



Chevron

December 18, 1997

Mr. Barney Chan
Alameda County Health Care Services
Department of Environmental Health
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Marketing - Sales West
Phone 510 842-9500

**Re: Chevron Service Station #9-0076
4265 Foothill Blvd.
Oakland, California**

286-17867

Dear Mr. Chan:

Enclosed is a copy of the Risk Based Corrective Action (RBCA) Tier 2 Risk Evaluation, dated December 12, 1997, that was prepared for this site by Chevron Research and Technology Company and at the request of Mr. Barney Chan, Alameda County Health Care Services. This risk evaluation was based on the indoor air inhalation of vapors from subsurface soil and groundwater present at the site.

The exposure pathway modeled was for the inhalation of vapors by an adult receptor directly above the contaminant sources. Contaminants of concerns (COC) in the soil and groundwater were BTEX and MtBE and risk ranges of $1e-5$ and $1e-6$ were used for the commercial and residential exposure scenarios. Representative concentrations for this evaluation were the 95% Upper Confidence Limit (UCL) values for soil and groundwater calculated in the GSI ASTM RBCA software package. Site-specific target levels (SSTL's) for each COC at a specific target risk value, $1e-5$ or $1e-6$, were generated based on site-specific and default parameter data for the site. These SSTL's were then compared to the 95% UCL concentrations and risk values were estimated for the indoor air inhalation of vapors from site soils and groundwater for the residential and commercial exposure scenarios.

The estimated risk for residential exposure to indoor air inhalation of vapors is exceeded for the site soils but not for the groundwater. The estimated risk for commercial exposure to indoor inhalation of vapors is not exceeded for soils and groundwater.

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December 18, 1997
Mr. Barney Chan
Chevron Service Station # 9-0076
Page 2

Therefore, based on the results of this RBCA evaluation, residential exposure to inhalation of vapors from site groundwater would not pose a potential health risk, however, the exposure from the inhalation of vapors from the soils would pose a potential residential health risk. Commercial exposure to inhalation of vapors from site soil and groundwater would not pose a potential health risk. Because residences are not located directly above the site soils, the modeled potential health risk by the residential exposure pathway may not be considered significant. The modeled commercial health risk to site workers does not exceed the $1e-5$ risk level and may not be considered significant.

If you have any questions or comments to this RBCA contact Curt Peck at (510) 242-7086 or myself at (510) 842-9136.

If you have any questions, call me at (510) 842-9136.

Sincerely,
CHEVRON PRODUCTS COMPANY



Philip R. Briggs
Site Assessment and Remediation Project Manager

Enclosure

cc. Mr. Alex Perez
Shell Oil Company
PO Box 8080
Martinez, CA 94553

American Stores Properties, Inc.
348 East South Temple Street
Salt Lake City, UT 84111
Attn. Barbara Russell

Mr. Curt Peck, CRTC, RIC 100/10-3514

Mr. Bill Scudder, Chevron

MEMORANDUM

December 12, 1997
Richmond, California

**RBCA Evaluation
Indoor Inhalation from Soil and Groundwater
Chevron Service Station #9-0076
4265 Foothill Boulevard
Oakland, California**

Mr. Phil Briggs:
San Ramon, California

This memorandum is submitted to fulfill a request by Barney Chan, Alameda County Health Care Services Department, to complete a risk evaluation based on the indoor air inhalation of vapors from subsurface soil and groundwater present at this site. Contaminants of concern (COC's) in the soil and groundwater were BTEX and MTBE and risk ranges of $1e-5$ and $1e-6$ were used for the commercial and residential exposure scenarios. Soil boring data from site assessment and product pipeline replacement activities were used to determine contaminant concentrations in the site soils. Groundwater data from the past year of sampling from the 9 monitoring wells at the site were used to determine the dissolved contaminant concentration and average depth to groundwater for the site. Representative concentrations for this evaluation were the 95% Upper Confidence Limit (UCL) values for soil and groundwater calculated in the GSI ASTM RBCA software package. Site-specific target levels (SSTL's) for each COC at a specific target risk value, either $1e-5$ or $1e-6$, were generated based on site-specific and default parameter data for the site. These SSTL's were then compared to the 95% UCL concentrations and risk values were estimated for the indoor air inhalation of vapors from site soils and groundwater for the residential and commercial exposure scenarios.

Exposure Scenarios

The exposure pathway modeled was for indoor air inhalation of vapors from site soils and groundwater. This exposure pathway assumes that the receptor (adult) is located directly above the contaminant sources. Exposure parameters for both residential and commercial exposure are presented in Output Tables 1A and 1B. Output Table 1A gives the parameters used in the model for the residential evaluation. Site-specific parameters for vadose zone thickness, capillary zone thickness, depth to groundwater and vertical extent of soil contamination were input with the model default parameters to generate an estimated health risk value for this exposure route. Soil and groundwater data were used to generate SSTL's for this site. Output Table 1B lists the exposure parameters input into the RBCA model for the commercial exposure evaluation.

Results

The estimated risk associated with residential exposure to indoor air inhalation of vapors from site subsurface soils and groundwater is $1.2e-5$, above the $1e-6$ estimated risk value considered acceptable for residential exposure. The estimated risk is driven by the site soils (specifically, samples C-A-8.5' and C-2-9') and not by the site groundwater. The site soils generate the $1.2e-5$ risk value and the site groundwater generates a $6.4e-7$ risk value. The soil SSTL (at $1e-6$) for benzene is 0.0074 mg/Kg, which is exceeded by the 95% UCL concentration of 0.085 mg/Kg. The groundwater SSTL (at $1e-6$) for benzene is 0.15 mg/L, above the 95% UCL concentration of 0.096 mg/L.

*9/10/97
over
average*

The estimated risk associated with commercial exposure to indoor inhalation of vapors from site subsurface soils and groundwater is $4.6e-6$, below the $1e-5$ estimated risk value considered acceptable for commercial exposure. Again, the estimated risk is driven by the site soils (samples C-A-8' and C-2-9') and not by the site groundwater. The site soils generate the $4.5e-6$ risk value and the site groundwater generates a $2e-7$ risk value. The soil SSTL (at $1e-5$) for benzene is 0.19 mg/Kg, above the 95% UCL concentration of 0.085 mg/Kg. The groundwater SSTL (at $1e-5$) for benzene is 4.8 mg/L, above the 95% UCL concentration of 0.096 mg/L.

Summary

Based on the results of this RBCA evaluation, site soil contaminant levels may generate a potential human health risk for residential exposure to inhalation of indoor vapors from site soils. Residential exposure to inhalation of vapors from site groundwater would not pose a potential health risk and commercial exposure to indoor inhalation of vapors from both soil and groundwater would also not pose a potential health risk. Because residences are not located directly above the site soils, the modeled potential health threat by the residential exposure pathway may not be considered significant. The modeled commercial health threat to site workers does not exceed the $1e-5$ risk level and may not be considered significant.

Please contact me at 242-7086 with questions or comments regarding this evaluation.

Sincerely,



Curtis A. Peck
SeniorHydrogeologist

Attachments:

Residential:

- RBCA Output Table 1A - Residential
- RBCA Worksheet 8.3 - Tier 2 Baseline Risk Summary Table
- RBCA Worksheet 9.2 - Subsurface Soil SSTL's
- RBCA Worksheet 9.3 - Groundwater SSTL's
- RBCA Worksheet 8.1 - Tier 2 Exposure and Intake Calculation - Soil and Groundwater
- RBCA Worksheet 8.2 - Tier 2 Pathway Risk Calculation
- RBCA Worksheet 5.5 - Soil Concentration Summary
- RBCA Worksheet 5.6 - Groundwater Concentration Summary
- Site Plan - Groundwater Monitoring Wells
- Table of Well Data and Analytical Results - Groundwater
- Table 1 - Analytical Results - Product Pipeline (7/97)
- Table 1 - Soil Sample Analysis - Borings (9/87)
- Table 2 - Soil Sample Analysis - Borings (8&11/90)

Commercial:

- RBCA Output Table 1B - Commercial
- RBCA Worksheet 8.3 - Tier 2 Baseline Risk Summary Table
- RBCA Worksheet 9.2 - Subsurface Soil SSTL's
- RBCA Worksheet 9.3 - Groundwater SSTL's
- RBCA Worksheet 8.1 - Tier 2 Exposure and Intake Calculation - Soil and Groundwater
- RBCA Worksheet 8.2 - Tier 2 Pathway Risk Calculation

RBCA TIER 1/TIER 2 EVALUATION

Output Table 1A

Site Name: Chevron SS #9-0076 Job Identification: 9-0076
 Site Location: 4265 Foothill Blvd., Oakland CA Date Completed: 12/10/97
 Completed By: Curt Peck

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			Commercial/Industrial	
		Adult	(1-5yrs)	(1-16 yrs)	Chronic	Constructn
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
I	Averaging time for vapor flux (yr)	30			25	1
EF	Exposure Frequency (days/yr)	350			250	180
EF Derm	Exposure Frequency for dermal exposure	350			250	
IRgw	Ingestion Rate of Water (L/day)	2			1	
IRs	Ingestion Rate of Soil (mg/day)	100	200		50	100
IRadj	Adjusted soil ing. rate (mg-yr/kg-d)	1.1E+02			9.4E+01	
IRa.in	Inhalation rate indoor (m ³ /day)	15			20	
IRa.out	Inhalation rate outdoor (m ³ /day)	20			20	10
SA	Skin surface area (dermal) (cm ²)	5.8E+03		2.0E+03	5.8E+03	5.8E+03
SAadj	Adjusted dermal area (cm ² -yr/kg)	2.1E+03			1.7E+03	
M	Soil to Skin adherence factor	1				
AAFs	Age adjustment on soil ingestion	FALSE			FALSE	
AAFd	Age adjustment on skin surface area	FALSE			FALSE	
tox	Use EPA tox data for air (or PEL based)?	TRUE				
gwMCL?	Use MCL as exposure limit in groundwater?	FALSE				

Surface Parameters		Definition (Units)	Residential	Constructn
A		Contaminated soil area (cm ²)	2.2E+06	1.0E+06
W		Length of affect. soil parallel to wind (cm)	1.5E+03	1.0E+03
W.gw		Length of affect. soil parallel to groundwater (cm)	1.5E+03	
Uair		Ambient air velocity in mixing zone (cm/s)	2.5E+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 /h)	6.9E-14	

Groundwater Parameters	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)	2.5E+03
Ugw.tr	Groundwater seepage velocity (cm/yr)	6.6E+03
Ks	Saturated hydraulic conductivity (cm/s)	
grad	Groundwater gradient (cm/cm)	
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
loc.sat	Fraction organic carbon in water-bearing unit	1.0E-03
BIO?	Is bioattenuation considered?	FALSE
BC	Biodegradation Capacity (mg/L)	

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

Soil Parameters	Definition (Units)	Value
hc	Capillary zone thickness (cm)	<u>5.1E+01</u> 2'
hw	Vadose zone thickness (cm)	<u>5.9E+02</u> (7.7')
rho	Soil density (g/cm ³)	1.7
foc	Fraction of organic carbon in vadose zone	0.01
phi	Soil porosity in vadose zone	0.38
Lgw	Depth to groundwater (cm)	<u>6.0E+02</u> 19.7'
Ls	Depth to top of affected subsurface soil (cm)	<u>1.2E+02</u> 4'
Lsubs	Thickness of affected subsurface soils (cm)	<u>8.2E+02</u> 27'
pH	Soil/groundwater pH	6.5
		capillary vadose foundation
phi.w	Volumetric water content	0.342 0.12 0.12
phi.a	Volumetric air content	0.038 0.26 0.26

