RO-412

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NOV 2 0 2001

November 15, 2001

- How were COC - representative concentrations determined - Use only soil at 5' bgs and w/in source area.
- SSTL worksheet missing (8.3)

Mr. Tom Bauhs
Chevron Products Company
P.O. Box 6004
San Ramon, California 94583

Subject: *Risk-Based Corrective Action Evaluation*
Former Chevron Service Station No. 9-1723
9757 San Leandro Street
Oakland, California
DG91723G.3C01

Mr. Bauhs:

At the request of Chevron Products Company (Chevron), Delta Environmental Consultants, Inc. network associate Gettler-Ryan Inc. (GR) is submitting this report to document the results of implementation of the Risk-Based Corrective Action (RBCA) planning process, as described in ASTM E-1739 "Standard Guide for Risk-Based Corrective Action Applied at Petroleum Sites". This Tier 2 RBCA was conducted with site-specific data from the former Chevron service station located at 9757 San Leandro Street, in Oakland, California. The purpose of this work was to evaluate whether the residual hydrocarbons in the subsurface soil and groundwater pose a risk to human health. This report describes site conditions and the RBCA model results for the site (RBCA version 1.01).

Risk-Based Corrective Action (RBCA)

Tier 1 of the RBCA process involves comparison of the site constituent concentrations to previously defined Risk-Based Screening Levels (RBSL) to evaluate whether further evaluation and/or active remediation is warranted. RBSL values are derived from standard exposure equations and reasonable maximum exposure (RME) estimates per U.S. EPA guidelines. RBSL concentrations are designed to be protective of human health even if exposure occurs directly within the onsite area of impacted soil or groundwater, and inherently provides conservative estimates of potential threats to human health and the environment. According to the RBCA process, if Tier 1 limits are not exceeded, the user may proceed directly to compliance monitoring and/or no further action. However, if these defined screening levels are exceeded, the affected media may be addressed by 1) remediating to the generic Tier 1 limits, if practicable, 2) conducting Tier 2 evaluation to develop site-specific remediation goals, or 3) implement an interim remedial action to abate risk "hot spots". Tier 2 analysis evaluates baseline risks both on and offsite, utilizing site specific soil, groundwater, and air parameters. Additionally, Tier 2 analyses allow the use of transport models in calculating risks and cleanup standards relate to offsite receptors.

Site Parameters

Complete exposure pathways are those that could pose a reasonable potential for contaminant contact with a human or environmental receptors. Under Tier 1 RBCA, only onsite receptors apply. For the purpose of this Tier 2 evaluation, a residential exposure pathway with a risk factor of 1.0E-6 was evaluated for the site. Groundwater beneath and in the site vicinity is not used for drinking purposes, therefore, groundwater ingestion or subsurface soil leaching to groundwater (ingestion) exposure pathways are not complete. Surface soils (<3 feet bgs) at the site are not impacted, therefore, they are not a risk factor. The only complete exposure pathways identified for the subject site are volatilization to outdoor and indoor air from subsurface soils (>3 feet bgs) and groundwater. These exposure pathways were evaluated in this Tier 2 RBCA analysis.

Where available, site specific physical data were used in this RBCA evaluation. Site specific parameters included contaminated soil area (1,800 ft^2), depth to top of affected soil (3 ft), length of affected soil parallel to wind (50 ft), and thickness of affected subsurface soils (6 ft). The depth of groundwater is estimated to be approximately 8 feet below ground surface (Blaine Tech Services Report 980717-R-1, 3rd Q 1998 Monitoring Report). For this evaluation, the depth to groundwater used was 8 feet. Where appropriate and consistent with site conditions, default values were used. The Chemicals of Concern (COC) were evaluated with a conservative 95% Upper Control Limit (UCL) factor as well as the California adjusted oral slope factor for benzene (0.1 for Benzene-CAL) for this RBCA analysis. In addition, risk exposure for a construction worker was also evaluated.

Results of RBCA Analysis

Based on the current information from the previous site investigations, the Tier 2 RBCA program evaluated the complete exposure pathways identified at the site. The RBCA program findings for the identified pathways are subsurface soil and groundwater volatilization to outdoor and indoor air exposures with a cumulative risk factor of 1.2E-9 and 8.1E-7 respectively (Appendix C, Tier 2 Worksheet 8.3). Using the residential risk factor of 1.0E-6 and site conditions, the Site-Specific Target Levels (SSTLs) were determined to be below established Tier 2 SSTLs (Appendix A, Tier 2 Worksheets 9.2 and 9.3). According to the RBCA decision making process, no further work is warranted to protect against exposure via these pathways. Pertinent input and output data including site specific parameters used in the analysis are presented in Appendix A. Soil and groundwater analytical data utilized in the RBCA are presented in Appendix B.

Conclusions and Recommendations

GR performed the RBCA evaluation for the assessment and response to petroleum hydrocarbons in the subsurface soil and groundwater beneath the subject site. A Tier 2 evaluation was performed utilizing available site specific data. The results of these analyses confirm the current site conditions do not exceed the calculated Tier 2 SSTLs specific to the site (Appendix A, Tier 2 worksheets 8.3). Based on the approved RBCA program and findings presented in this report, it is our opinion that no further work is warranted and the site should be considered for case closure.

Consultant locate. 8.3.
otherwise 8.2

If you have any questions or comments on the enclosed materials please feel free to contact us at (916) 631-1300.

