	ND	ND[6]

Table 1 - Chemical Analytical Data

Former Tosco 76 Branded Facility No. 1871
96 Mac Arthur Boulevard
Oakland, California

Sample ID	Date Collected	TPHg (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl-Benzene (ppm)	Xylenes (ppm)	Total Lead (ppm)
DISPOSAL CHARACTERIZATION SAMPLES							
SP1 (A-D)	5/12/98	<1.0	<0.0050	<0.0050	<0.0050	0.015	19
SP1 (E-H)	5/12/98	170[3]	2.9	0.74	0.78	3.2	2.2
SP1 (I-L)	5/12/98	60	1.5	5.5	6.6	27	5.9
SP1 (M-P)	5/12/98	380	1.6	5.6	7.5	34	4.6
SP1 (Q-T)	5/12/98	50	0.32	0.90	0.81	3.5	4.9
SP1 (U-X)	5/12/98	1,200	9.0	26	28	100	2.1
SP1 (Y,Z,1,2)	5/12/98	130	0.94	2.8	2.3	12	3.5
SP1 (3,4,5,6)	5/12/98	13[4]	0.36	0.57	0.22	0.92	1.9

Sample ID	Date Collected	Lead (ppm)	Chromium (ppm)	Nickel (ppm)	Zinc (ppm)	Cadmium (ppm)
WO1	5/11/98	1.0	18	21	61	<0.50
WO SP1	5/12/98	3.0	30	56	57	<0.50
Water-WO	5/11/98	<0.020	0.053	0.055	0.065	<0.010

EXPLANATION:

ND = none detected
NA = not applicable
ppm = parts per million
NR = analysis not requested
MTBE = methyl tert-butyl ether

ANALYTICAL LABORATORY:

Sequoia Analytical (ELAP # 1271)

Table 1 - Chemical Analytical Data

Former Tosco 76 Branded Facility No. 1871

96 Mac Arthur Boulevard

Oakland, California

NOTES:

[1] = TPH as hydraulic fluid was non-detectable.

[2] = None of the analytes detected except bromodichloromethane (0.0058 ppm), chloroform (0 014 ppm), dibromochloromethane (0 0019 ppm), 1,4-dichlorobenzene (0.00089 ppm 1,2-dichlorobenzene (0.0028 ppm), and tetrachloroethene (0.0017 ppm).

[3] = Laboratory reports indicates gasoline and unidentified hydrocarbons >C8

[4] = Laboratory reports indicates gasoline and discrete peaks

[5] = Laboratory reports indicates unidentified hydrocarbons >C16

[6] = Non of the analytes detected except for phenanthrene (0.350 ppm), pyrene (0.380 ppm), and fluoranthene (0380 ppm).

[7] = Laboratory reports indicates unidentified hydrocarbons <C14

ANALYTICAL METHODS:

TPHg = Total Petroleum Hydrocarbons as gasoline according to EPA Method 8015 Modified.