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

Building Parameters	Definition (Units)	Residential	Commercial
Lb	Building volume/area ratio (cm)	2.0E+02	3.0E+02
ER	Building air exchange rate (h ⁻¹)	1.4E-04	2.3E-04
Lcrk	Foundation crack thickness (cm)	1.5E+01	
eta	Foundation crack fraction	0.01	

Matrix of Target Risks	Definition	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	2	

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 SITE ASSESSMENT

Tier 2 Worksheet 8.3

Site Name: Chevron SS #9-0076

Completed By: Curt Peck

Site Location: 4265 Foothill Blvd., Oakland CA

Date Completed: 12/10/1997

1 of 1

TIER 2 BASELINE RISK SUMMARY TABLE

EXPOSURE PATHWAY	BASELINE CARCINOGENIC RISK					BASELINE TOXIC EFFECTS				
	Individual COC Risk		Cumulative COC Risk		Risk Limit(s) Exceeded?	Hazard Quotient		Hazard Index		Toxicity Limit(s) Exceeded?
	Maximum Value	Target Risk	Total Value	Target Risk		Maximum Value	Applicable Limit	Total Value	Applicable Limit	
OUTDOOR AIR EXPOSURE PATHWAYS										
Complete:	NC	1.0E-6	NC	N/A	<input type="checkbox"/>	NC	1.0E+0	NC	N/A	<input type="checkbox"/>
INDOOR AIR EXPOSURE PATHWAYS										
Complete:	1.2E-5	1.0E-6	1.2E-5	N/A	<input checked="" type="checkbox"/>	5.7E-1	1.0E+0	6.2E-1	N/A	<input type="checkbox"/>
SOIL EXPOSURE PATHWAYS										
Complete:	NC	1.0E-6	NC	N/A	<input type="checkbox"/>	NC	1.0E+0	NC	N/A	<input type="checkbox"/>
GROUNDWATER EXPOSURE PATHWAYS										
Complete:	NC	1.0E-6	NC	N/A	<input type="checkbox"/>	NC	1.0E+0	NC	N/A	<input type="checkbox"/>
CRITICAL EXPOSURE PATHWAY (Select Maximum Values From Complete Pathways)										
	1.2E-5	1.0E-6	1.2E-5	N/A	<input checked="" type="checkbox"/>	5.7E-1	1.0E+0	6.2E-1	N/A	<input type="checkbox"/>

Software: GSI RBCA Spreadsheet

Serial: G-303-YDX-938

RBCA SITE ASSESSMENT

Tier 2 Worksheet 9.2

Site Name: Chevron SS #9-0076

Completed By: Curt Peck

1 OF 1

Site Location: 4265 Foothill Blvd., Oakland CA

Date Completed: 12/10/1997

Calculation Option: 1

**SUBSURFACE SOIL SSTL VALUES
(> 3.3 FT BGS)**

Target Risk (Class A & B) 1.0E-6

MCL exposure limit?

Target Risk (Class C) 1.0E-5

PEL exposure limit?

Target Hazard Quotient 1.0E+0

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

CONSTITUENTS OF CONCERN		Representative Concentration	Soil Leaching to Groundwater			Soil Volatilization to Indoor Air		Soil Volatilization to Outdoor Air		Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	Name	(mg/kg)	Residential (on-site)	Commercial (on-site)	Regulatory(MCL) (on-site)	Residential (on-site)	Commercial (on-site)	Residential (on-site)	Commercial (on-site)	(mg/kg)	■* If yes	Only if "yes" left
71-43-2	Benzene	8.5E-2	NA	NA	NA	7.4E-3	NA	NA	NA	7.4E-3	■	1.1E+01
100-41-4	Ethylbenzene	3.9E-2	NA	NA	NA	3.6E+1	NA	NA	NA	3.6E+1	<input type="checkbox"/>	<1
1634-04-4	Methyl t-Butyl Ether	1.0E+1	NA	NA	NA	2.5E+2	NA	NA	NA	2.5E+2	<input type="checkbox"/>	<1
108-88-3	Toluene	7.7E-2	NA	NA	NA	2.1E+1	NA	NA	NA	2.1E+1	<input type="checkbox"/>	<1
1330-20-7	Xylene (mixed isomers)	4.8E-1	NA	NA	NA	>Res	NA	NA	NA	>Res	<input type="checkbox"/>	<1

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

Software: GSI RBCA Spreadsheet

Serial: G-303-YDX-938

RBCA SITE ASSESSMENT

Tier 2 Worksheet 9.3

Site Name: Chevron SS #9-0076

Completed By: Curt Peck

Site Location: 4265 Foothill Blvd., Oakland CA

Date Completed: 12/10/1997

1 OF 1

GROUNDWATER SSTL VALUES

Target Risk (Class A & B) 1.0E-6

MCL exposure limit?

Calculation Option: 1

Target Risk (Class C) 1.0E-5

PEL exposure limit?

Target Hazard Quotient 1.0E+0

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

CONSTITUENTS OF CONCERN		Representative Concentration (mg/L)	Groundwater Ingestion			Groundwater Volatilization to Indoor Air		Groundwater Volatilization to Outdoor Air		Applicable SSTL (mg/L)	SSTL Exceeded ? <input type="checkbox"/> * If yes	Required CRF Only if "yes" left
			Residential (on-site)	Commercial (on-site)	Regulatory(MCL) (on-site)	Residential (on-site)	Commercial (on-site)	Residential (on-site)	Commercial (on-site)			
71-43-2	Benzene	9.6E-2	NA	NA	NA	1.5E-1	NA	NA	NA	1.5E-1	<input type="checkbox"/>	<1
100-41-4	Ethylbenzene	1.9E-2	NA	NA	NA	>Sol	NA	NA	NA	>Sol	<input type="checkbox"/>	<1
1634-04-4	Methyl t-Butyl Ether	4.7E-2	NA	NA	NA	2.0E+3	NA	NA	NA	2.0E+3	<input type="checkbox"/>	<1
108-88-3	Toluene	1.0E-2	NA	NA	NA	2.2E+2	NA	NA	NA	2.2E+2	<input type="checkbox"/>	<1
1330-20-7	Xylene (mixed isomers)	2.8E-2	NA	NA	NA	>Sol	NA	NA	NA	>Sol	<input type="checkbox"/>	<1

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

Software: GSI RBCA Spreadsheet

Serial: G-303-YDX-938

Site Name: Chevron SS #9-0076

Site Location: 4265 Foothill Blvd., Oakland CA

Completed By: Curt Peck

Date Completed: 12/10/1997

4 OF 9

TIER 2 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		2) NAF Value (m ³ /kg)		3) Exposure Medium		4) Exposure Multiplier		5) Average Daily Intake Rate	
	Subsurface Soil Conc (mg/kg)	On-Site Residential	Receptor	On-Site Residential	Indoor Air: POE Conc. (µg/m ³) (1) / (2)	On-Site Residential	(R ₁ EF ₁ ED) ₁ /BW ₁ AT (m ³ /kg-day)	On-Site Residential	(mg/kg-day) (3) X (4)	On-Site Residential
Benzene	8.5E-2		1.9E+1		4.5E-3		8.8E-2		4.0E-4	
Ethylbenzene	3.9E-2		2.6E+1		1.5E-3		2.1E-1		3.1E-4	
Methyl t-Butyl Ether	1.0E+1		5.9E+1		1.7E-1		2.1E-1		3.5E-2	
Toluene	7.7E-2		3.8E+1		2.0E-3		2.1E-1		4.1E-4	
Xylene (mixed isomers)	4.8E-1		7.0E+1		6.8E-3		2.1E-1		1.4E-3	

NOTE: ABS = Dermal absorption factor (dim) BW = Body weight (kg) EF = Exposure frequency (days/yr) POE = Point of exposure
 AF = Adherence factor (mg/cm²) CF = Units conversion factor ET = Exposure time (hrs/day) SA = Skin exposure area (cm²/day)
 AT = Averaging time (days) ED = Exposure duration (yrs) IR = Inhalation rate (m³/day)

Site Name: Chevron SS #9-0076

Site Location: 4265 Foothill Blvd., Oakland (Completed By: Curt Peck

Date Completed: 12/10/1997

5 OF 9

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS

(CHECKED IF PATHWAY IS ACTIVE)

GROUNDWATER:

Exposure Concentration

VAPOR INTRUSION TO BUILDINGS

Constituents of Concern

1) Source Medium
Groundwater Conc.
(mg/L)

2) NAF Value (m³/L)
Receptor

On-Site Residential

3) Exposure Medium
Indoor Air: POE Conc. (mg/m³) (1) / (2)

On-Site Residential

4) Exposure Multiplier
(IR*EF*ED)/(BW*AT) (m³/kg-day)

On-Site Residential

5) Average Daily Intake Rate
(mg/kg-day) (3) X (4)

On-Site Residential

TOTAL PATHWAY INTAKE (mg/kg-day)

(Sum intake values from subsurface & groundwater routes.)

On-Site Residential

	Groundwater Conc. (mg/L)	On-Site Residential	On-Site Residential	On-Site Residential	On-Site Residential	On-Site Residential	On-Site Residential
Benzene	9.6E-2	3.9E+2	2.4E-4	8.6E-2	2.1E-5	4.2E-4	
Ethylbenzene	1.9E-2	3.9E+2	5.0E-5	2.1E-1	1.0E-5	3.2E-4	
Methyl t-Butyl Ether	4.7E-2	4.8E+2	1.0E-4	2.1E-1	2.0E-5	3.5E-2	
Toluene	1.0E-2	4.0E+2	2.5E-5	2.1E-1	5.2E-6	4.2E-4	
Xylene (mixed isomers)	2.8E-2	4.3E+2	6.5E-5	2.1E-1	1.3E-5	1.4E-3	

NOTE: ABS = Dermal absorption factor (dim)
AF = Adherence factor (mg/cm²)
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 (m³/day)

POE = Point of exposure
SA = Skin exposure area (cm²/day)

Site Name: Chevron SS #9-0076

Site Location: 4265 Foothill Blvd., Oakland CA

Completed By: Curt Peck

Date Completed: 12/10/1997

2 OF 4

TIER 2 PATHWAY RISK CALCULATION

INDOOR AIR EXPOSURE PATHWAYS

(CHECKED IF PATHWAYS ARE ACTIVE)

Constituents of Concern	CARCINOGENIC RISK				TOXIC EFFECTS			
	(1) EPA	(2) Total Carcinogenic Intake Rate (mg/kg/day)	(3) Inhalation Slope Factor	(4) Individual COC Risk (2) x (3)	(5) Total Toxicant Intake Rate (mg/kg/day)	(6) Inhalation Reference Dose	(7) Individual COC Hazard Quotient (5) / (6)	
	Carcinogenic Classification	On-Site Residential	(mg/kg-day) ⁻¹	On-Site Residential	On-Site Residential	(mg/kg-day)	On-Site Residential	
Benzene	A	4.2E-4	2.9E-2	1.2E-5	9.8E-4	1.7E-3	5.7E-1	
Ethylbenzene	D				3.2E-4	2.9E-1	1.1E-3	
Methyl t-Butyl Ether					3.5E-2	8.6E-1	4.1E-2	
Toluene	D				4.2E-4	1.1E-1	3.7E-3	
Xylene (mixed isomers)	D				1.4E-3	2.0E+0	7.0E-4	