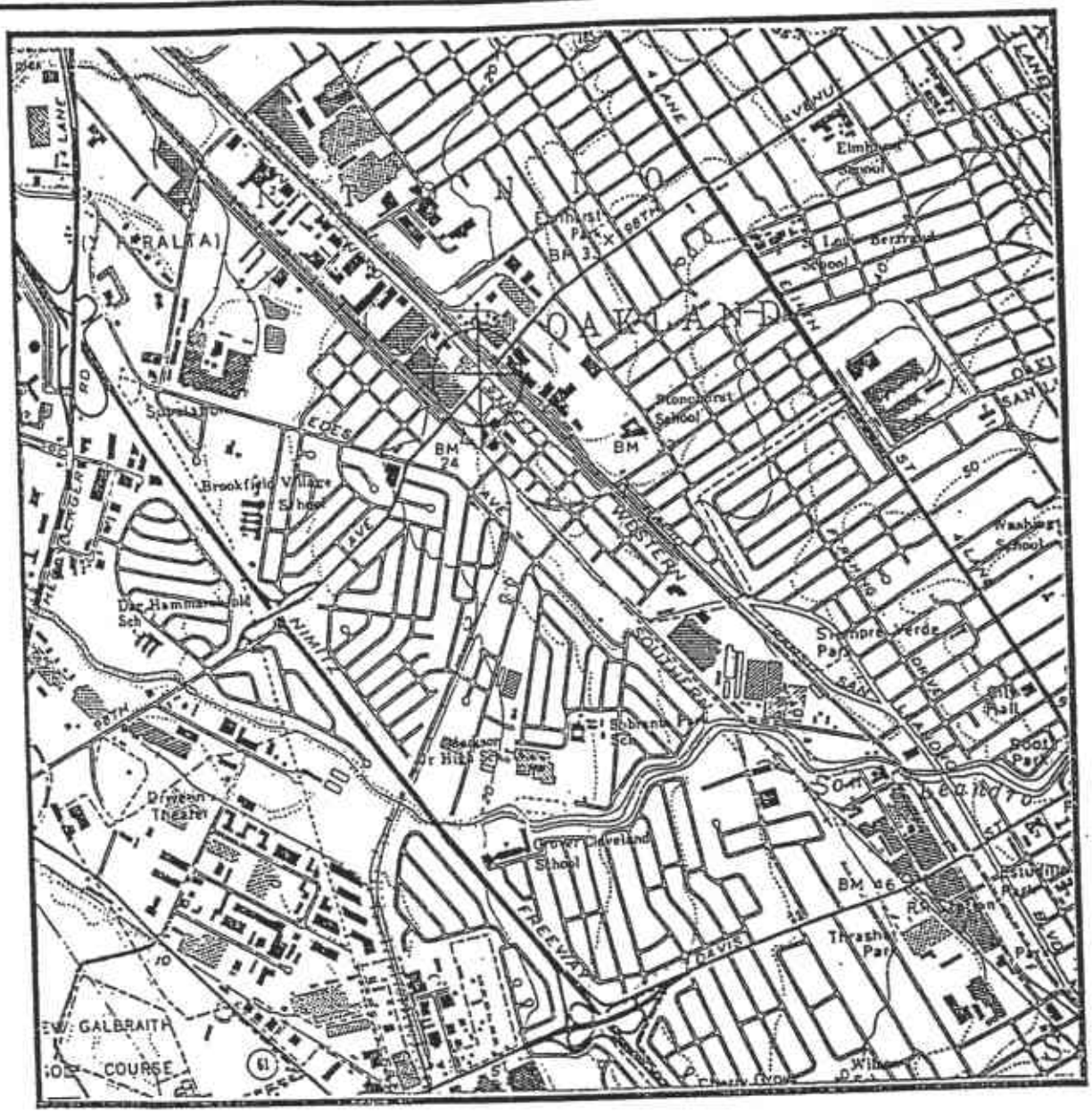
DELTA ENVIRONMENTAL CONSULTANTS, INC.
Network Associate **GETTLER-RYAN INC.**

Tony Mihram
for
Jed A. Douglas
Project Geologist

David W. Herzog
Senior Geologist
R.G. 7211

Attachments: Figure 1: Site Location Map
Figure 2: Site Plan
Appendix A: Tier 2 RBCA Input/Output Data
Appendix B: Soil and Groundwater Analytical Data

Cc: Ms. Eva Chu, ACEHS, 1131 Harbor Bay Parkway, Suite 250, Alameda, CA 94502
Pacific American Management Company LLC (PAMCO), 104 Caledonia Street, Suite C, Sausalito, CA 94965
Mr. Todd Del Frate, Delta Environmental Consultants, Inc.



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SOURCE: U.S.G.S. TOPOGRAPHIC QUADRANGLE
SAN LEANDRO, CALIFORNIA
7.5 MINUTE SERIES
1959, PHOTREVISED 1980

SITE LOCATION

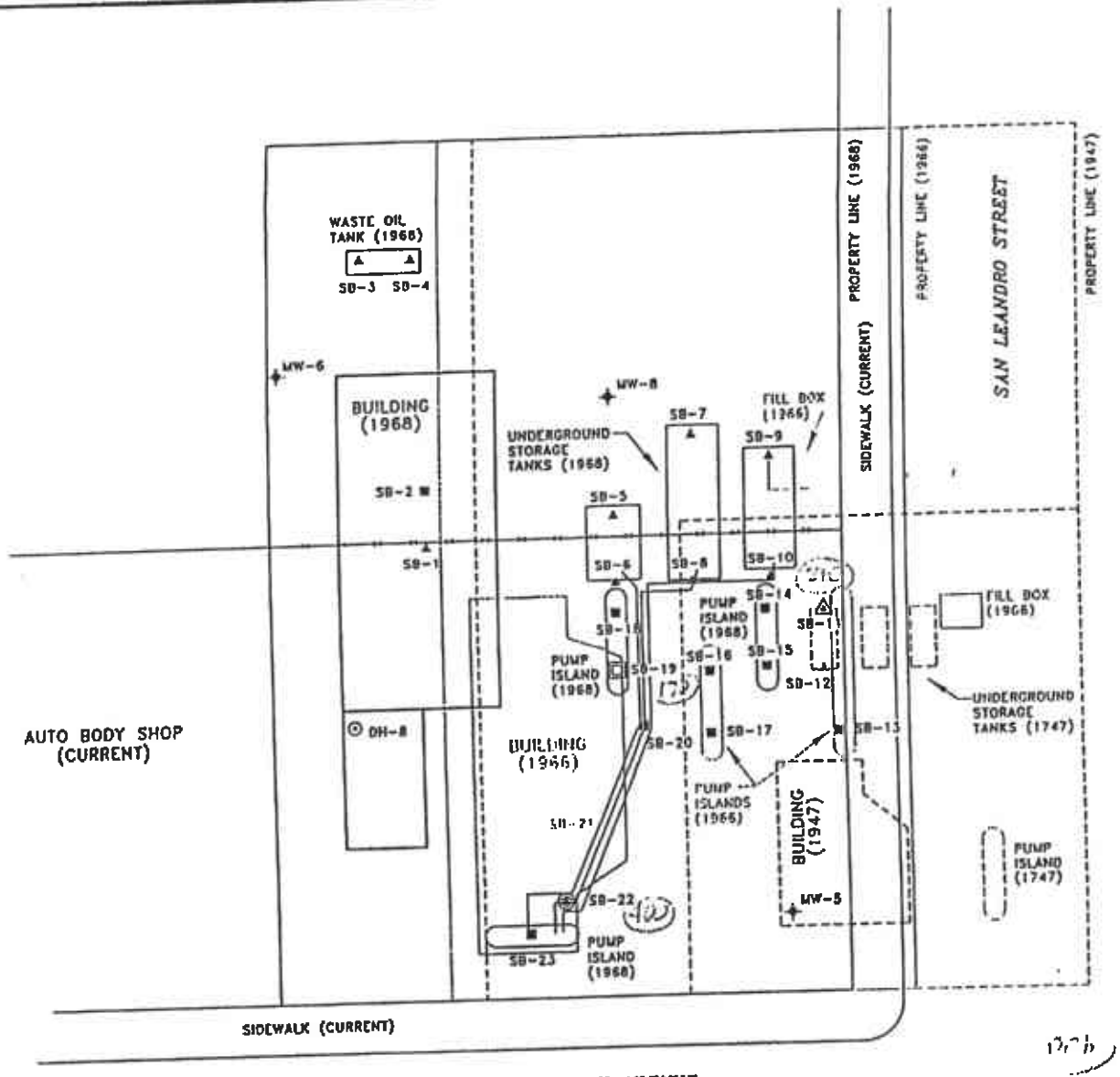
SCALE 1:24,000

0 2,000 4,000
SCALE FEET

SITE LOCATION MAP

GROUNDWATER TECHNOLOGY

CLIENT: CHEVRON U.S.A. PRODUCTS CO. FORMER SERVICE STATION NO. 9-1723	FILE: 0080SL (1:1)	PROJECT NO.: 02070-0080	PM	PE/RG
	REV.			FIGURE: 1
LOCATION: 9757 SAN LEANDRO BOULEVARD OAKLAND, CALIFORNIA	DES. JF	DET. AJK	DATE: 11/21/94	