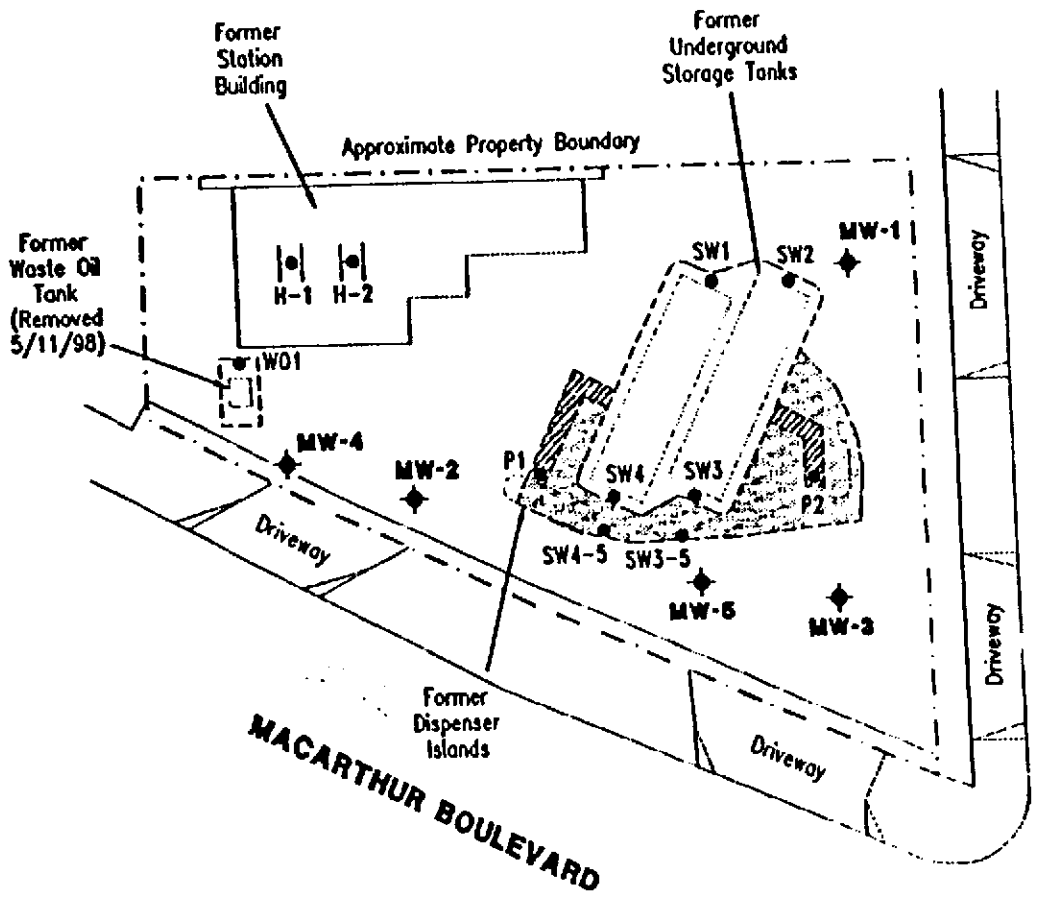
TPHd = Total Petroleum Hydrocarbons as diesel according to EPA Method 8015 Modified.

O&G = Total recoverable petroleum oil according to Standard Methods 5520 E&F(Gravimetric).

HVOCs = Halogenated volatile organic compounds according to EPA Method 8010.

SVOCs = Semi-volatile organic compounds according to EPA Method 8270.

Metals = EPA Method 6010.



EXPLANATION

- Groundwater monitoring well
- Soil sample location
- Product piping trench
- Tank excavation
- Over excavation

N

0 30

Scale in Feet

Source: Figure Modified From Drawing Provided By MPDS Services, Inc.

FIGURE 2

Gettler - Ryan Inc.

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

SITE PLAN/SOIL SAMPLE LOCATION MAP
Former Tosco 76 Branded Facility No. 1871
96 MacArthur Boulevard
Oakland, California

JOB NUMBER 140165.02

REVIEWED BY

DATE July, 1998

REVISED DATE

KEI-P94-0601.R4
May 17, 1996

TABLE 4

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected by KEI on March 20, 1996)

Sample Number	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Ethyl-benzene	Xylenes	TOG	EPA Method 8010 Constituents	EPA Method 8270 Constituents
EB1(5)	ND	ND	ND	ND	ND	ND	ND	ND[2]	ND
EB1(10)	ND	ND	ND	ND	ND	ND	ND	ND	ND
EB2(5)	ND	ND	ND	ND	ND	ND	ND	ND	ND
EB2(10)	73[1]	5.7	ND	0.0094	ND	0.035	540	ND	ND[5]
MW4(5)	1.1[1]	ND	ND	ND	0.0052	0.019	ND	ND[3]	ND
MW4(9.5)	350[1]	24	ND	0.74	0.15	0.48	1,000	ND[4]	ND[6]
MW5(5)	--	ND	ND	ND	ND	ND	--	--	--
MW5(9)	--	ND	0.023	ND	ND	ND	--	--	--

NOTE: The soil samples were collected at the depths below grade indicated in the ( ) of the respective sample number.