Total Pathway Carcinogenic Risk = 1.2E-5 0.0E+0

Total Pathway Hazard Index = 6.2E-1 0.0E+0

Site Name: Chevron SS #9-0076

Completed By: Curt Peck

Site Location: 4265 Foothill Blvd., Oakland CA

Date Completed: 12/10/1997

1 of 1

TIER 2 SUBSURFACE SOIL CONCENTRATION DATA SUMMARY

CONSTITUENTS DETECTED		Analytical Method	Detected Concentrations				
		Typical Detection Limit (mg/kg)	No. of Samples	No. of Detects	Maximum Conc. (mg/kg)	Mean Conc. (mg/kg)	UCL on Mean Conc. (mg/kg)
71-43-2	Benzene	5.0E-03	38	24	3.3E+01	4.0E-02	8.5E-02
100-41-4	Ethylbenzene	5.0E-03	23	8	3.6E+00	1.5E-02	3.9E-02
1634-04-4	Methyl t-Butyl Ether	2.5E+00	5	5	1.0E+01	6.1E+00	1.0E+01
108-88-3	Toluene	5.0E-03	38	22	5.4E+01	3.6E-02	7.7E-02
1330-20-7	Xylene (mixed isomers)	5.0E-03	38	34	3.5E+02	2.1E-01	4.8E-01

Serial: G-303-YDX-93I

Software: GSI RBCA Spreadsheet

Version: 1.0.1

**SCREEN 7.3
SUBSURFACE SOILS
CONCENTRATION
CALCULATOR**

UCL Percentile

95%

Analytical Data (Up to 50 Data Points)

1 2 3 4 5 6 7 8 9 10 11

Calculated Distribution of Data
Default Detection Limit (mg/kg)

Lognormal	0.005
Lognormal	0.005
Normal	2.5
Lognormal	0.005
Lognormal	0.005

	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Sample Name	CA-10	CA-20	CA-25	C-1-10	C-1-20	C-1-30	C-2-10	C-2-20	C-2-30	C-3-10	C-3-20
Date Sampled											
(B)	33	2	1.8	0.05	0.05	0.05	16	0.07	0.93	0.05	0.05
	12	0.1	0.1	0.1	0.1	0.1	54	0.8	0.1	0.1	0.1
	350	2	0.4	0.4	0.4	0.4	120	0.4	3	0.4	0.4

boring CA-10 near C-1

C1-C4 (MW1-4)
C5-C8 (MW5-8)

12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
C-3-30	C-4-10	C-4-20	C-4-30	C-5-11	C-5-16	C-5-21	C-5-26	C-6-16	C-6-21	C-6-31	C-6-41	C-7-11	C-7-16	C-7-21	C-7-31
				8/1/90	8/1/90	8/1/90	8/1/90	8/1/90	8/1/90	8/1/90	8/1/90	8/1/90	8/1/90	8/1/90	8/1/90
0.05	3.9	0.05	0.05	0.5	ND	ND	ND	ND	ND	0.2	ND	ND	ND	0.02	ND
				0.8	ND	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND
0.1	23	0.1	0.1	1.7	0.008	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
0.4	46	0.4	0.4	4.5	0.02	0.015	0.015	0.015	0.015	0.3	0.015	0.015	0.015	0.015	0.015

28 29 30 31 32 33 34 35 36 37 38 39

SP1-4

(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
C-7-41	C-8-5.5	C-8-40	C-8-45	PL1-4	PL2-4	PL3-4	PL4-4	PL5-4	SP1-A-D	SP2-A-D	
8/1/90	8/1/90	8/1/90	8/1/90	7/21/97	7/21/97	7/21/97	7/21/97	7/21/97	7/21/97	7/21/97	

[B]

0.007	ND	ND	ND	0.031	0.64	0.2	ND	0.64	0.034	ND	
ND	ND	ND	ND	0.023	3.6	0.88	0.87	0.71	0.29	ND	
				2.5	1.25	10	10	6.9			
ND	ND	ND	ND	0.016	0.9	0.15	ND	0.25	0.045	ND	
0.015	ND	ND	ND	0.19	11	4.4	3.5	0.51	0.93	ND	

Site Name: Chevron SS #9-0076

Completed By: Curt Peck

Site Location: 4265 Foothill Blvd., Oakland CA Date Completed: 12/10/1997

1 of 1

TIER 2 GROUNDWATER CONCENTRATION DATA SUMMARY

CONSTITUENTS DETECTED		Analytical Method	Detected Concentrations				
			Typical Detection Limit (mg/L)	No. of Samples	No. of Detects	Maximum Conc. (mg/L)	Mean Conc. (mg/L)
CAS No.	Name						
71-43-2	Benzene	5.0E-04	44	31	6.6E+00	3.5E-02	9.6E-02
100-41-4	Ethylbenzene	5.0E-04	44	28	1.8E+00	8.4E-03	1.9E-02
1634-04-4	Methyl t-Butyl Ether	2.5E-03	42	23	4.6E+00	2.2E-02	4.7E-02
108-88-3	Toluene	5.0E-04	44	27	1.2E+00	4.8E-03	1.0E-02
1330-20-7	Xylene (mixed isomers)	5.0E-04	44	29	6.3E+00	1.1E-02	2.8E-02

22 pp 6

**SCREEN 7.1
GROUNDWATER
CONCENTRATION
CALCULATOR**

Choose UCL Percentile

95%

Analytical Data (Up to 50 Data Points)

1 2 3 4 5 6 7 8 9 10 11

Calculated Distribution of Data
Default Detection Limit
(mg/L)

Lognormal	0.0005
Lognormal	0.0005
Lognormal	0.0025
Lognormal	0.0005
Lognormal	0.0005

	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Well Name	C-1	C-1	C-1	C-1	C-1	C-2	C-2	C-2	C-2	C-2	C-2
Date Sampled	9/6/96	12/19/96	3/17/97	6/11/97	9/17/97	9/20/95	12/6/95	3/17/97	6/11/97	9/17/97	
	0.024	0.12	0.66	0.13	0.16	6.6	5	4.8	5.5	4.8	
	0.01	0.013	0.015	0.016	0.013	1.6	1.8	1.8	1.4	1.2	
	0.043	0.025	0.11	0.13	0.18			3.4	3.1	3.2	
	0.00056	0.022	0.01	0.002	0.023	0.33	0.086	1.2	0.72	0.22	
	0.0024	0.019	0.01	0.0034	0.049	5.5	3.7	6.3	4.1	1.8	

12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

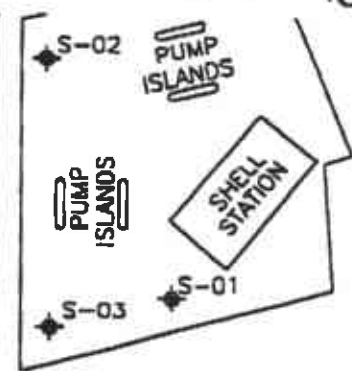
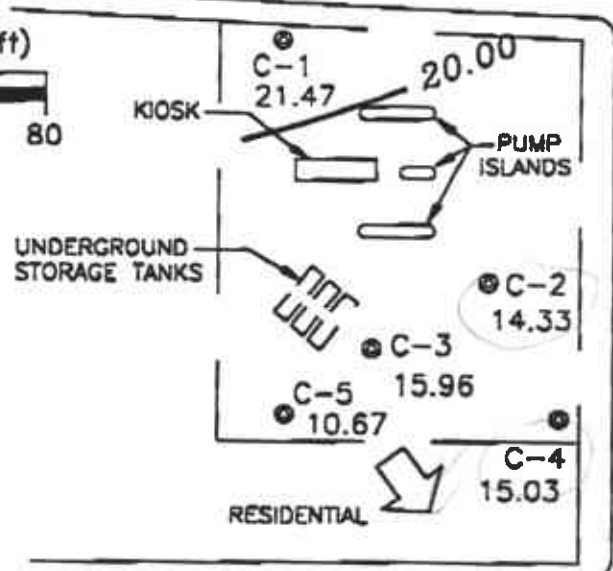
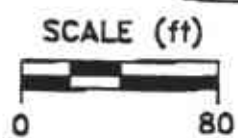
(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
C-3	C-3	C-3	C-3	C-3	C-4	C-4	C-4	C-4	C-4	C-5	C-5	C-5	C-5	C-6	C-6
9/6/96	12/19/96	3/17/97	6/11/97	9/17/97	9/6/96	12/19/96	3/17/97	6/11/97	9/17/97	9/6/96	12/19/96	3/17/97	6/11/97	6/21/96	9/6/96
0.0009	0.036	0.0011	0.0011	0.019	0.5	4.9	5.8	4.4	4.3	nd	nd	nd	nd	0.56	0.72
nd	0.0065	nd	nd	0.0066	0.23	1.1	1.4	0.79	0.94	nd	nd	nd	nd	0.018	0.013
nd	nd	nd	nd	0.013	3.1	0.25	1.7	2	4.6	nd	nd	nd	nd	0.077	0.16
nd	0.033	nd	nd	0.019	0.2	0.32	0.7	0.52	0.14	nd	nd	nd	nd	0.005	0.01
nd	0.028	0.00076	nd	0.04	1	2	2.2	1.8	1.1	nd	nd	nd	nd	0.005	0.01

28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43

(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
C-6	C-6	C-6	C-6	C-7	C-7	C-7	C-7	C-7	C-7	C-8	C-8	C-8	C-8	C-9	C-9
12/19/96	3/17/97	6/11/97	9/17/97	9/6/96	12/19/96	3/17/97	6/11/97	9/17/97	9/6/96	12/19/96	3/17/97	6/11/97	8/13/96	9/6/96	12/19/96
0.32	0.5	0.57	0.33	3.4	0.0086	0.31	0.015	0.12	nd	nd	nd	nd	nd	nd	nd
0.0025	0.025	0.029	0.0025	0.46	0.00085	0.11	0.0033	0.031	nd	nd	nd	nd	nd	nd	nd
0.014	0.05	0.22	0.076	0.25	nd	0.098	nd	0.054	nd	nd	nd	nd	nd	nd	nd
0.0025	0.01	0.005	0.0025	0.05	0.0005	0.048	nd	0.011	nd	nd	nd	nd	nd	nd	nd
0.0025	0.01	0.01	0.0025	0.85	0.0034	0.31	0.0051	0.084	nd	nd	nd	nd	nd	nd	nd

Post-it® Fax Note	7671	Date	10-23-97	# of pages	18
To	CURT PAUL	From	PHIL BRIGGS		
Co./Dept.	CRTC		Monitoring Well		
Phone #			data sheets list		
Fax #	242-1380		D.O and ORP.		

Results



BOND STREET

HIGH STREET

EAST 17th STREET

EXPLANATION

- MONITORING WELL LOCATION
- 15.96 GROUNDWATER ELEVATION (FT. MSL)
- 20.00 — GROUNDWATER ELEVATION CONTOUR (FT. MSL)
- ➔ APPROXIMATE GROUNDWATER FLOW DIRECTION; APPROXIMATE GRADIENT = 0.04



Revised from Geoconsultants, Inc.