LEGEND

- MONITORING WELL
- SOIL BORING
- SOIL BORING, 5-FOOT DEPTH (GTI, 1996)
- SOIL BORING, 10-FOOT DEPTH (GTI, 1996)
- SOIL BORING, 10-FOOT DEPTH WITH GROUNDWATER SAMPLE (GTI, 1996)
- SOIL BORING, 13-FOOT DEPTH WITH GROUNDWATER SAMPLE (GTI, 1996)
- SOIL BORING, 15-FOOT DEPTH
- SOIL BORING, 15-FOOT DEPTH WITH GROUNDWATER SAMPLE (GTI, 1996)
- 1968 STRUCTURES AND PROPERTY LINE
- 1966 STRUCTURES AND PROPERTY LINE
- 1947 STRUCTURES AND PROPERTY LINE

NOTES:

1. STATION BUILDINGS, PUMPS AND TANKS HAVE BEEN REMOVED.
2. SITE IS CURRENTLY USED AS A PARKING LOT FOR AUTOMOBILE REPAIR SHOP (SOUTHERN HALF), AND FOR TRAILER PARKING (NORTHERN HALF).
3. LOCATION OF 1966 UNDERGROUND STORAGE TANKS AND 1947 & 1966 PRODUCT LINES ARE UNKNOWN AT THIS TIME.

GROUNDWATER TECHNOLOGY

SCALE: 0 FEET 20

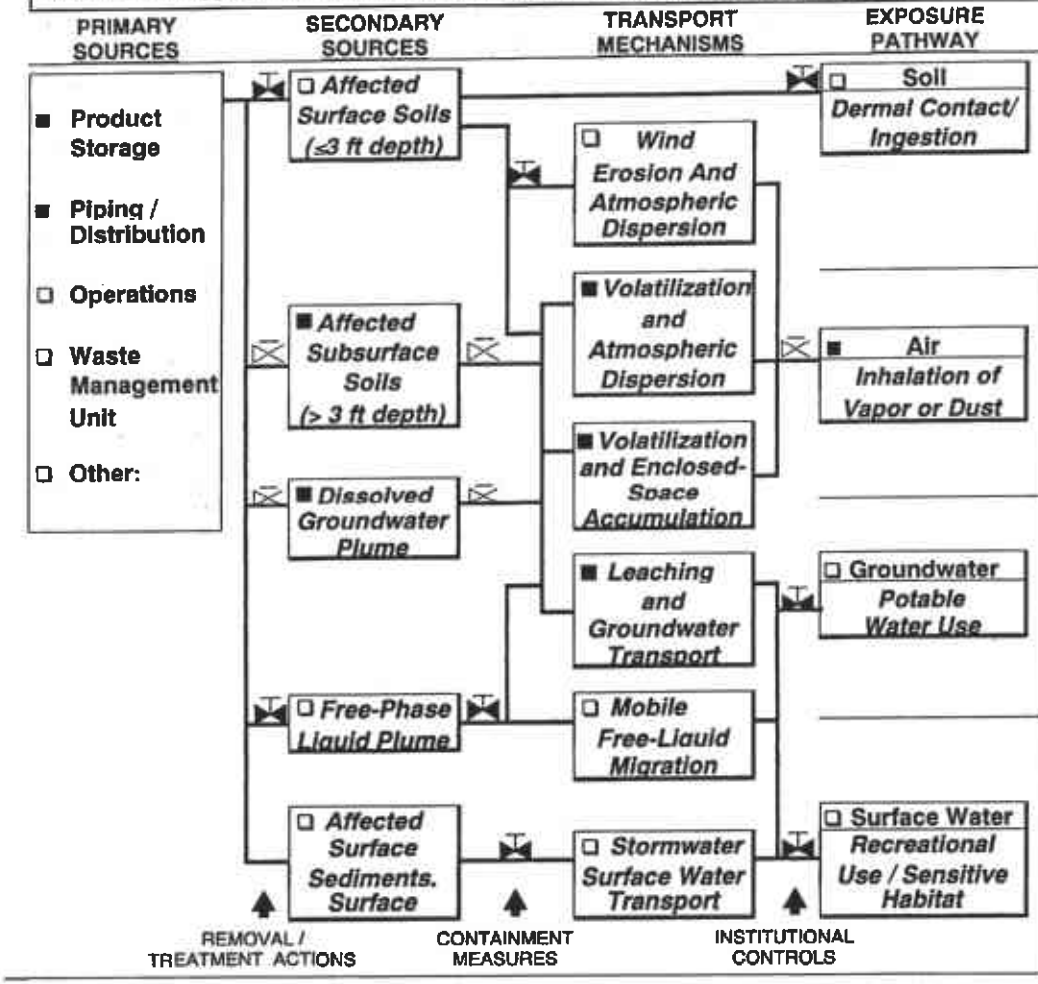
SOIL BORING LOCATION MAP

CLIENT:	CHEVRON U.S.A. PRODUCTS CO. SERVICE STATION NO. 9-1723
LOCATION:	9757 SAN LEANDRO STREET OAKLAND, CALIFORNIA
FILE: 0080-SM (1:20)	PROJECT NO.: 02070-0080
REV.:	
DES.: BMc / DFT.: EFK / DATE: 4-25-96	FIGURE: 2
PM:	PE/RG:

Site Name: Former Chevron Service Station No. 9-1723 | Date Completed: September 5, 2001
Site Location: 9757 San Leandro Street, Oakland, CA | Completed By: Jed A. Douglas