ND = Non-detectable.

-- Indicates analysis was not performed.

Results are in milligrams per kilogram (mg/kg), unless otherwise indicated.

.0050

TABLE 4 (Continued)

SUMMARY OF LABORATORY ANALYSES
SOIL

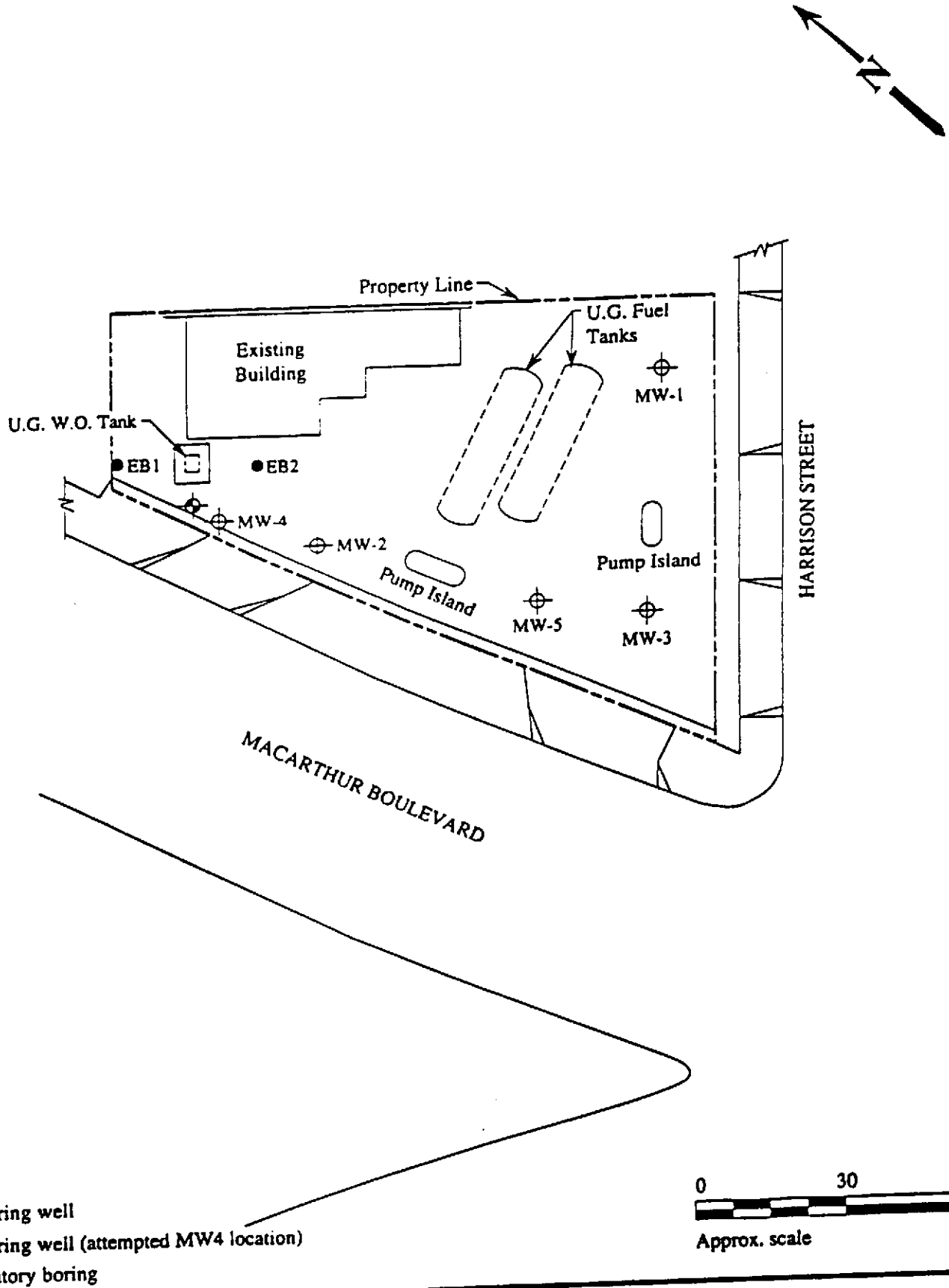
FOOTNOTES

(1) Sequoia Analytical Laboratory reported that the extractable hydrocarbons detected were "unidentified hydrocarbons."
(2) 1,1-dichloroethene was detected at a concentration of 6.0 micrograms per kilogram (µg/kg).
(3) 1,1-dichloroethene and tetrachloroethene were detected at concentrations of 11 and 8.7 µg/kg, respectively.
(4) 1,2-dichlorobenzene and 1,4-dichlorobenzene were detected at concentrations of 37 and 12 µg/kg, respectively.
(5) All EPA method 8270 constituents were non-detectable, except for the following five compounds:

Compound	Concentration (µg/kg)
Benzo(k)fluoranthene	190
Chrysene	180
Fluoranthene	610
Phenanthrene	100
Pyrene	690

(6) All EPA method 8270 constituents were non-detectable, except for the following 11 compounds:

Compound	Concentration (µg/kg)	Compound	Concentration (µg/kg)
Acenaphthene	170	Fluoranthene	860
Anthracene	350	Fluorene	190
Benzo(a)anthracene	260	Naphthalene	150
Benzo(b)fluoranthene	240	Phenanthrene	1,300
Benzo(a)pyrene	160	Pyrene	960
Chrysene	290		



LEGEND

- Monitoring well
- Monitoring well (attempted MW4 location)
- Exploratory boring

0 30 60

Approx. scale feet

EXPLORATORY BORING AND MONITORING WELL LOCATION MAP

KAPREALIAN ENGINEERING INCORPORATED

UNOCAL SERVICE STATION # 1871
96 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

FIGURE 3

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (650) 364-9600, FAX (650) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (925) 988-9600, FAX (925) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100