PREPARED BY RRM engineering contracting firm	Chevron Station 9-0076 4265 Foothill Boulevard Oakland, California	FIGURE: 1
	GROUNDWATER ELEVATION CONTOUR MAP, SEPTEMBER 17, 1997	PROJECT: DAC04

Table of Well Data and Analytical Results

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet.			Volumetric Measurements are in gallons.				Analytical results are in parts per billion (ppb)						
DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	SPH Thickness	SPH Removed	Total SPH Removed	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	MTBE
C-1													
04/28/89	35.42	15.37	20.05	--	--	--	--	940	30	1.3	11	13	--
08/08/89	35.42	11.35	24.07	--	--	--	--	820	45	2.0	13	13	--
12/21/89	35.42	12.61	22.81	--	--	--	--	--	--	--	--	--	--
08/27/90	35.42	13.30	22.12	--	--	--	--	440	15	1.0	6.0	13	--
11/04/90	35.42	9.88	25.58	--	--	--	--	--	--	--	--	--	--
06/18/91	35.42	19.78	21.64	--	--	--	--	74	5.8	0.6	1.9	1.3	--
09/19/91	35.42	10.84	24.58	--	--	--	--	150	7.1	>0.5	2.3	3.0	--
12/20/91	35.42	9.25	26.17	--	--	--	--	250	10	>0.5	3.7	1.6	--
03/18/92	35.42	17.17	18.25	--	--	--	--	190	16	>0.5	8.5	2.9	--
07/14/92	35.42	7.81	27.61	--	--	--	--	20,000	480	2200	510	2900	--
10/08/92	35.42	10.98	24.44	--	--	--	--	360	34	4.6	19	12	--
01/08/93	35.42	15.74	19.68	--	--	--	--	120	9.1	0.5	5.1	1.8	--
04/14/93	35.42	18.04	16.38	--	--	--	--	190	74	0.6	1.0	2.0	--
07/16/93	35.42	--	--	--	--	--	--	--	--	--	--	--	--
07/27/93	35.42	26.03	9.39	--	--	--	--	300	12	>0.5	5.0	2.0	--
09/21/93	38.41	16.99	21.42	--	--	--	--	360	12	1.2	5.8	3.7	--
01/28/94	38.41	18.84	19.57	--	--	--	--	370	24	1.0	13	4.0	--
03/17/94	38.41	21.56	16.85	--	--	--	--	460	42	<0.5	6.7	3.7	--
06/16/94	38.41	20.59	17.83	--	--	--	--	320	20	0.7	8.7	3.0	--
08/22/94	38.41	18.15	20.28	--	--	--	--	380	24	0.6	8.8	1.9	--
12/15/94	38.41	22.59	15.82	--	--	--	--	280	23	7.8	7.8	13	--
03/30/95	38.41	26.39	12.02	--	--	--	--	2200	890	8.9	15	<5.0	--
06/20/95	38.41	24.01	14.40	--	--	--	--	690	140	<2.0	9.4	2.8	--
09/20/95	38.41	24.59	13.82	--	--	--	--	730	27	78	28	130	--
12/06/95	38.41	17.61	20.60	--	--	--	--	220	16	<0.5	7.2	1.7	11
03/21/96	38.41	26.78	11.65	--	--	--	--	640	170	<2.0	6.7	<2.0	35
06/21/96	38.41	24.18	14.25	--	--	--	--	640	140	<1.2	8.7	2.0	23
09/06/96	38.41	21.66	16.75	--	--	--	--	460	24	0.56	10	2.4	43
12/19/96	38.41	24.43	13.98	--	--	--	--	790	120	22	13	19	<25
03/17/97	38.41	25.63	12.78	--	--	--	--	2200	660	<10	15	<10	110
06/11/97	38.41	23.25	15.16	--	--	--	--	1500	130	<2.0	18	3.4	130
09/17/97	38.41	21.47	16.94	--	--	--	--	910	160	23	13	49	180

* See table of Additional Analysis

10/23/97 13:28 0510 842 8370 CHEVRON U.S.A. 003/018

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet.			Volumetric Measurements are in gallons.				Analytical results are in parts per billion (ppb)						
DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	SPH Thickness	SPH Removed	Total SPH Removed	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	MTBE
C-2													
04/28/89	35.18	8.74	26.44	--	--	--	--	120,000	30,000	22,000	3000	17,000	--
08/08/89	35.18	5.29	29.90	0.01	--	--	--	--	--	--	--	--	--
12/21/89	35.18	5.86	29.32	--	--	--	--	--	--	--	--	--	--
08/27/90	35.18	5.77	29.55	0.17	--	--	--	--	--	--	--	--	--
11/04/90	35.18	4.71	30.47	--	--	--	--	--	--	--	--	--	--
06/18/91	35.18	6.90	28.33	0.06	--	--	--	--	--	--	--	--	--
09/19/91	35.18	5.84	29.39	0.06	--	--	--	170,000	20,000	10,000	2800	18,000	--
12/20/91	35.18	5.95	29.23	--	--	--	--	--	--	--	--	--	--
03/18/92	35.18	21.58	13.60	0.09	--	--	--	--	--	--	--	--	--
07/14/92	35.18	--	--	--	--	--	--	--	--	--	--	--	--
10/08/92	35.18	--	--	--	--	--	--	--	--	--	--	--	--
01/08/93	35.18	10.98	24.20	Sheen	--	--	--	79,000	14,000	7200	3500	16,000	--
04/14/93	35.18	--	--	--	--	--	--	--	--	--	--	--	--
07/16/93	35.18	5.03	30.15	--	--	--	--	2200	440	73	24	350	--
09/21/93	37.47	11.18	26.29	--	--	--	--	11,000	2300	300	270	910	--
01/28/94	37.47	13.51	23.98	--	--	--	--	49,000	11,000	3900	1600	12,000	--
03/17/94	37.47	11.48	25.99	--	--	--	--	16,000	3300	1000	220	3500	--
06/18/94	37.47	19.55	23.92	--	--	--	--	20,000	4800	1500	520	4300	--
09/22/94	37.47	11.85	25.62	--	--	--	--	35,000	5600	850	1700	7300	--
12/15/94	37.47	16.31	21.18	--	--	--	--	96,000	9000	3500	3300	13,000	--
03/30/95	37.47	20.29	17.18	--	--	--	--	100,000	9400	3700	3900	14,000	--
06/20/95	37.47	18.52	18.95	--	--	--	--	93,000	6400	1900	2900	11,000	--
09/20/95	37.47	19.27	18.20	--	--	--	--	58,000	6600	330	1600	5500	--
12/06/95	37.47	12.71	24.76	--	--	--	--	40,000	5000	88	1800	3700	<500
03/21/96	37.47	21.30	16.17	0.00	0.132	0.130	--	--	--	--	--	--	--
06/21/96	37.47	19.34	18.15	0.02	0.028	0.156	--	--	--	--	--	--	--
09/08/96	37.47	16.38	21.14	0.04	0.079	0.235	--	--	--	--	--	--	--
12/19/96	37.47	19.94	17.55	0.03	0.050	0.285	--	--	--	--	--	--	--
03/17/97	37.47	18.88	18.59	--	--	0.285	--	58,000	4800	1200	1800	6300	3400
06/11/97	37.47	16.17	21.30	--	--	0.285	--	40,000	5500	720	1400	4100	3100
09/17/97	37.47	14.33	23.14	--	--	0.285	--	30,000	4800	220	1200	1800	3200

* See table of Additional Analysis

10/23/97 13:28 6510 842 8370 CHEVRON U.S.A. 0004/018

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet.			Volumetric Measurements are in gallons.				Analytical results are in parts per billion (ppb)						
DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	SPH Thickness	SPH Removed	Total SPH Removed	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	MTBE
C-3													
04/28/89	35.28	7.28	28.00	--	--	--	--	<500	1.7	<0.5	<0.5	<0.5	--
08/08/89	35.28	5.28	30.00	--	--	--	--	<500	1.0	<0.5	<0.5	<0.5	--
12/21/89	35.28	4.75	30.53	--	--	--	--	--	--	--	--	--	--
08/27/90	35.28	5.60	29.68	--	--	--	--	<50	<0.3	<0.3	<0.3	>0.6	--
11/04/90	35.30	4.94	30.36	--	--	--	--	--	--	--	--	--	--
06/18/91	35.30	6.84	28.46	--	--	--	--	52	1.1	<0.5	<0.5	1.2	--
09/19/91	35.30	5.97	29.33	--	--	--	--	73	1.2	<0.5	<0.5	<0.5	--
12/20/91	35.30	5.53	29.77	--	--	--	--	<50	0.7	<0.5	<0.5	>0.5	--
03/18/92	35.30	9.55	25.75	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	--
07/14/92	35.30	7.49	27.87	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	--
10/08/92	35.30	6.75	28.55	--	--	--	--	<50	<0.5	<0.5	<0.5	0.5	--
01/08/93	35.30	9.45	25.85	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
04/14/93	35.30	11.34	23.96	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	--
07/16/93	35.30	9.66	25.64	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	--
09/21/93	38.37	12.15	26.22	--	--	--	--	<50	0.7	>0.5	<0.5	>0.6	--
01/28/94	38.37	12.71	25.66	--	--	--	--	<50	2.0	<0.5	<0.5	1.0	--
09/17/94	38.37	13.42	24.95	--	--	--	--	<50	2.8	<0.5	0.6	1.5	--
06/16/94	38.37	14.06	24.31	--	--	--	--	<50	1.4	<0.5	<0.5	<0.5	--
09/22/94	38.37	13.33	25.04	--	--	--	--	<50	0.6	>0.5	<0.5	<0.5	--
12/15/94	38.37	16.15	22.22	--	--	--	--	<50	2.8	1.7	0.82	4.5	--
03/30/95	38.37	19.95	18.42	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
06/20/95	38.37	18.58	19.79	--	--	--	--	110	2.2	>0.5	<0.5	1.2	--
09/20/95	38.37	19.42	18.95	--	--	--	--	580	21	80	23	120	--
12/08/95	38.37	14.21	24.16	--	--	--	--	<50	0.73	>0.5	<0.5	0.67	<2.5
03/21/96	38.37	20.52	17.85	--	--	--	--	<50	<0.5	>0.5	<0.5	<0.5	<2.5
06/21/96	38.37	18.59	19.78	--	--	--	--	57	<0.5	>0.5	<0.5	<0.5	<2.5
09/06/96	38.37	16.74	21.63	--	--	--	--	<50	0.90	>0.5	<0.5	<0.5	<2.5
12/19/96	38.37	16.07	22.30	--	--	--	--	310	36	33	6.5	28	<2.5
03/17/97	38.37	19.42	18.95	--	--	--	--	54	1.1	>0.5	>0.5	0.76	<2.5
06/11/97	38.37	17.22	21.15	--	--	--	--	120	1.1	>0.5	<0.5	<0.5	<2.5
09/17/97	38.37	15.96	22.41	--	--	--	--	240	19	19	6.6	40	13

* See table of Additional Analysis

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet.

Volumetric Measurements are in gallons.