EXPOSURE CONTROL FLOWCHART

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



POTENTIAL RECEPTORS

Exposed Receptors

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

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

Exposed Persons

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

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

Groundwater Users

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

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

Surface Water Users

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

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

REMEDIAL ACTION TECHNOLOGY OPTIONS

□ Complete Pathway: ○ *Current* ● *Potential*

⋈ Action Required: □Yes ■ No

If yes, list technology options for ⋈

A HEALTH BAND SAFETY PLAN SHOULD BE PREPARED FOR SOIL REMOVAL > 4 FEET

■ Complete Pathway: ○ *Current* ● *Potential*

⋈ Action Required: □Yes ■ No

If yes, list technology options for ⋈

□ Complete Pathway: ○ *Current* ○ *Potential*

⋈ Action Required: □Yes ■ No

If yes, list technology options for ⋈

□ Complete Pathway: ○ *Current* ○ *Potential*

⋈ Action Required: □Yes □ No

If yes, list technology options for ⋈

(■ OR ● OR ⋈ TO SELECT)

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

Site Name: Former Chevron 9-1723
Site Location: 9757 San Leandro Blvd., Oakland

Completed By: J. Douglas
Date Completed: 10/11/2001

TIER 2 BASELINE RISK SUMMARY TABLE

	BASELINE CARCINOGENIC RISK					BASELINE TOXIC EFFECTS				
	Individual COC Risk		Cumulative COC Risk		Risk Limit(s) Exceeded?	Hazard Quotient		Hazard Index		Toxicity Limit(s) Exceeded?
EXPOSURE PATHWAY	Maximum Value	Target Risk	Total Value	Target Risk		Maximum Value	Applicable Limit	Total Value	Applicable Limit	
OUTDOOR AIR EXPOSURE PATHWAYS										
Complete:	9.2E-10	1.0E-6	1.2E-9	N/A	☐	1.3E-5	1.0E+0	2.5E-5	N/A	☐
INDOOR AIR EXPOSURE PATHWAYS										
Complete:	6.3E-7	1.0E-6	8.1E-7	N/A	☐	8.6E-3	1.0E+0	1.7E-2	N/A	☐
SOIL EXPOSURE PATHWAYS										
Complete:	NC	1.0E-6	NC	N/A	■	NC	1.0E+0	NC	N/A	■
GROUNDWATER EXPOSURE PATHWAYS										
Complete:	NC	1.0E-6	NC	N/A	■	NC	1.0E+0	NC	N/A	■
CRITICAL EXPOSURE PATHWAY (Select Maximum Values From Complete Pathways)										
	6.3E-7	1.0E-6	8.1E-7	N/A	☐	8.6E-3	1.0E+0	1.7E-2	N/A	☐

RBCA TIER 1/TIER 2 EVALUATION

Output Table 1

Site Name: Former Chevron 9-1723 Job Identification: DG91723B.3C01
Site Location: 9757 San Leandro Blvd., Oakland Date Completed: 10/11/01
Completed By: J. Douglas

Software: GSI RBCA Spreadsheet
Version: 1.0.1

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

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

Matrix of Exposed Persons to Complete Exposure Pathways		Residential	Commercial/Industrial Chronic	Commercial/Industrial Constrctn
Outdoor Air Pathways:				
SS.v	Volatiles and Particulates from Surface Soils	FALSE	FALSE	FALSE
S.v	Volatilization from Subsurface Soils	TRUE	FALSE	
GW.v	Volatilization from Groundwater	TRUE	FALSE	
Indoor Air Pathways:				
S.b	Vapors from Subsurface Soils	TRUE	FALSE	
GW.b	Vapors from Groundwater	TRUE	FALSE	
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	2	

Surface Parameters	Definition (Units)	Residential	Constrctn
A	Contaminated soil area (cm^2)	***1.7E+06***	
W	Length of affect. soil parallel to wind (cm)	***1.5E+03***	
W.gw	Length of affect. soil parallel to groundwater (cm)	***1.2E+03***	
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)		
Pe	Particulate areal emission rate (g/cm^2/s)		

Groundwater	Definition (Units)	Value
delta.gw	Groundwater mixing zone depth (cm)	***4.6E+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
foc.sat	Fraction organic carbon in water-bearing unit	1.0E-03
BIO?	Is bioattenuation considered?	FALSE
BC	Biodegradation Capacity (mg/L)	

Soil	Definition (Units)	Value		
hc	Capillary zone thickness (cm)	***2.8E+01***		
hv	Vadose zone thickness (cm)	***2.5E+02***		
rho	Soil density (g/cm^3)	1.7		
foc	Fraction of organic carbon in vadose zone	***0.001***		
phi	Soil porosity in vadose zone	***0.36***		
Lgw	Depth to groundwater (cm)	***2.8E+02***		
Ls	Depth to top of affected subsurface soil (cm)	***1.5E+02***		
Lsubs	Thickness of affected subsurface soils (cm)	***1.2E+02***		
pH	Soil/groundwater pH	***6.8***		
		capillary	vadose	foundation
phi.w	Volumetric water content	***0.35***	0.34	0.12
phi.a	Volumetric air content	***0.01***	***0.02***	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	***0.001***	

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

Site Name: Former Chevron 9-1723 Site Location: 9757 San Leandro Blvd., Oakland Completed By: J. Douglas Date Completed: 10/11/2001

TIER 2 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 (ERxEFxEDy/tBWxAT) (m^3/kg-day)		5) Average Daily Intake Rate (mg/kg-day) (3) X (4)	
Benzene	0.0E+0								
Benzene-CAL	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 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 Chevron 9-1723 Site Location: 9757 San Leandro Blvd., Oakland Completed By: J. Douglas Date Completed: 10/11/2001

TIER 2 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 Residential		3) Exposure Medium: Outdoor Air: POE Conc. (mg/m^3) (1) / (2): On-Site Residential		4) Exposure Multiplier ((ReEF)x(ED)/(BW)x(AT)) (m^3/kg-day): On-Site Residential		5) Average Daily Intake Rate (mg/kg-day) (3) X (4): On-Site Residential	
Benzene	3.0E-2	4.0E+5		7.4E-8		1.2E-1		8.7E-9	
Benzene-CAL	3.0E-2	4.0E+5		7.4E-8		1.2E-1		8.7E-9	
Ethylbenzene	2.0E-2	6.1E+5		3.3E-8		2.7E-1		9.0E-9	
Methyl t-Butyl Ether	2.6E-2	1.3E+5		2.0E-7		2.7E-1		5.5E-8	
Toluene	1.8E-2	6.4E+5		2.8E-8		2.7E-1		7.8E-9	
Xylene (mixed isomers)	4.7E-2	9.2E+5		5.1E-8		2.7E-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 frequency (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 Chevron 9-1723 | Site Location: 9757 San Leandro Blvd., Oakl | Completed By: J. Douglas | Date Completed: 10/11/2001 | 3 OF 9