1455 McDowell Blvd. North, Ste. D, Petaluma, CA 94954, (707) 792-1865, FAX (707) 792-0342

Gettler Ryan/Geostrategies
6747 Sierra Court Suite J
Dublin, CA 94568

Attention: Barbara Sieminsk

Client Proj. ID: Unocal #140165.01
Sample Descript: EB3-9.5
Matrix: SOLID
Analysis Method: 8015Mod/8020
Lab Number: 9809D14-01

Sampled: 09/16/98
Received: 09/18/98
Extracted: 09/23/98
Analyzed: 09/24/98
Reported: 09/29/98

QC Batch Number: GC092398BTEXEXA
Instrument ID: GCHP22

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit mg/Kg	Sample Results mg/Kg
TPPH as Gas	1.0	N.D.
Methyl t-Butyl Ether	0.025	N.D.
Benzene	0.0050	N.D.
Toluene	0.0050	N.D.
Ethyl Benzene	0.0050	N.D.
Xylenes (Total)	0.0050	N.D.
Chromatogram Pattern:		

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	105
4-Bromofluorobenzene	60	140	98

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Tod Granicher
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (650) 364-9600, FAX (650) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (925) 988-9600, FAX (925) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100
1455 McDowell Blvd. North, Ste. D, Petaluma, CA 94954, (707) 792-1865, FAX (707) 792-0342

Gettler Ryan/Geostrategies
6747 Sierra Court, Ste. J
Dublin, CA 94568
Attention: Barbara Siminski

Client Project ID: Uncoal #141065.01

QC Sample Group: 9809D14

Reported: Sep 29, 1998

QUALITY CONTROL DATA REPORT

Matrix:	Solid
Method:	EPA 8015
Analyst:	N.H.
ANALYTE	Gasoline

QC Batch #: GC092398BTEXEXA

Sample No.:	9809891-15
Date Prepared:	9/23/98
Date Analyzed:	9/23/98
Instrument I.D.#:	GCHP01
Sample Conc., mg/Kg:	N.D.
Conc. Spiked, mg/Kg:	5.0
Matrix Spike, mg/Kg:	6.5
% Recovery:	130
Matrix Spike Duplicate, mg/Kg:	4.5
% Recovery:	90
Relative % Difference:	36
RPD Control Limits:	0-25