Analytical results are in parts per billion (ppb)

DATE	Well	Ground	Depth	Total			Notes	TPH- Gasoline	Benzene	Toluene	Ethyl- Benzene	Xylene	MTBE
	Head Elev.	Water Elev.	To Water	SPH Thickness	SPH Removed	SPH Removed							
C-4													
01/12/89	33.45	3.96	29.49	--	--	--	--	--	--	--	--	--	--
04/12/89	33.45	6.01	27.44	--	--	--	--	--	--	--	--	--	--
04/28/89	33.45	3.96	29.49	--	--	--	20,000	6300	550	230	1500	--	--
08/08/89	33.45	3.90	29.55	--	--	--	8000	7500	340	88	1000	--	--
12/21/89	33.45	3.43	30.02	--	--	--	--	--	--	--	--	--	--
08/27/90	33.48	4.46	29.02	--	--	--	26,000	10,000	280	410	1400	--	--
11/04/90	33.48	3.67	29.81	--	--	--	--	--	--	--	--	--	--
06/18/91	33.48	6.03	27.45	--	--	--	34,000	14,000	410	450	1300	--	--
09/19/91	33.48	4.89	28.65	--	--	--	16,000	7400	90	110	460	--	--
12/20/91	33.48	4.84	28.84	--	--	--	24,000	12,000	120	260	740	--	--
03/18/92	33.48	11.05	24.49	--	--	--	48,000	8000	1300	1300	2400	--	--
07/14/92	33.48	6.59	26.89	--	--	--	40,000	14,000	920	550	2400	--	--
10/08/92	33.48	5.69	27.79	--	--	--	29,000	13,000	190	110	1400	--	--
01/08/93	33.48	9.98	23.50	--	--	--	25,000	7000	630	860	1800	--	--
04/14/93	33.48	12.95	21.13	--	--	--	27,000	6300	1000	900	1400	--	--
07/16/93	33.48	9.52	23.96	--	--	--	28,000	7800	1100	830	2100	--	--
09/21/93	36.49	10.98	25.51	--	--	--	30,000	9600	130	390	1300	--	--
01/28/94	36.49	13.18	23.31	--	--	--	18,000	7800	440	260	1200	--	--
03/17/94	36.49	15.14	21.35	--	--	--	32,000	7800	820	820	1800	--	--
08/16/94	36.49	13.99	22.50	--	--	--	25,000	7800	710	600	1800	--	--
09/22/94	36.49	12.58	23.93	--	--	--	25,000	7800	140	600	1100	--	--
12/15/94	36.49	17.47	19.02	--	--	--	38,000	7600	460	1200	2000	--	--
03/30/95	36.49	21.63	14.88	--	--	--	41,000	8700	1600	1800	3000	--	--
08/20/95	36.49	19.59	16.90	--	--	--	29,000	6000	890	960	1800	--	--
09/20/95	36.49	20.29	16.20	--	--	--	12,000	6900	510	290	1300	--	--
12/06/95	36.49	13.37	23.12	--	--	--	13,000	3900	42	30	250	<250	<1000
03/21/96	36.49	22.39	14.10	--	--	--	39,000	4800	640	1000	1800	2000	2000
08/21/96	36.49	19.54	16.95	--	--	--	26,000	4400	640	960	1800	2000	3100
09/06/96	36.49	16.36	20.13	--	--	--	23,000	500	200	230	1000	2000	<250
12/19/96	36.49	19.57	16.92	--	--	--	23,000	4900	320	1100	2000	1700	1700
03/17/97	36.49	19.09	17.40	--	--	--	30,000	5800	700	1400	2200	2000	2000
06/11/97	36.49	18.15	18.34	--	--	--	29,000	4400	520	790	1800	2000	2000
09/17/97	36.49	15.03	21.46	--	--	--	17,000	4300	140	840	1100	4600	4600

* See table of Additional Analysis

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet.

Volumetric Measurements are in gallons.

Analytical results are in parts per billion (ppb)

DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	SPH Thickness	SPH Removed	Total SPH Removed	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	MTBE
C-5													
08/27/90	35.50	5.67	29.83	--	--	--	--	<50	<0.3	<0.3	<0.3	<0.8	--
11/14/90	35.50	4.94	30.56	--	--	--	--	--	--	--	--	--	--
06/18/91	35.50	6.98	28.52	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
09/19/91	35.50	5.99	29.51	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
12/20/91	35.50	5.54	29.96	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
03/18/92	35.50	9.58	25.92	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
07/14/92	35.50	7.50	28.00	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
10/08/92	35.50	6.85	28.65	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
01/08/93	35.50	9.48	26.02	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
04/14/93	35.50	11.46	24.04	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
07/16/93	35.50	10.29	25.21	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
09/21/93	38.50	12.14	26.36	--	--	--	--	80	10	8.1	1.9	9.4	--
01/28/94	38.50	12.60	25.90	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
03/17/94	38.50	14.00	24.50	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
06/16/94	38.50	14.10	24.40	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
09/22/94	38.50	13.34	25.16	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
12/15/94	38.50	15.61	22.89	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
03/30/95	38.50	19.98	18.54	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
06/20/95	38.50	18.37	20.13	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
09/20/95	38.50	14.16	24.34	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	2.5
12/06/95	38.50	14.40	24.10	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	2.5
03/21/96	38.50	20.10	18.40	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	8.7
06/21/96	38.50	18.23	20.27	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	2.5
06/08/96	38.50	18.60	21.90	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	2.5
12/19/96	38.50	17.35	21.15	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	2.5
03/17/97	38.50	18.66	19.84	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	2.5
06/11/97	38.50	16.90	21.60	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	2.5
09/17/97	38.50	10.67	27.83	--	--	--	Sampled annually	--	--	--	--	--	--

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet.				Volumetric Measurements are in gallons.				Analytical results are in parts per billion (ppb)					
DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	SPH Thickness	SPH Removed	Total SPH Removed	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	MTBE
C-6													
08/27/90	32.40	-11.71	44.11	--	--	--	--	7200	2100	6.0	41	300	--
11/14/90	32.40	-11.63	44.03	--	--	--	--	--	--	--	--	--	--
05/16/91	32.40	-11.09	43.49	--	--	--	--	4400	2500	18	160	77	--
09/19/91	32.40	-1.82	34.32	--	--	--	--	3100	1600	8.3	73	8.0	--
12/20/91	32.40	-8.95	41.35	--	--	--	--	4400	1300	3.2	74	10	--
03/18/92	32.40	-8.29	40.69	--	--	--	--	9800	3200	34	250	500	--
07/14/92	32.40	-6.49	38.89	--	--	--	--	8500	2200	100	96	240	--
10/08/92	32.40	-6.27	38.67	--	--	--	--	1800	1000	3.1	15	41	--
01/08/93	32.40	-5.41	37.61	--	--	--	--	5200	1600	6.8	63	120	--
04/14/93	32.40	-2.30	34.70	--	--	--	--	11,000	1800	13	110	200	--
07/16/93	32.40	-1.47	33.87	--	--	--	--	4800	820	10	41	57	--
09/21/93	35.40	1.42	33.98	--	--	--	--	4100	1200	<50	75	130	--
01/28/94	35.40	1.54	33.86	--	--	--	--	3100	990	14	40	34	--
03/17/94	35.40	3.09	32.31	--	--	--	--	5100	950	18	61	83	--
06/16/94	35.40	3.90	31.50	--	--	--	--	3800	970	6.4	52	82	--
09/22/94	35.40	4.18	31.22	--	--	--	--	4100	980	7.8	43	46	--
12/15/94	35.40	4.00	31.40	--	--	--	--	5000	1400	<20	73	61	--
03/30/95	35.40	9.02	26.38	--	--	--	--	5500	1700	<13	120	97	--
06/20/95	35.40	10.39	25.01	--	--	--	--	1700	470	<10	29	16	--
09/20/95	35.40	11.35	24.05	--	--	--	--	3500	770	<5.0	45	17	--
12/06/95	35.40	7.28	26.12	--	--	--	--	3100	710	<10	41	20	<50
03/21/96	35.40	12.28	23.12	--	--	--	--	1400	330	>2.5	15	8.1	19
06/21/96	35.40	11.80	23.50	--	--	--	--	2200	560	>5.0	18	<5.0	77
09/06/96	35.40	10.57	24.83	--	--	--	--	2800	720	>10	13	<10	180
12/18/96	35.40	10.90	24.50	--	--	--	--	830	320	<2.5	<2.5	<2.5	14
03/17/97	35.40	12.81	22.59	--	--	--	--	2200	500	>10	25	<10	<50
06/11/97	35.40	11.64	23.76	--	--	--	--	3000	570	<5.0	29	10	220
09/17/97	35.40	10.66	24.74	--	--	--	--	1400	330	<5.0	<5.0	<5.0	76

* See table of Additional Analysis

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet.			Volumetric Measurements are in gallons.				Analytical results are in parts per billion (ppb)						
DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	SPH Thickness	SPH Removed	Total SPH Removed	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	MTBE
C-7													
08/27/80	32.17	-12.08	44.23	--	--	--	--	110	26	0.8	4.0	6.0	--
11/14/90	32.17	-11.94	44.11	--	--	--	--	--	--	--	--	--	--
06/18/91	32.17	-9.88	42.05	--	--	--	--	23,000	5700	420	1000	2800	--
09/19/91	32.17	-9.55	41.72	--	--	--	--	26,000	4600	330	970	2400	--
12/20/91	32.17	-9.50	41.67	--	--	--	--	33,000	5500	270	1000	2100	--
03/18/92	32.17	-9.03	41.20	--	--	--	--	27,000	5800	410	1300	3300	--
07/14/92	32.17	-7.60	39.77	--	--	--	--	46,000	12,000	720	1700	4600	--
10/08/92	32.17	-6.97	39.14	--	--	--	--	22,000	6800	370	1300	3200	--
01/08/93	32.17	-6.33	38.50	--	--	--	--	36,000	7600	540	1700	4200	--
04/14/93	32.17	-3.78	35.93	--	--	--	--	23,000	3100	450	670	1900	--
07/16/93	32.17	-3.21	35.38	--	--	--	--	19,000	3200	330	550	1800	--
09/21/93	35.19	-0.27	35.46	--	--	--	--	17,000	2700	160	410	780	--
01/28/94	35.19	-0.26	35.45	--	--	--	--	14,000	1800	210	390	1000	--
03/17/94	35.19	1.95	33.24	--	--	--	--	17,000	1800	210	410	1200	--
06/16/94	35.19	2.12	33.07	--	--	--	--	12,000	1800	180	410	1200	--
09/22/94	35.19	2.45	32.74	--	--	--	--	10,000	1700	110	320	580	--
12/15/94	35.19	3.27	31.92	--	--	--	--	10,000	1200	120	280	710	--
03/30/95	35.19	7.59	27.60	--	--	--	--	4600	460	73	160	460	--
06/20/95	35.19	7.32	27.87	--	--	--	--	26,000	4400	450	900	2400	--
08/20/95	35.19	7.11	28.08	--	--	--	--	9400	610	81	250	800	--
12/08/95	35.19	4.57	30.62	--	--	--	--	1200	110	12	25	71	34
03/21/96	35.19	7.34	27.85	--	--	--	--	17,000	1300	160	410	1300	<100
06/21/96	35.19	7.77	27.42	--	--	--	--	14,000	1300	210	500	1700	590
09/06/96	35.19	6.84	28.35	--	--	--	--	15,000	3400	<50	460	850	<250
12/19/96	35.19	6.08	29.11	--	--	--	--	530	6.6	0.50	0.85	3.4	<2.5
03/17/97	35.19	8.05	27.14	--	--	--	--	4600	310	48	110	310	98
08/11/97	35.19	7.14	28.05	--	--	--	--	420	15	<0.5	3.3	5.1	<2.5
09/17/97	35.19	6.19	29.00	--	--	--	--	1400	120	11	31	84	54