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

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

GROUNDWATER: VAPOR INHALATION

Constituents of Concern	Exposure Concentration 1) Source Medium: Groundwater Conc. (mg/L)	2) NAF Value (m^3/L) Receptor: On-Site Residential		3) Exposure Medium: Outdoor Air: POE Conc. (mg/m^3) (1) / (2) — On-Site Residential		4) Exposure Multiplier: (IRxEFxED)/(BWxAT) (m^3/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 surface, subsurface & groundwater routes.) — On-Site Residential	
Benzene	1.4E-2	3.1E+6		4.5E-9		1.2E-1		5.3E-10		9.2E-9	
Benzene-CAL	1.4E-2	3.1E+6		4.5E-9		1.2E-1		5.3E-10		9.2E-9	
Ethylbenzene	5.3E-3	3.8E+6		1.4E-9		2.7E-1		3.8E-10		9.4E-9	
Methyl t-Butyl Ether	8.1E-3	4.1E+5		2.0E-8		2.7E-1		5.4E-9		6.0E-8	
Toluene	1.2E-3	3.5E+6		3.4E-10		2.7E-1		9.4E-11		7.9E-9	
Xylene (mixed isomers)	2.6E-3	3.9E+6		6.8E-10		2.7E-1		1.9E-10		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 exposure area (cm^2/day)

Software: GSI RBCA Spreadsheet
Version: 1.0.1
Serial: G-225-ZRX-496

Site Name: Former Chevron 9-1723 | Site Location: 9757 San Leandro Blvd., Oakland | Completed By: J. Douglas | Date Completed: 10/11/2001 | *1 OF 4*

TIER 2 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 Residential		(3) Inhalation Slope Factor (mg/kg-day)^-1	(4) Individual COC Risk (2) x (3) On-Site Residential		(5) Total Toxicant Intake Rate (mg/kg/day) On-Site Residential		(6) Inhalation Reference Dose (mg/kg-day)	(7) Individual COC Hazard Quotient (5) / (6) On-Site Residential	
Benzene	A	9.2E-9		2.9E-2	2.7E-10		2.1E-8		1.7E-3	1.3E-5	
Benzene-CAL	A	9.2E-9		1.0E-1	9.2E-10		2.1E-8		1.7E-3	1.3E-5	
Ethylbenzene	D						9.4E-9		2.9E-1	3.3E-8	
Methyl t-Butyl Ether							6.0E-8		8.6E-1	7.0E-8	
Toluene	D						7.9E-9		1.1E-1	6.9E-8	
Xylene (mixed isomers)	D						1.4E-8		2.0E+0	7.1E-9	

Total Pathway Carcinogenic Risk = 1.2E-9 | 0.0E+0

Total Pathway Hazard Index = 2.5E-5 | 0.0E+0

Site Name: Former Chevron 9-1723 Site Location: 9757 San Leandro Blvd., Oakland Completed By: J. Douglas Date Completed: 10/11/2001

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 Subsurface Soil Conc. (mg/kg)	2) NAF Value (m^3/kg) Receptor On-Site Residential		3) Exposure Medium Indoor Air: POE Conc. (mg/m^3) (1) / (2) On-Site Residential		4) Exposure Multiplier (ReEFxED)/(BWxAT) (m^3/kg-day) On-Site Residential		5) Average Daily Intake Rate (mg/kg-day) (1) X (4) On-Site Residential	
Benzene	3.0E-2	4.5E+2		6.7E-5		8.8E-2		5.9E-6	
Benzene-CAL	3.0E-2	4.5E+2		6.7E-5		8.8E-2		5.9E-6	
Ethylbenzene	2.0E-2	6.4E+2		3.1E-5		2.1E-1		6.4E-6	
Methyl t-Butyl Ether	2.6E-2	6.4E+2		4.0E-5		2.1E-1		8.2E-6	
Toluene	1.8E-2	6.9E+2		2.6E-5		2.1E-1		5.4E-6	
Xylene (mixed isomers)	4.7E-2	9.9E+2		4.8E-5		2.1E-1		9.8E-6	

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

Software: GSI RBCA Spreadsheet
Version: 1.0.1
Serial: G-225-ZRX-488

Site Name: Former Chevron 9-1723 | Site Location: 9757 San Leandro Blvd., Oakl | Completed By: J. Douglas | Date Completed: 10/11/2001 | 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	Exposure Concentration: 1) Source Medium: Groundwater Conc. (mg/L)	2) NAF Value (m^3/L) Receptor: On-Site Residential		3) Exposure Medium: Indoor Air: POE Conc. (mg/m^3) (1) / (2): On-Site Residential		4) Exposure Multiplier: (IRxEFxED)/(BWxAT) (m^3/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	
Benzene	1.4E-2	3.2E+3		4.4E-6		8.8E-2		3.9E-7		6.3E-6	
Benzene-CAL	1.4E-2	3.2E+3		4.4E-6		8.8E-2		3.9E-7		6.3E-6	
Ethylbenzene	5.3E-3	3.6E+3		1.4E-6		2.1E-1		2.9E-7		6.7E-6	
Methyl t-Butyl Ether	8.1E-3	3.2E+3		2.5E-6		2.1E-1		5.2E-7		8.7E-6	
Toluene	1.2E-3	3.6E+3		3.4E-7		2.1E-1		6.9E-8		5.5E-6	
Xylene (mixed isomers)	2.6E-3	3.9E+3		6.7E-7		2.1E-1		1.4E-7		1.0E-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 frequancey (days/yr)
ET = Exposure time (hrs/day)
IR = Inhalation rate (m^3/day)
POE = Point of exposure
SA = Skin exposure area (cm^2/day)

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

Site Name: Former Chevron 9-1723 Site Location: 9757 San Leandro Blvd., Oakland Completed By: J. Douglas Date Completed: 10/11/2001

TIER 2 PATHWAY RISK CALCULATION

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

Constituents of Concern	(1) EPA Carcinogenic Classification	CARCINOGENIC RISK: (2) Total Carcinogenic Intake Rate (mg/kg/day) On-Site Residential		(3) Inhalation Slope Factor (mg/kg-day)^-1	(4) Individual COC Risk (2) x (3) On-Site Residential		TOXIC EFFECTS: (5) Total Toxicant Intake Rate (mg/kg/day) On-Site Residential		(6) Inhalation Reference Dose (mg/kg-day)	(7) Individual COC Hazard Quotient (5) / (6) On-Site Residential	
Benzene	A	6.3E-6		2.9E-2	1.8E-7		1.5E-5		1.7E-3	8.6E-3	
Benzene-CAL	A	6.3E-6		1.0E-1	6.3E-7		1.5E-5		1.7E-3	8.6E-3	
Ethylbenzene	D						6.7E-6		2.9E-1	2.3E-5	
Methyl t-Butyl Ether							8.7E-6		8.6E-1	1.0E-5	
Toluene	D						5.5E-6		1.1E-1	4.8E-5	
Xylene (mixed isomers)	D						1.0E-5		2.0E+0	5.0E-6	
Total Pathway Carcinogenic Risk =					8.1E-7	0.0E+0	***Total Pathway Hazard Index =***			1.7E-2	0.0E+0

Site Name: Former Chevron 9-1723 Site Location: 9757 San Leandro Blvd., Oakland Completed By: J. Douglas Date Completed: 10/11/2001