LCS Batch#: GC092398BTEXEXA

Date Prepared:	9/23/98
Date Analyzed:	9/23/98
Instrument I.D.#:	GCHP01
Conc. Spiked, mg/Kg:	5.0
Recovery, mg/Kg:	5.9
LCS % Recovery:	118

Percent Recovery Control Limits:

MS/MSD	60-140
LCS	70-130

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Tod Granicher
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (650) 364-9600, FAX (650) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (925) 988-9600, FAX (925) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100
1455 McDowell Blvd. North, Ste. D, Petaluma, CA 94954, (707) 792-1865, FAX (707) 792-0342

Gettler Ryan/Geostrategies
6747 Sierra Court Suite J
Dublin, CA 94568
Attention: Barbara Sieminsk

Client Proj. ID: Unocal #140165.01

Lab Proj. ID: 9809D14

Received: 09/18/98

Reported: 09/29/98

LABORATORY NARRATIVE

In order to properly interpret this report, it must be reproduced in its entirety. This report contains a total of 4 pages including the laboratory narrative, sample results, quality control, and related documents as required (cover page, COC, raw data, etc.).

SEQUOIA ANALYTICAL

Tod Granicher
Project Manager

UNOCAL 76

☐ 680 Chesapeake Drive • Redwood City, CA 94063 • (415) 364-9600
☐ 819 Striker Ave., Suite 8 • Sacramento, CA 95834 • (916) 921-9600
☐ 404 N. Wiget Lane • Walnut Creek, CA 94598 • (510) 988-9600
☐ 18939 120th Ave., N.E., Suite 101 • Bothell, WA 98011 • (206) 481-9200
☐ East 11115 Montgomery, Suite B • Spokane, WA 99206 • (509) 924-9200
☐ 15055 S.W. Sequoia Pkwy, Suite 110 • Portland, OR 97222 • (503) 624-9800

Consultant Company: Gettler - Ryan Inc	Project Name: 96 MacArthur Blvd, Oakland, Job # 140165.01
Address: 6747 Sierra Ct, Ste J	~~UNOCAL~~ Project Manager: Tina Berry
City: Dublin State: CA Zip Code: 94568	AFE #:
Telephone: (925) 551-7555 FAX #: (925) 551-7888	Site #, City, State: 1871, Oakland, CA
Report To: Barbara Sieminski Sampler: Barbara Sieminski	QC Data: ☑ Level D (Standard) ☐ Level C ☐ Level B ☐ Level A

Turnaround Time: ☑ 10 Work Days ☐ 5 Work Days ☐ 3 Work Days ☐ 2 Work Days ☐ 1 Work Day ☐ 2-8 Hours

CODE: ☐ Misc. ☐ Detect. ☐ Eval. ☐ Remed. ☐ Demol. ☐ Closure

☐ Drinking Water ☐ Waste Water ☐ Other

Analyses Requested

	Client Sample I.D.	Date/Time Sampled	Matrix Desc.	# of Cont.	Cont. Type	Laboratory Sample #	TPH gas/BTEX/MTBE	Comments
X	1. EB3-9.5	09/16/98	Soil	1	tube	61	X	
	2.							
	3.							
	4.							
	5.							
	6.							
	7.							
	8.							
	9.							
	10.							