* See table of Additional Analysis

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet.			Volumetric Measurements are in gallons.				Analytical results are in parts per billion (ppb)						
DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	SPH Thickness	SPH Removed	Total SPH Removed	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	MTBE
C-8													
11/14/90	30.68	-12.61	43.29	--	--	--	--	<50	<0.3	<0.3	<0.3	<0.6	--
08/18/91	30.68	-11.94	42.62	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
09/19/91	30.68	-11.04	41.72	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
12/20/91	30.68	-10.30	40.98	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
03/18/92	30.68	-9.34	40.02	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
07/14/92	30.68	-8.34	39.02	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
10/08/92	30.68	-8.00	38.68	--	--	--	--	<50	<0.5	<0.5	<0.5	1.1	--
01/08/93	30.68	-7.39	38.07	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
04/14/93	30.68	-5.31	35.99	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
07/16/93	30.68	-4.64	35.32	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
09/21/93	34.68	-0.62	35.30	--	--	--	--	<50	<0.5	>0.5	<0.5	>0.8	--
01/28/94	34.68	-0.93	35.61	--	--	--	--	<50	<0.5	>0.5	<0.5	>0.5	--
03/17/94	34.68	0.31	34.37	--	--	--	--	<50	<0.5	>0.5	<0.5	>0.5	--
06/16/94	34.68	1.32	33.36	--	--	--	--	<50	<0.5	>0.5	<0.5	>0.5	--
09/22/94	34.68	1.86	32.82	--	--	--	--	<50	<0.5	>0.5	<0.5	>0.5	--
12/15/94	34.68	2.32	32.36	--	--	--	--	<50	<0.5	>0.5	<0.5	>0.5	--
03/30/95	34.68	5.44	29.24	--	--	--	--	<50	<0.5	>0.5	<0.5	>0.5	--
06/20/95	34.68	6.34	28.34	--	--	--	--	<50	<0.5	>0.5	<0.5	>0.5	--
09/20/95	34.68	5.20	29.48	--	--	--	--	<50	<0.5	>0.5	<0.5	>0.5	--
12/06/95	34.68	3.76	30.92	--	--	--	--	<50	<0.5	>0.5	<0.5	>0.5	<2.5
03/21/96	34.68	6.03	28.65	--	--	--	--	<50	<0.5	>0.5	<0.5	>0.5	<2.5
06/21/96	34.68	6.78	27.90	--	--	--	--	<50	<0.5	>0.5	<0.5	>0.5	<2.5
09/08/96	34.68	5.98	28.70	--	--	--	--	<50	<0.5	>0.5	<0.5	>0.5	<2.5
12/19/96	34.68	4.98	29.70	--	--	--	--	<50	<0.5	>0.5	<0.5	>0.5	<2.5
03/17/97	34.68	6.92	27.76	--	--	--	--	<50	<0.5	>0.5	<0.5	>0.5	<2.5
06/11/97	34.68	5.87	28.81	--	--	--	--	<50	<0.5	>0.5	<0.5	>0.5	<2.5
09/17/97	34.68	5.32	29.36	--	--	--	Sampled annually	--	--	--	--	--	--
C-9													
08/13/96	--	--	28.27	--	--	--	--	ND	ND	ND	ND	ND	ND
09/08/96	--	--	28.47	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
12/19/96	30.68	1.39	29.29	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
03/17/97	30.68	3.11	27.57	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
06/11/97	30.68	2.41	28.27	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
09/17/97	30.68	2.05	28.63	--	--	--	Sampled annually	--	--	--	--	--	--

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet.

Volumetric Measurements are in gallons.

Analytical results are in parts per billion (ppb)

DATE	Well	Ground	Depth	Total			Notes	TPH- Gasoline	Benzene	Toluene	Ethyl- Benzene	Xylene	MTBE
	Head Elev.	Water Elev.	To Water	SPH Thickness	SPH Removed	SPH Removed							
TRIP BLANK													
04/28/88	--	--	--	--	--	--	--	<500	<0.5	<0.5	<0.5	>0.5	--
08/08/89	--	--	--	--	--	--	--	<500	<0.5	<0.5	<0.5	>0.5	--
08/27/90	--	--	--	--	--	--	--	<50	<0.3	<0.3	<0.3	>0.6	--
11/14/90	--	--	--	--	--	--	--	<50	<0.3	<0.3	<0.3	>0.6	--
05/18/91	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	--
08/19/91	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	--
12/20/91	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	--
03/18/92	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	--
07/14/92	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	--
10/08/92	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	--
01/08/93	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	--
04/14/93	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	--
07/16/93	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	--
09/21/93	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.8	--
01/28/94	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	--
03/17/94	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	--
06/16/94	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.6	>0.5	--
08/22/94	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	--
12/15/94	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	--
03/30/95	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	--
06/20/95	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	--
09/20/95	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	--
12/06/95	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	--
03/21/96	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	2.5
06/21/96	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	2.5
09/08/96	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	2.5
12/19/96	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	2.5
03/17/97	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	2.5
06/11/97	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	2.5
09/17/97	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	>0.5	2.5

Cumulative Table of Well Data and Analytical Results

ADDITIONAL ANALYSES

Analytical values are in parts per million (ppm) unless otherwise noted

DATE	Notes	Total Alkalinity mg CaCO ₃ /L	Ferrous Iron	Nitrate as Nitrate	Sulfate
C-1					
09/17/97	--	2.0	1.1	<1.0	12
C-2					
09/17/97	--	560	4.7	<1.0	<1.0
C-3					
09/17/97	--	340	0.012	100	33
C-4					
09/17/97	--	540	5.9	<1.0	<1.0
C-6					
09/17/97	--	620	1.1	<1.0	18
C-7					
09/17/97	--	600	4.8	<1.0	18

Note: Blaine Tech Services, Inc. began routine monitoring of the groundwater wells at this site on November 1, 1994.
Earlier field data and analytical results are drawn from the September 27, 1994 Groundwater Technology, Inc. report.

ABBREVIATIONS:

TPH = Total Petroleum Hydrocarbons

MTBE = Methyl t-Butyl Ether

ND = Not detected at or above the minimum quantitation limit. See laboratory reports for minimum quantitation limits.

Table 1. Analytical Results - Chevron Service Station #9-0076, 4265 Foothill Boulevard, Oakland, California.

Sample Name	Depth (ft)	Date	TPHg ←	Benzene	Toluene	Ethylbenzene ppm	Xylenes	MTBE	Lead →
PL1-4	4.0	07/21/97	1.8	0.031	0.016	0.023	0.19		
PL2-4	4.0	07/21/97	210	0.64	0.90	3.6		2.5	
PL3-4	4.0	07/21/97	34	0.20	0.15	0.88	11	<2.5	
PL4-4	4.0	07/21/97	45	<0.0050	<0.0050	0.87	4.4	10	
PL5-4	4.0	07/21/97	130	0.64	0.25	0.71	3.5	10	
SP1-(A-D)*	--	07/21/97	43 ¹	0.034	0.045	0.29	0.51	6.9	
SP2-(A-D)	--	07/21/97	<1.0	<0.0050	<0.0050	<0.0050	0.93	--	23 (14 ¹ , 0.67 ²) 36

EXPLANATION:

TPHg = Total Petroleum Hydrocarbons as gasoline

MTBE = Methyl t-Butyl Ether

ppm = Parts per million

-- = Not analyzed/not applicable

¹ = Gasoline and unidentified hydrocarbons > CB

² = STLC extract result

³ = TCLP extract result

⁴ = Sample was also analyzed for Halogenated Volatile Organics by EPA Method 8010 - all compounds were not detected.

ANALYTICAL METHODS:

TPHg = EPA Method 8015 Mod.

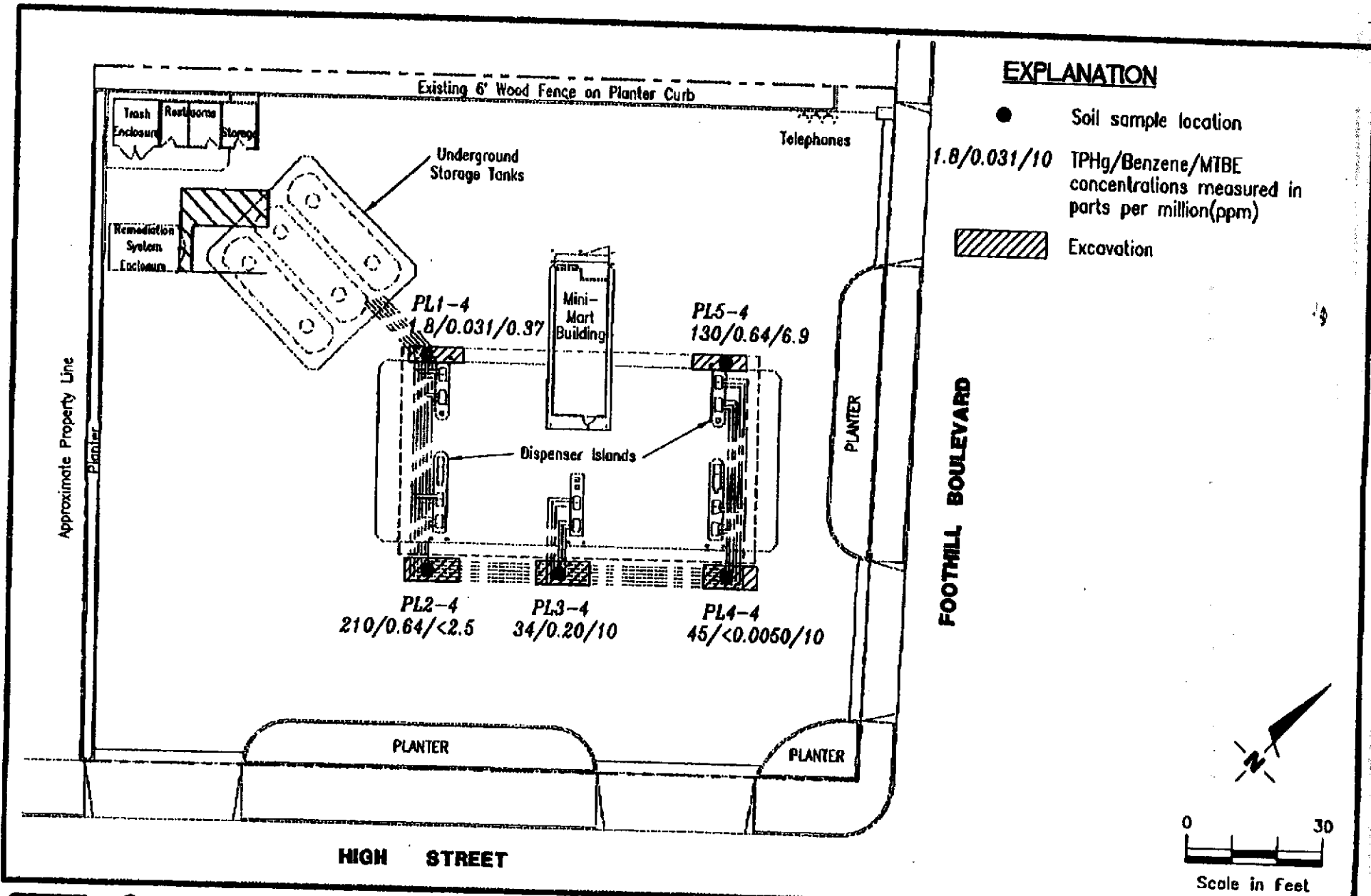
Benzene, toluene, ethylbenzene, xylenes, and MTBE = EPA Method 8020

Lead = EPA 6010

ANALYTICAL LABORATORY:

Sequoia Analytical (ELAP #1271)

Post- ¹ Fax Note	7671	Date	07/29/97	# of pages	2
To	Chris Pace	From	Phyllis Babbs		
Co/Dept.	CLTC	Co.	QPS		
Phone #		Phone	708 842-9136		
Fax	708 242-1380	Fax #			



Gertler - Ryan Inc.