TIER 2 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	3.0E-2								
Benzene-CAL	3.0E-2								
Ethylbenzene	2.0E-2								
Methyl t-Butyl Ether	2.6E-2								
Toluene	1.8E-2								
Xylene (mixed isomers)	4.7E-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)

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

Site Name: Former Chevron 9-1723 Site Location: 9757 San Leandro Blvd., Oakland | Completed By: J. Douglas | Date Completed: 10/11/2001 | 9 OF 9

TIER 2 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	1.4E-2										
Benzene-CAL	1.4E-2										
Ethylbenzene	5.3E-3										
Methyl t-Butyl Ether	8.1E-3										
Toluene	1.2E-3										
Xylene (mixed isomers)	2.6E-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)

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

Site Name: Former Chevron 9-1723 Site Location: 9757 San Leandro Blvd., Oakland Completed By: J. Douglas Date Completed: 10/11/2001

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

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	1.4E-2	UCL			3.0E-2	UCL
Benzene-CAL	1.4E-2	UCL			3.0E-2	UCL
Ethylbenzene	5.3E-3	UCL			2.0E-2	UCL
Methyl t-Butyl Ether	8.1E-3	UCL			2.6E-2	UCL
Toluene	1.2E-3	UCL			1.8E-2	UCL
Xylene (mixed isomers)	2.6E-3	UCL			4.7E-2	UCL

Site Name: Former Chevron 9-1723
Site Location: 9757 San Leandro Blvd., Oakland

Completed By: J. Douglas
Date Completed: 10/11/2001

RBCA SITE ASSESSMENT | **Input Screen 6.3**

CONSTITUENT MOLE FRACTIONS

(Complete the following table)

CONSTITUENT	Mole Fraction of Constituent in Source Material
Benzene	
Benzene-CAL	
Ethylbenzene	
Methyl t-Butyl Ether	
Toluene	
Xylene (mixed isomers)	

Site Name: Former Chevron 9-1723 Completed By: J. Douglas
Site Location: 9757 San Leandro Blvd., Date Completed: 10/11/2001

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
Benzene-CAL	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 Chevron 9-1723
Site Location: 9757 San Leandro Blvd., Oakland

Completed By: J. Douglas
Date Completed: 10/11/2001

RBCA SITE ASSESSMENT | **Input Screen 9.1**

CONSTITUENT HALF-LIFE VALUES

(Complete the following table)

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

Site Name: Former Chevron 9-1723 Completed By: J. Douglas
Site Location: 9757 San Leandro Blvd., C Date Completed: 10/11/2001

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		
Benzene-CAL		
Ethylbenzene		
Methyl t-Butyl Ether		
Toluene		
Xylene (mixed isomers)		

Site Name: Former Chevron 9-1723
Site Location: 9757 San Leandro Blvd., Oakland

Completed By: J. Douglas
Date Completed: 10/11/2001

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			
71-43-2	Benzene-CAL	O	78.1		9.30E-02		1.10E-05		1.58		5.29E-03	2.20E-01		9.52E+01		1.75E+03				
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 Chevron 9-1723 Site Location: 9757 San Leandro Blvd., Completed By: J. Douglas Date Completed: 10/11/2001

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
71-43-2	Benzene-CAL			1.70E-03		1.00E-01		1.00E-01		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 Chevron 9-1723 Site Location: 9757 San Leandro Blv Completed By: J. Douglas Date Completed: 10/11/2001

Software version: 1.0.1

RBCA CHEMICAL DATABASE

Miscellaneous Chemical Data

CAS Number	Constituent	Maximum Contaminant Level MCL (mg/L)	reference	Permissible Exposure Limit PEL/TLV (mg/m3)	ref	Relative Absorption Factors Oral	Dermal	Detection Limits Groundwater (mg/L)	ref	Soil (mg/kg)	ref	Half Life (First-Order Decay) (days) Saturated	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
71-43-2	Benzene-CAL	5.00E-03		3.20E+00		1	0.5	0.002		0.005		720	720	
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 Chevron 9-1723 Site Location: 9757 San Leandro Blvd., Oakland Completed By: J. Douglas Date Completed: 10/11/2001

Software version: 1.0.1

Table 1
SOIL SAMPLE ANALYTICAL RESULTS
BTEX AND PETROLEUM HYDROCARBONS

APRIL 1-4, 1996

CHEVRON SERVICE STATION #9-1723
9757 SAN LEANDRO BOULEVARD, OAKLAND, CALIFORNIA

SAMPLE NUMBER		DATE	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYL BENZENE (mg/kg)	TOTAL XYLENES (mg/kg)	TPH-G (mg/kg)	TOTAL OIL AND GREASE (mg/kg)
BORING	DEPTH (feet BGS)							
SB-1	5	04/02/96	--	--	--	--	--	--
	10		1.4	0.44	8.9	28	400	78
	15		--	--	--	--	--	--
SB-2	5	04/01/96	--	--	--	--	--	--
	10		0.18	0.12	0.79	0.59	51	24
SB-3	5	04/01/96	--	--	--	--	--	--
	10		0.54	0.66	2.3	3.3	190	35
	15		--	--	--	--	--	--
SB-4	5	04/01/96	--	--	--	--	--	--
	10		0.59	0.52	0.14	1.1	170 a	940
	15		0.091	0.036	0.029	0.23	20 a	--
SB-5	5	04/01/96	--	--	--	--	--	--
	10		2.4	1.4	10	4.2	300	--
	15		--	--	--	--	--	--
SB-6	5	04/04/96	--	--	--	--	--	--
	10		0.57	ND<0.0050	0.42	2.3	330 a	--
	15		--	--	--	--	--	--
SB-7	5	04/01/96	2.2	0.58	7.7	7.9	880	--
	10		1.3	1.6	7.0	27	500	--
	15		--	--	--	--	--	--
SB-8	5	04/04/96	1.6	ND<0.0050	ND<0.0050	0.79	110 a	--
	10		4.6	1.1	0.76	2.1	240 a	--
	15		0.0054	ND<0.0050	ND<0.0050	0.042	2.1 b	--
SB-9	5	04/01/96	0.60	0.16	0.14	0.82	57	--
	10		--	--	--	--	--	--
	15		3.8	7.4	17	69	610	--
SB-10	5	04/04/96	3.7	8.9	9.9	53	450	--
	10		99	40	150	210	1,300	--
	15		0.010	0.0051	ND<0.0050	0.016	ND<1.0	--
SB-11	5	04/04/96	0.012	0.040	0.019	0.056	7.5 a	--
	10		1.5	ND<0.0050	9.7	3.2	550	--
	15		--	--	--	--	--	--
SB-12	5	04/03/96	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<1.0	--
	10		1.1	4.1	19	85	750	--
	15		--	--	--	--	--	--
SB-13	5	04/03/96	--	--	--	--	--	--
	10		1.6	0.81	7.4	24	340	--
SB-14	5	04/04/96	0.066	0.050	0.097	0.067	17 a	--
	10		5.0	28	16	82	820	--
SB-15	5	04/03/96	0.011	0.0060	ND<0.0050	0.15	2.1 a	--
	10		17	68	53	260	1,800	--
SB-16	5	04/03/96	0.15	ND<0.0050	0.0069	0.026	1.9	--
	10		6.2	1.8	28	76	760	--
SB-17	5	04/03/96	--	--	--	--	--	--
	10		4.3	15	38	150	1,600	--
SB-18	5	04/04/96	--	--	--	--	--	--
	10		5.9	4.5	2.0	5.4	480	--
SB-19	5	04/03/96	--	--	--	--	--	--
	10		2.3	ND<0.0050	1.1	1.5	[illegible]	--
SB-20	5	04/03/96	--	--	--	--	--	--
	10		3.8	1.5	17	39	510	--
SB-21	5	04/02/96	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<1.0	--
SB-22	5	04/02/96	0.027	0.0091	0.020	0.015	3.1 a	--
	10		0.72	0.47	4.7	0.39	110	--
SB-23	5	04/02/96	--	--	--	--	--	--
	10		3.4	0.29	0.86	4.6	140	--