Relinquished By: Barbara Sieminski	Date: 09/18/98	Time: 1440	Received By: Charles Crumpton	Date: 9-18-98	Time: 1440
Relinquished By: Charles Crumpton	Date: 9-18-98	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By Lab:	Date: 9/18/98	Time: 1834

Were Samples Received in Good Condition? ☒ Yes ☐ No Samples on Ice? ☒ Yes ☐ No Method of Shipment FS Page __ of __

To be completed upon receipt of report:

1) Were the analyses requested on the Chain of Custody reported? ☐ Yes ☐ No If no, what analyses are still needed? _____

2) Was the report issued within the requested turnaround time? ☐ Yes ☐ No If no, what was the turnaround time? _____

Approved by: _____ Signature: _____ Company: _____ Date: _____

Pink - Client
Yellow - Laboratory
White - Laboratory

KEI-P94-0601.R4
May 17, 1996

TABLE 5

SUMMARY OF LABORATORY ANALYSES
WATER

(Collected by KEI on March 20, 1996)

Sample Number	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Ethyl-benzene	Xylenes	TOG (mg/L)	EPA Method 8010 Constituents	EPA Method 8270 Constituents
EB1	ND	ND	ND	ND	ND	1.3	ND	ND(1)	ND
EB2	410	1,400	690	41	25	64	ND	ND	ND(2)

ND = Non-detectable.

mg/L = milligrams per liter.

Results are in micrograms per liter (µg/L), unless otherwise indicated.

FOOTNOTES:

(1) 1,1-dichloroethane was detected at a concentration of 0.54 µg/L.

(2) All EPA method 8270 constituents were non-detectable, except for the following four compounds: fluoranthene at 2.2 µg/L, naphthalene at 26 µg/L, pyrene at 2.4 µg/L, and 2-methylnaphthalene at 2.2 µg/L.

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (650) 364-9600, FAX (650) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (925) 988-9600, FAX (925) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100
1455 McDowell Blvd. North, Ste. D, Petaluma, CA 94954, (707) 792-1865, FAX (707) 792-0342

Gettler Ryan/Geostrategies
6747 Sierra Court Suite J
Dublin, CA 94568

Attention: Deanna Harding

Client Proj. ID: 96 MacArthur Blvd #140165.01
Sample Descript: EB3-W
Matrix: LIQUID
Analysis Method: 8015Mod/8020
Lab Number: 9809D94-01

Sampled: 09/16/98
Received: 09/18/98

Analyzed: 09/28/98
Reported: 10/01/98

QC Batch Number: GC092898BTEX21A
Instrument ID: GCHP21

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit ug/L	Sample Results ug/L
TPPH as Gas	50	N.D.
Methyl t-Butyl Ether	**2.5**	**3.6**
Benzene	0.50	N.D.
Toluene	0.50	N.D.
Ethyl Benzene	0.50	N.D.
Xylenes (Total)	0.50	N.D.
Chromatogram Pattern:		

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	92

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Tod Granicher
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (650) 364-9600, FAX (650) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (925) 988-9600, FAX (925) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100
1455 McDowell Blvd. North, Ste. D, Petaluma, CA 94954, (707) 792-1865, FAX (707) 792-0342

Gettler Ryan/Geostrategies
6747 Sierra Court, Ste. J
Dublin, CA 94568
Attention: Deanna Harding

Client Project ID: 96 MacArthur Blvd. #140165.01

QC Sample Group: 9809D94

Reported: Oct 1, 1998

QUALITY CONTROL DATA REPORT

Matrix:	Liquid			
Method:	EPA 8020			
Analyst:	GR/DB			
ANALYTE	Benzene	Toluene	Ethylbenzene	Xylenes
QC Batch #:	GC092898BTEX21A			
Sample No.:	GW9809917-2			
Date Prepared:	9/28/98	9/28/98	9/28/98	9/28/98
Date Analyzed:	9/28/98	9/28/98	9/28/98	9/28/98
Instrument I.D.#:	GCGP21	GCGP21	GCGP21	GCGP21
Sample Conc., ug/L:	N.D.	N.D.	N.D.	N.D.
Conc. Spiked, ug/L:	10	10	10	30
Matrix Spike, ug/L:	9.7	9.8	9.9	30
% Recovery:	97	98	99	101
Matrix Spike Duplicate, ug/L:	10	10	10	31
% Recovery:	100	100	101	102
Relative % Difference:	3.0	2.0	2.0	0.99
RPD Control Limits:	0-25	0-25	0-25	0-25