6747 Sierra Ct., Suite J (510) 551-7555
Dublin, CA 94568

SOIL CONCENTRATION MAP.
Chevron Service Station No. 9-0076
4265 Foothill Boulevard
Oakland, California

JOB NUMBER
1219.02

REVIEWED BY
[Signature]

DATE
September, 1997

REVISED DATE

FIGURE

2

002/002

09/29/97 14:45 0510 842 8370 CHEVRON U.S.A.

TABLE 1

Summary of Analytical Results

Groundwater Samples (Sample Date: 9/1/87)

<u>Well</u>	<u>Gasoline (ppb)</u>	<u>Benzene (ppb)</u>	<u>Toluene (ppb)</u>	<u>Xylenes (ppb)</u>
C-1	22,000	800	1,000	2,900
C-2	(floating product detected)			
C-3	250	11	8	7
C-4	3,200	520	66	130
Detection Limits	50	1	1	1

Soil Samples

<u>Boring</u>	<u>Depth (feet)</u>	<u>Gasoline (ppm)</u>	<u>Benzene (ppm)</u>	<u>Toluene (ppm)</u>	<u>Xylenes (ppm)</u>
C-A	8.5-10.0	3,600	33	12	350
	19.0-20.5	63	2.0	0.1	2.0
	23.5-25.0	52	1.8	nd	0.4
C-1	9.0-10.5	nd	nd	nd	nd
	19.0-20.5	nd	nd	nd	nd
	29.0-30.5	nd	nd	nd	nd
C-2	9.0-10.5	1,200	16	54	120
	19.0-20.5	nd	0.07	0.8	nd
	29.0-30.5	48	0.93	0.1	3
C-3	9.0-10.5	7	0.05	nd	0.4
	19.0-20.5	nd	nd	nd	nd
	29.0-30.5	nd	nd	nd	nd
C-4	9.0-10.5	580	3.9	23	46
	19.0-20.5	nd	nd	nd	nd
	29.0-30.5	nd	nd	nd	nd
Detection Limits		5	0.05	0.1	0.4

Notes: nd - not detected
 ppb - parts per billion
 ppm - parts per million

TABLE 2. Results of Soil Analyses - Chevron Service Station #9-0076, 4265 Foothill Boulevard, Oakland, California

Soil Boring (Well ID)	Sample Depth	Date Sampled	Analytical Lab	Analytic Method	Sat/Unsat	TPH-G B E T X -----parts per million (mg/kg)-----				
						TPH-G	B	E	T	X
BH-E (C-5)	11.0	08/01/90	GTEL	8015/8020	Unsat	54				
	16.0	08/01/90	GTEL	8015/8020	Unsat	<10	0.5	0.8	1.7	4.5
	21.0	08/01/90	GTEL	8015/8020	Unsat	<10	<0.005	<0.005	0.008	0.02
	26.0	08/01/90	GTEL	8015/8020	Unsat	<10	<0.005	<0.005	<0.005	<0.015
BH-F (C-6)	16.0	08/01/90	GTEL	8015/8020	Unsat	<10	<0.005	<0.005	<0.005	<0.015
	21.0	08/01/90	GTEL	8015/8020	Unsat	<10	<0.005	<0.005	<0.005	<0.015
	31.0	08/01/90	GTEL	8015/8020	Unsat	42	0.2	0.1	<0.005	0.3
	41.0	08/01/90	GTEL	8015/8020	Unsat	<10	<0.005	<0.005	<0.005	<0.015
BH-G (C-7)	11.0	07/31/90	GTEL	8015/8020	Unsat	<10	<0.005	<0.005	<0.005	<0.015
	16.0	07/31/90	GTEL	8015/8020	Unsat	<10	<0.005	<0.005	<0.005	<0.015
	21.0	07/31/90	GTEL	8015/8020	Unsat	<10	0.02	<0.005	<0.005	<0.015
	31.0	07/31/90	GTEL	8015/8020	Unsat	<10	<0.005	<0.005	<0.005	<0.015
	41.0	07/31/90	GTEL	8015/8020	Unsat	<10	0.007	<0.005	<0.005	<0.015
BH-H (C-8)	5.5	11/01/90	GTEL	8015/8020	Unsat	<10	<0.005	<0.005	<0.005	<0.005
	40.0	11/01/90	GTEL	8015/8020	Unsat	<10	<0.005	<0.005	<0.005	<0.005
	45.0	11/01/90	GTEL	8015/8020	Sat	<10	<0.005	<0.005	<0.005	<0.005

SOS

Abbreviations:

TPH-G = Total Petroleum Hydrocarbons as Gasoline
 B = Benzene
 E = Ethylbenzene
 T = Toluene
 X = Xylenes
 Sat = Saturated soil sample
 Unsat = Unsaturated soil sample
 <n = Not detected at detection limit of n ppm

Analytical Laboratory:

GTEL = GTEL Environmental Laboratories, Concord, California

Analytic Methods:

8015 = Modified EPA Method 8015 for TPH-G
 8020 = EPA Method 8020 for BETX



RBCA TIER 1/TIER 2 EVALUATION

Output Table 1 **B**

Site Name: Chevron SS #9-0076 Job Identification: 9-0076 Software: GSI RBCA Spreadsheet
 Site Location: 4265 Foothill Blvd., Oakland CA Date Completed: 12/10/97 Version: 1.0.1
 Completed By: Curt Peck

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

Exposure		Residential			Commercial/Industrial						
Parameter	Definition (Units)	Adult	(1-6yrs)	(1-16 yrs)	Chronic	Constrctn	Surface Parameters		Definition (Units)	Residential	Constrctn
ATc	Averaging time for carcinogens (yr)	70					A	Contaminated soil area (cm ²)	2.2E+06	1.0E+06	
ATn	Averaging time for non-carcinogens (yr)	30	6	16	25	1	W	Length of affect. soil parallel to wind (cm)	1.5E+03	1.0E+03	
BW	Body Weight (kg)	70	15	35	70		W.gw	Length of affect. soil parallel to groundwater (cm)	1.5E+03		
ED	Exposure Duration (yr)	30	6	16	25	1	Uair	Ambient air velocity in mixing zone (cm/s)	2.3E+02		
t	Averaging time for vapor flux (yr)	30			25	1	delta	Air mixing zone height (cm)	2.0E+02		
EF	Exposure Frequency (days/yr)	350			250	180	Lss	Thickness of affected surface soils (cm)	1.0E+02		
EF.Derm	Exposure Frequency for dermal exposure	350			250		Pe	Particulate areal emission rate (g/cm ² /s)	6.9E-14		
IRgw	Ingestion Rate of Water (L/day)	2			1		Groundwater Definition (Units)				
IRs	Ingestion Rate of Soil (mg/day)	100	200		50	100	delta.gw	Groundwater mixing zone depth (cm)	2.0E+02		
IRadj	Adjusted soil ing. rate (mg-yr/kg-d)	1.1E+02			9.4E+01		I	Groundwater infiltration rate (cm/yr)	3.0E+01		
IRa.in	Inhalation rate indoor (m ³ /day)	15			20		Ugw	Groundwater Darcy velocity (cm/yr)	2.5E+03		
IRa.out	Inhalation rate outdoor (m ³ /day)	20			20	10	Ugw.tr	Groundwater seepage velocity (cm/yr)	6.6E+03		
SA	Skin surface area (dermal) (cm ²)	5.8E+03		2.0E+03	5.8E+03	5.8E+03	Ks	Saturated hydraulic conductivity (cm/s)			
SAadj	Adjusted dermal area (cm ² -yr/kg)	2.1E+03			1.7E+03		grad	Groundwater gradient (cm/cm)			
M	Soil to Skin adherence factor	1					Sw	Width of groundwater source zone (cm)			
AAFs	Age adjustment on soil ingestion	FALSE			FALSE		Sd	Depth of groundwater source zone (cm)			
AAFd	Age adjustment on skin surface area	FALSE			FALSE		phi.eff	Effective porosity in water-bearing unit	3.8E-01		
tox	Use EPA tox data for air (or PEL based)?	TRUE					foc.sal	Fraction organic carbon in water-bearing unit	1.0E-03		
gwMCL?	Use MCL as exposure limit in groundwater?	FALSE					BIO?	Is bioattenuation considered?	FALSE		
							BC	Biodegradation Capacity (mg/L)			
Matrix of Exposed Persons to Complete Exposure Pathways		Residential			Commercial/Industrial						
							Soil		Definition (Units)	Value	
Outdoor Air Pathways:							hc	Capillary zone thickness (cm)	<u>6.7E+01</u>		
SS.v	Volatiles and Particulates from Surface Soils	FALSE			FALSE	FALSE	hv	Vadose zone thickness (cm)	<u>5.4E+02</u>		
S.v	Volatilization from Subsurface Soils	FALSE			FALSE		rho	Soil density (g/cm ³)	1.7		
GW.v	Volatilization from Groundwater	FALSE			FALSE		foc	Fraction of organic carbon in vadose zone	0.01		
Indoor Air Pathways:							phi	Soil porosity in vadose zone	0.38		
S.b	Vapors from Subsurface Soils	FALSE			TRUE		Lgw	Depth to groundwater (cm)	<u>6.0E+02</u>		
GW.b	Vapors from Groundwater	FALSE			TRUE		Ls	Depth to top of affected subsurface soil (cm)	<u>1.2E+02</u>		
Soil Pathways:							Lsubs	Thickness of affected subsurface soils (cm)	<u>8.2E+02</u>		
SS.d	Direct Ingestion and Dermal Contact	FALSE			FALSE	FALSE	pH	Soil/groundwater pH	6.5		
Groundwater Pathways:									<u>capillary</u>	<u>vadose</u>	<u>foundation</u>
GW.i	Groundwater Ingestion	FALSE			FALSE		phi.w	Volumetric water content	0.342	0.12	0.12
S.l	Leaching to Groundwater from all Soils	FALSE			FALSE		phi.a	Volumetric air content	0.038	0.26	0.26
Matrix of Receptor Distance and Location On- or Off-Site		Residential			Commercial/Industrial						
							Building		Definition (Units)	Residential	Commercial
GW	Groundwater receptor (cm)	Distance	On-Site		Distance	On-Site	Lb	Building volume/area ratio (cm)	2.0E+02	3.0E+02	
S	Inhalation receptor (cm)		TRUE			TRUE	ER	Building air exchange rate (s ⁻¹)	1.4E-04	2.3E-04	
			TRUE			TRUE	Lcrk	Foundation crack thickness (cm)	1.5E+01		
							eta	Foundation crack fraction	0.01		
Matrix of Target Risks											
							Transport Parameters		Definition (Units)	Residential	Commercial
TRab	Target Risk (class A&B carcinogens)	Individual	Cumulative				Groundwater				
TRc	Target Risk (class C carcinogens)	<u>1.0E-05</u>					ax	Longitudinal dispersivity (cm)			
THQ	Target Hazard Quotient	1.0E+00					ay	Transverse dispersivity (cm)			
Opt	Calculation Option (1, 2, or 3)	1					az	Vertical dispersivity (cm)			
Tier	RBCA Tier	2					Vapor				
							dcy	Transverse dispersion coefficient (cm)			
							dcz	Vertical dispersion coefficient (cm)			