EXPLANATION
BGS = Below ground surface
TPH-G = Total petroleum hydrocarbons-as-gasoline
mg/kg = milligrams per kilogram, equivalent to parts per million (ppm)
ND = Not detected at or above the minimum detection limit shown
a = Gasoline and unidentified hydrocarbons >C8
b = Unidentified hydrocarbons >C8

Table 1. Summary of Previous Chemical Results from Soil Samples

WELL NUMBER	SAMPLING DATE	DEPTH (FEET)	TPH (GASOLINE) mg/kg	BENZENE ug/kg	TOLUENE ug/kg	ETHYL BENZENE ug/kg	XYLENES, TOTAL ug/kg	DIESEL mg/kg	MOTOR OIL mg/kg
Source: Groundwater Technology, Inc., 1988									
MW-5	18-May-88	5	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	NT	NT
	18-May-88	10	160	ND(0.5)	ND(0.5)	3000	7000	NT	NT
	18-May-88	15	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	NT	NT
MW-6	18-May-88	5	ND(1)	ND(0.5)	ND(5)	ND(5)	ND(5)	NT	NT
	18-May-88	10	310	ND(0.5)	2000	4000	18000	NT	NT
MW-7	18-May-88	5	ND(1)	ND(0.5)	ND(5)	ND(5)	ND(5)	NT	NT
	18-May-88	10	ND(1)	ND(0.5)	ND(5)	ND(5)	ND(5)	NT	NT
MW-8	19-May-88	5	2	ND(0.5)	ND(5)	ND(5)	ND(5)	NT	NT
	19-May-88	10	5	ND(0.5)	ND(5)	ND(5)	ND(5)	NT	NT
Source: Beta Associates, 1987									
MW-1	18-Apr-87	3	NT	ND(10)	ND(10)	ND(10)	ND(20)	NT	NT
MW-2	18-Apr-87	3	NT	ND(10)	ND(10)	ND(10)	ND(20)	NT	NT
DH-3	18-Apr-87	2.5	NT	ND(10)	ND(10)	ND(10)	ND(20)	NT	NT
MW-4	18-Apr-87	10.5	NT	ND(10)	ND(10)	NT	ND(10)	ND	ND
DH-5	18-Apr-87	5	NT	ND(10)	ND(10)	ND(10)	ND(20)	NT	NT
DH-6	18-Apr-87	10.5	NT	ND(10)	ND(10)	NT	ND(10)	ND	ND
DH-7	18-Apr-87	3.5	ND(1)	ND(10)	ND(10)	NT	ND(10)	NT	NT
DH-8	18-Apr-87	10	1017	1063	9997	NT	108092	ND(1)	240
DH-9	18-Apr-87	1	NT	ND(10)	ND(10)	ND(10)	ND(20)	NT	NT
DH-10	18-Apr-87	1	NT	NT	NT	NT	NT	NT	NT
DH-11	18-Apr-87	1	NT	ND(10)	ND(10)	NT	ND(10)	NT	380

NOTES:

mg/kg: milligrams per kilogram (equivalent to parts per million)
ug/kg: micrograms per kilogram (equivalent to parts per billion)
ND: Not detected; Limit of detection indicated in parenthesis
NT: Not Tested

Total Petroleum Hydrocarbons (TPH) by EPA Method 8015
Benzene, Toluene, Ethyl Benzene, Total Xylenes by EPA Method 8020
Extraction by EPA Method 5030, Purge and Trap

Table 5. Summary of Chemical Results from Soil Samples

WELL NUMBER	SAMPLING DATE	DEPTH (FEET)	TPH (GASOLINE) mg/kg	BENZENE ug/kg	TOLUENE ug/kg	BENZENE ug/kg	TOTAL ug/kg
SB-1	03-Aug-89	6-6.5	ND(10)	ND(5)	30	ND(5)	ND(5)
	03-Aug-89	10-10.5	400	1900	1400	4100	11000
SB-2	03-Aug-89	6-6.5	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
	03-Aug-89	9-9.5	34	140	200	270	430
	03-Aug-89	15.5-16	140	670	790	1300	4900
SB-3	03-Aug-89	6-6.5	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
	03-Aug-89	9-9.5	130	900	ND(100)	1500	3400
	03-Aug-89	15-15.5	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
SB-4	03-Aug-89	5-5.5	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
	03-Aug-89	10-10.5	300	3300	420	8200	12000
	03-Aug-89	15-15.5	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
SB-5	03-Aug-89	5-5.5	ND(10)	47	ND(5)	ND(5)	ND(5)
	03-Aug-89	10-10.5	470	1900	580	7200	22000
	03-Aug-89	15-15.5	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
SB-6	05-Oct-89	5-5.5	ND(10)	18	23	8.0	27
	05-Oct-89	10-10.5	270	2000	900	1600	3800
	05-Oct-89	15-15.5	ND(10)	33	34	5.5	26
MW-9	04-Aug-89	6-6.5	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
	04-Aug-89	12-12.5	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
MW-10	04-Aug-89	6-6.5	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
	04-Aug-89	12-12.5	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)

NOTES:

mg/kg: milligrams per kilogram (equivalent to parts per million)
ug/kg: micrograms per kilogram (equivalent to parts per billion)
ND: Not detected; limit of detection indicated in parenthesis

Total Petroleum Hydrocarbons (TPH) by EPA Method 8015
Benzene, Toluene, Ethyl Benzene, Total Xylenes by EPA Method 8020
Extraction by EPA Method 5030, Purge and Trap

Analyses performed by Curtis & Tompkins, Ltd.