LCS Batch#:	GWLCS092898A			
Date Prepared:	9/28/98	9/28/98	9/28/98	9/28/98
Date Analyzed:	9/28/98	9/28/98	9/28/98	9/28/98
Instrument I.D.#:	GCGP21	GCGP21	GCGP21	GCGP21
Conc. Spiked, ug/L:	10	10	10	30
LCS Recovery, ug/L:	10	10	10	30
LCS % Recovery:	100	100	101	101

Percent Recovery Control Limits:

MS/MSD	60-140	60-140	60-140	60-140
LCS	70-130	70-130	70-130	70-130

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Tod Granicher
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (650) 364-9600, FAX (650) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (925) 988-9600, FAX (925) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100
1455 McDowell Blvd. North, Ste. D, Petaluma, CA 94954, (707) 792-1865, FAX (707) 792-0342

Gettler Ryan/Geostrategies
6747 Sierra Court Suite J
Dublin, CA 94568
Attention: Deanna Harding

Client Proj. ID: 96 MacArthur Blvd #140165.01

Lab Proj. ID: 9809D94

Received: 09/18/98

Reported: 10/01/98

LABORATORY NARRATIVE

In order to properly interpret this report, it must be reproduced in its entirety. This report contains a total of 4 pages including the laboratory narrative, sample results, quality control, and related documents as required (cover page, COC, raw data, etc.).

SEQUOIA ANALYTICAL

Tod Granicher
Project Manager

UNOCAL 76

☑ 680 Chesapeake Drive • Redwood City, CA 94063 • (415) 364-9600
☐ 819 Striker Ave., Suite 8 • Sacramento, CA 95834 • (916) 921-9600
☐ 404 N. Wiget Lane • Walnut Creek, CA 94598 • (510) 988-9600
☐ 18939 120th Ave., N.E., Suite 101 • Bothell, WA 98011 • (206) 481-9200
☐ East 11115 Montgomery, Suite B • Spokane, WA 99206 • (509) 924-9200
☐ 15055 S.W. Sequoia Pkwy, Suite 110 • Portland, OR 97222 • (503) 624-9800

Consultant Company: Gettler-Ryan Inc	Project Name: 96 MacArthur Blvd, Oakland, Job#14016
Address: 6747 Sierra Ct, Ste J	~~UNOCAL~~ Project Manager: Tina Berry
City: Dublin State: CA Zip Code: 94568	AFE #:
Telephone: (925) 551-7555 FAX #: (925) 551-7888	Site #, City, State: 1871, Oakland, CA
Report To: Barbara Sieminski Sampler: Barbara Sieminski	QC Data: ☑ Level D (Standard) ☐ Level C ☐ Level B ☐ Level A

Turnaround Time: ☑ 10 Work Days ☐ 5 Work Days ☐ 3 Work Days ☐ 2 Work Days ☐ 1 Work Day ☐ 2-8 Hours

CODE: ☐ Misc. ☐ Detect. ☐ Eval. ☐ Remed. ☐ Demol. ☐ Closure

☐ Drinking Water ☐ Waste Water ☐ Other

Analyses Requested: 9809D94

Client Sample I.D.	Date/Time Sampled	Matrix Desc.	# of Cont.	Cont. Type	Laboratory Sample #	TPH as / BTEX / MTBE	Comments
1. EB3-W	09/16/98	water	4 VOAs	VOA		Note on dptmt. ppwk. that Hold Time up 09/30/98.	hold Ryan per Doug Lee at Gettler Ryan 9/23/98 @ 10
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							

Relinquished By: Barbara Sieminski	Date: 09/18/98	Time: 1440	Received By: Charles Livingston	Date: 9-18-98	Time: 1440
Relinquished By: Charles Livingston	Date: 9-18-98	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By Lab:	Date: 9/18/98	Time: 1534

Were Samples Received in Good Condition? ☒ Yes ☐ No Samples on Ice? ☒ Yes ☐ No Method of Shipment: FS Page __ of __

To be completed upon receipt of report:

Were the analyses requested on the Chain of Custody reported? ☐ Yes ☐ No If no, what analyses are still needed? _____