RBCA SITE ASSESSMENT

Tier 2 Worksheet 8.3

Site Name: Chevron SS #9-0076

Completed By: Curt Peck

Site Location: 4265 Foothill Blvd., Oakland CA

Date Completed: 12/10/1997

1 of 1

TIER 2 BASELINE RISK SUMMARY TABLE

EXPOSURE PATHWAY	BASELINE CARCINOGENIC RISK					BASELINE TOXIC EFFECTS				
	Individual COC Risk		Cumulative COC Risk		Risk Limit(s) Exceeded?	Hazard Quotient		Hazard Index		Toxicity Limit(s) Exceeded?
	Maximum Value	Target Risk	Total Value	Target Risk		Maximum Value	Applicable Limit	Total Value	Applicable Limit	
OUTDOOR AIR EXPOSURE PATHWAYS										
Complete:	NC	1.0E-5	NC	N/A	<input type="checkbox"/>	NC	1.0E+0	NC	N/A	<input type="checkbox"/>
INDOOR AIR EXPOSURE PATHWAYS										
Complete:	4.6E-6	1.0E-5	4.6E-6	N/A	<input type="checkbox"/>	2.6E-1	1.0E+0	2.8E-1	N/A	<input type="checkbox"/>
SOIL EXPOSURE PATHWAYS										
Complete:	NC	1.0E-5	NC	N/A	<input type="checkbox"/>	NC	1.0E+0	NC	N/A	<input type="checkbox"/>
GROUNDWATER EXPOSURE PATHWAYS										
Complete:	NC	1.0E-5	NC	N/A	<input type="checkbox"/>	NC	1.0E+0	NC	N/A	<input type="checkbox"/>
CRITICAL EXPOSURE PATHWAY (Select Maximum Values From Complete Pathways)										
	4.6E-6	1.0E-5	4.6E-6	N/A	<input type="checkbox"/>	2.6E-1	1.0E+0	2.8E-1	N/A	<input type="checkbox"/>

RBCA SITE ASSESSMENT

Tier 2 Worksheet 9.2

Site Name: Chevron SS #9-0076

Completed By: Curt Peck

Site Location: 4265 Foothill Blvd., Oakland CA

Date Completed: 12/10/1997

1 OF 1

**SUBSURFACE SOIL SSTL VALUES
(> 3.3 FT BGS)**

Target Risk (Class A & B) 1.0E-5

MCL exposure limit?

Calculation Option: 1

Target Risk (Class C) 1.0E-5

PEL exposure limit?

Target Hazard Quotient 1.0E+0

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

CONSTITUENTS OF CONCERN		Representative Concentration (mg/kg)	Soil Leaching to Groundwater			Soil Volatilization to Indoor Air		Soil Volatilization to Outdoor Air		Applicable SSTL (mg/kg)	SSTL Exceeded ? If yes	Required CRF Only if "yes" left
CAS No.	Name		Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)	Residential: (on-site)	Commercial: (on-site)	Residential: (on-site)	Commercial: (on-site)			
71-43-2	Benzene	8.5E-2	NA	NA	NA	NA	1.9E-1	NA	NA	1.9E-1	<input type="checkbox"/>	<1
100-41-4	Ethylbenzene	3.9E-2	NA	NA	NA	NA	9.3E+1	NA	NA	9.3E+1	<input type="checkbox"/>	<1
1634-04-4	Methyl t-Butyl Ether	1.0E+1	NA	NA	NA	NA	6.4E+2	NA	NA	6.4E+2	<input type="checkbox"/>	<1
108-88-3	Toluene	7.7E-2	NA	NA	NA	NA	5.5E+1	NA	NA	5.5E+1	<input type="checkbox"/>	<1
1330-20-7	Xylene (mixed isomers)	4.8E-2	NA	NA	NA	NA	>Res	NA	NA	>Res	<input type="checkbox"/>	<1

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

RBCA SITE ASSESSMENT

Tier 2 Worksheet 9.3

Site Name: Chevron SS #9-0076

Completed By: Curt Peck

Site Location: 4265 Foothill Blvd., Oakland CA

Date Completed: 12/10/1997

1 OF 1

GROUNDWATER SSTL VALUES

Target Risk (Class A & B) 1.0E-5 MCL exposure limit?
 Target Risk (Class C) 1.0E-5 PEL exposure limit?
 Target Hazard Quotient 1.0E+0

Calculation Option: 1

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

CONSTITUENTS OF CONCERN		Representative Concentration (mg/L)	Groundwater Ingestion			X Groundwater Volatilization to Indoor Air		Groundwater Volatilization to Outdoor Air		Applicable SSTL (mg/L)	SSTL Exceeded ? *■* if yes	Required CRF Only if "yes" left
			Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)	Residential: (on-site)	Commercial: (on-site)	Residential (on-site)	Commercial: (on-site)			
71-43-2	Benzene	9.6E-2	NA	NA	NA	NA	4.8E+0	NA	NA	4.8E+0	<input type="checkbox"/>	<1
100-41-4	Ethylbenzene	1.9E-2	NA	NA	NA	NA	>Sol	NA	NA	>Sol	<input type="checkbox"/>	<1
1634-04-4	Methyl t-Butyl Ether	4.7E-2	NA	NA	NA	NA	5.1E+3	NA	NA	5.1E+3	<input type="checkbox"/>	<1
108-88-3	Toluene	1.0E-2	NA	NA	NA	NA	>Sol	NA	NA	>Sol	<input type="checkbox"/>	<1
1330-20-7	Xylene (mixed isomers)	2.8E-2	NA	NA	NA	NA	>Sol	NA	NA	>Sol	<input type="checkbox"/>	<1

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

Site Name: Chevron SS #9-0076

Site Location: 4265 Foothill Blvd., Oakland CA

Completed By: Curt Peck

Date Completed: 12/10/1997

4 OF 9

TIER 2 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		2) NAE Value (m ³ /kg) Receptor		3) Exposure Medium Indoor 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)	
	Subsurface Soil Conc. (mg/kg)		On-Site Commercial		On-Site Commercial		On-Site Commercial		On-Site Commercial	
Benzene	8.5E-2		3.9E+1		2.2E-3		7.0E-2		1.5E-4	
Ethylbenzene	3.9E-2		6.3E+1		6.2E-4		2.0E-1		1.2E-4	
Methyl t-Butyl Ether	1.0E+1		1.5E+2		6.8E-2		2.0E-1		1.3E-2	
Toluene	7.7E-2		9.5E+1		8.1E-4		2.0E-1		1.6E-4	
Xylene (mixed isomers)	4.8E-2		1.7E+2		2.8E-4		2.0E-1		5.4E-5	

NOTE: ABS = Dermal absorption factor (dim) BW = Body weight (kg) EF = Exposure frequency (days/yr) POE = Point of exposure
 AF = Adherence factor (mg/cm²) CF = Units conversion factor ET = Exposure time (hrs/day) SA = Skin exposure area (cm²/day)
 AT = Averaging time (days) ED = Exposure duration (yrs) IR = Inhalation rate (m³/day)

Site Name: Chevron SS #9-0076

Site Location: 4265 Foothill Blvd., Oakland (Completed By: Curt Peck

Date Completed: 12/10/1997

5 OF 9

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS

(CHECKED IF PATHWAY IS ACTIVE)

GROUNDWATER:

VAPOR INTRUSION TO BUILDINGS

Constituents of Concern	1) Source Medium		2) NAF Value (m ³ /L) Receptor		3) Exposure Medium Indoor Air: POE Conc. (mg/m ³) (1) / (2)		4) Exposure Multiplier (IR×EF×ED)/(BW×AT) (m ³ /kg-day)		5) Average Daily Intake Rate (mg/kg-day) (3) X (4)		TOTAL PATHWAY INTAKE (mg/kg-day) (Sum Intake values from subsurface & groundwater routes.)	
	Groundwater Conc. (mg/L)	On-Site Commercial	On-Site Commercial	On-Site Commercial	On-Site Commercial	On-Site Commercial	On-Site Commercial	On-Site Commercial	On-Site Commercial	On-Site Commercial	On-Site Commercial	
Benzene	9.6E-2		9.7E+2		9.9E-5		7.0E-2		6.9E-6		1.6E-4	
Ethylbenzene	1.9E-2		9.5E+2		2.0E-5		2.0E-1		3.9E-6		1.2E-4	
Methyl t-Butyl Ether	4.7E-2		1.2E+3		4.0E-5		2.0E-1		7.9E-6		1.3E-2	
Toluene	1.0E-2		9.8E+2		1.0E-5		2.0E-1		2.0E-6		1.6E-4	
Xylene (mixed isomers)	2.8E-2		1.1E+3		2.7E-5		2.0E-1		5.2E-6		6.0E-5	

NOTE: ABS = Dermal absorption factor (dim)
AF = Adherence factor (mg/cm²)
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 (m³/day)

POE = Point of exposure
SA = Skin exposure area (cm²/day)

RBGA SITE ASSESSMENT

Tier 2 Worksheet 8.2

Site Name: Chevron SS #9-0076

Site Location: 4265 Foothill Blvd., Oakland CA

Completed By: Curt Peck

Date Completed: 12/10/1997

2 OF 4

TIER 2 PATHWAY RISK CALCULATION

INDOOR AIR EXPOSURE PATHWAYS

(CHECKED IF PATHWAYS ARE ACTIVE)

Constituents of Concern	CARCINOGENIC RISK				TOXIC EFFECTS			
	(1) EPA Carcinogenic Classification	(2) Total Carcinogenic Intake Rate (mg/kg/day)	(3) Inhalation Slope Factor (mg/kg-day) ⁻¹	(4) Individual COC Risk (2) x (3)	(5) Total Toxicant Intake Rate (mg/kg/day)	(6) Inhalation Reference Dose (mg/kg-day)	(7) Individual COC Hazard Quotient (5) / (6)	
		On-Site Commercial		On-Site Commercial	On-Site Commercial		On-Site Commercial	On-Site Commercial
Benzene	A	1.6E-4	2.9E-2	4.6E-6	4.5E-4	1.7E-3		2.6E-1
Ethylbenzene	D				1.2E-4	2.9E-1		4.4E-4
Methyl t-Butyl Ether					1.3E-2	8.6E-1		1.6E-2
Toluene	D				1.6E-4	1.1E-1		1.4E-3
Xylene (mixed isomers)	D				6.0E-5	2.0E+0		3.0E-5

Total Pathway Carcinogenic Risk = 0.0E+0 4.6E-6

Total Pathway Hazard Index = 0.0E+0 2.8E-1

Handwritten notes and calculations:

- SR + 10⁻⁵ = 10⁻⁶
- RBGA
- R = $\frac{10^{-5}}{1.77}$
- R = $\frac{10^{-5}}{1.77}$
- 0.029

029