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet. Analytical results are in parts per billion (ppb)

DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	Lead	MTBE
MW-5											
11/02/93	21.84	11.15	10.69	--	790	43	3.4	22	12	<400	--
02/10/94	21.84	13.10	8.74	--	1400	52	3.0	50	40	--	--
05/12/94	21.84	12.40	9.44	--	1800	87	6.2	77	66	--	--
08/26/94	21.84	--	--	--	--	--	--	--	--	--	--
11/11/94	21.84	13.50	8.34	--	380	18	<1.0	18	11	--	--
02/01/95	21.84	14.32	7.52	--	570	36	0.59	21	11	--	--
05/18/95	21.84	12.87	8.97	--	590	29	1.0	16	9.8	--	--
08/02/95	21.84	11.98	9.86	--	210	9.2	<0.5	4.0	1.2	--	<2.5
11/01/95	21.84	11.58	10.26	--	210	5.6	<0.5	1.9	<0.5	--	<25
01/31/96	21.84	14.72	7.12	--	1200	50	<5.0	19	29	--	11
05/16/96	21.84	14.22	7.62	--	440	14	<0.5	17	8.6	--	2.5
08/01/96	21.84	11.86	9.98	--	58	1.4	<0.5	<0.5	<0.5	--	6.9
12/17/96	21.84	13.13	8.71	--	300	9.7	<0.5	11	6.3	--	5.0
02/20/97	21.84	12.81	9.03	--	350	6.7	<0.5	4.3	1.9	--	7.3
05/02/97	21.84	12.50	9.34	--	270	4.8	<0.5	3.5	1.3	--	3.1
07/23/97	21.84	11.70	10.14	--	290	3.4	<0.5	<0.5	<0.5	--	8.6
11/04/97	21.84	11.69	10.15	--	160	3.8	<0.5	1.5	<0.5	--	<2.5
02/04/98	21.84	16.54	5.30	--	140	4.3	<0.5	8.5	<0.5	--	25
05/01/98	21.84	12.77	9.07	--	1200	19	<1.0	9.7	1.7	--	11
07/17/98	21.84	12.19	9.65	--	900	3.6	<2.0	12	2.6	--	

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet.

Analytical results are in parts per billion (ppb)

DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	Lead	MTBE
MW-6											
11/02/93	21.71	10.93	10.78	--	300	19	1.8	2.5	5.0	<400	--
02/10/94	21.71	12.86	8.85	--	200	10	0.9	2.0	4.0	--	--
05/12/94	21.71	12.08	9.63	--	210	10	1.1	1.2	3.1	--	--
08/26/94	21.71	10.82	10.89	--	310	16	1.4	2.3	7.1	--	--
11/11/94	21.71	13.25	8.46	--	<50	1.3	<0.5	<0.5	1.0	--	--
02/01/95	21.71	14.02	7.69	--	<50	1.9	<0.5	<0.5	0.51	--	--
05/18/95	21.71	12.43	9.28	--	<50	8.2	<0.5	<0.5	<0.5	--	--
08/02/95	21.71	11.64	10.07	--	<50	2.3	<0.5	<0.5	<0.5	--	--
11/01/95	21.71	11.31	10.40	--	<50	<0.5	<0.5	<0.5	<0.5	--	<2.5
01/31/96	21.71	13.63	8.08	--	<50	0.98	<0.5	<0.5	<0.5	--	<2.5
05/16/96	21.71	13.91	7.80	--	<50	1.6	<0.5	<0.5	<0.5	--	<2.5
08/01/96	21.71	11.56	10.15	--	<50	0.82	<0.5	<0.5	<0.5	--	<2.5
12/17/96	21.71	13.26	8.45	--	63	2.6	<0.5	<0.5	<0.5	--	<2.5
02/20/97	21.71	--	--	Inaccessible	--	--	--	--	--	--	--
05/02/97	21.71	--	--	Inaccessible	--	--	--	--	--	--	--
05/29/97	21.71	11.72	9.99	--	120	1.8	<0.5	<0.5	<0.5	--	2.6
07/23/97	21.71	11.31	10.40	--	<50	<0.5	<0.5	<0.5	<0.5	--	<2.5
11/04/97	21.71	11.38	10.33	--	63	1.2	<0.5	<0.5	<0.5	--	<2.5
02/04/98	21.71	16.19	5.52	--	<50	<0.5	<0.5	<0.5	<0.5	--	<2.5
05/01/98	21.71	12.40	9.31	--	<50	<0.5	<0.5	<0.5	<0.5	--	<2.5
07/17/98	21.71	11.84	9.87	--	<50	1.0	<0.5	<0.5	<0.5	--	<2.5

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet. Analytical results are in parts per billion (ppb)

DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	Lead	MTBE
MW-7											
11/02/93	20.95	10.88	10.07	--	--	--	--	--	--	--	--
02/10/94	20.95	--	--	--	--	--	--	--	--	--	--
05/12/94	20.95	--	--	--	--	--	--	--	--	--	--
08/26/94	20.95	--	--	--							
NO LONGER MONITORED OR SAMPLED											
MW-8											
11/02/93	21.84	11.02	10.82	--	15,000	2000	440	420	1400	<400	--
02/10/94	21.84	12.97	8.87	--	6500	1200	380	250	7900	--	--
05/12/94	21.84	12.19	9.65	--	30,000	1400	2900	800	3800	--	--
08/26/94	21.84	10.90	10.94	--	17,000	720	200	330	930	--	--
11/11/94	21.84	13.38	8.46	--	6800	250	170	190	650	--	--
02/01/95	21.84	14.36	7.48	--	330	68	2.8	2.7	4.3	--	--
05/18/95	21.84	12.54	9.30	--	540	120	12	11	23	--	--
08/02/95	21.84	11.73	10.11	--	1100	150	9.7	20	40	--	<5.0
11/01/95	21.84	11.36	10.48	--	1700	120	15	16	39	--	<2.5
01/31/96	21.84	14.64	7.20	--	57	5.3	<0.5	<0.5	<0.5	--	64
05/16/96	21.84	13.99	7.85	--	2100	260	43	56	130	--	7.4
08/01/96	21.84	11.59	10.25	--	1100	45	0.92	8.9	25	--	22
12/17/96	21.84	12.95	8.89	--	2000	280	30	51	88	--	--
02/20/97	21.84	--	--	Inaccessible	--	--	--	--	--	--	--
05/02/97	21.84	--	--	Inaccessible	--	--	--	--	--	--	--
05/29/97	21.84	11.79	10.05	--	3400	280	31	53	120	--	<50
07/23/97	21.84	11.48	10.36	--	760	20	2.2	2.6	5.0	--	9.7
11/04/97	21.84	11.49	10.35	--	1100	150	13	22	39	--	49
02/04/98	21.84	16.29	5.55	--	270	6.8	<0.5	3.3	<0.5	--	<2.5
05/01/98	21.84	12.62	9.22	--	190	5.3	<0.5	<0.5	0.75	--	2.8
07/17/98	21.84	11.89	9.95	--	1400	210	20	24	54	--	<25