Was the report issued within the requested turnaround time? ☐ Yes ☐ No If no, what was the turnaround time? _____

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)	B	T	E	X	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
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	--
	07/24/95	9.94	66.67	960	20	ND	4.2	6.2	--

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)	B	T	E	X	MTBE
				<---ppb--->					
MW-2	10/23/95	10.70	65.91	ND	ND	ND	ND	ND	19
(cont)	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
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

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)	B	T	E	X	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
					0.005	0.005	0.005	0.005	2,920
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
Trip Blank									
TB-LB	01/14/98	--	--	ND	ND	ND	ND	ND	ND
	07/01/98	--	--	ND	ND	ND	ND	ND	ND

1998

Average last Year

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.

Table 2

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

Well ID	Date	TPH(D)	TOG	VOC	SVOC
		<---------- ppb ---------->			
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

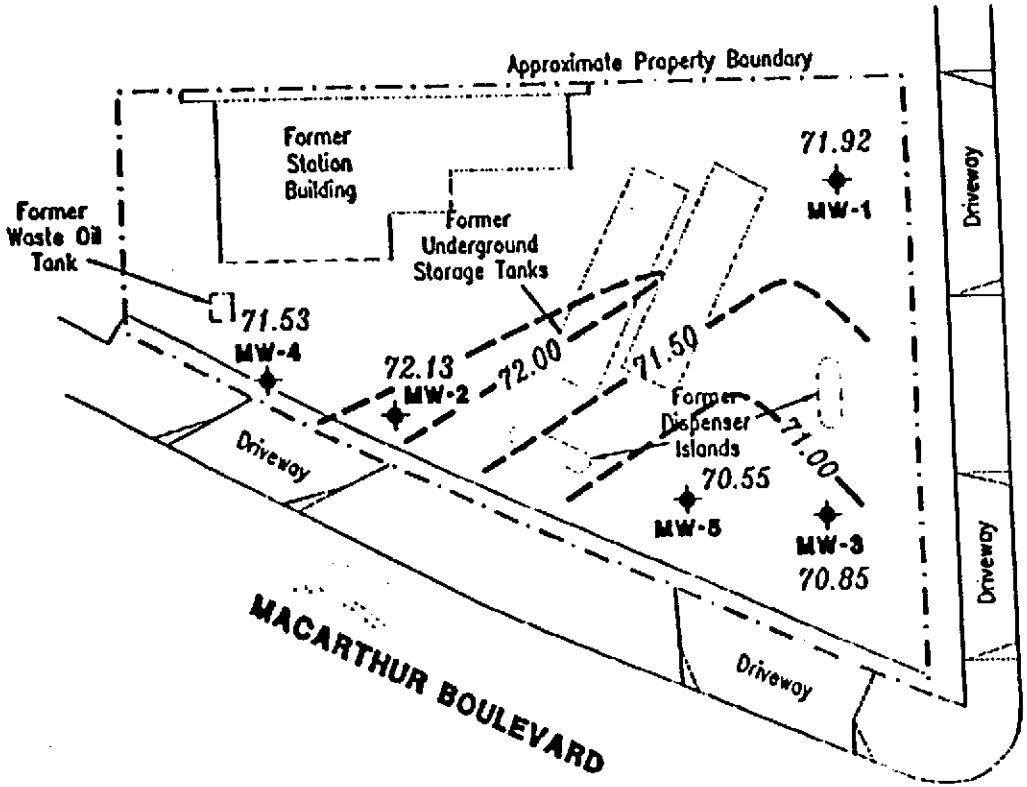
EXPLANATIONS:

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
VOC = 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.

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



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 0.03 Ft./Ft.

0 30

Scale In Feet

Source: Figure Modified From Drawing Provided By MPDS Services, Inc.

FIGURE 1

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

POTENTIOMETRIC MAP
Tosco (Former Unocal) Service Station No. 1871
96 MacArthur Boulevard
Oakland, California

JOB NUMBER 180068 | REVIEWED BY | DATE July 1, 1998 | REVISED DATE