ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
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October 27, 1997

Mr. Phil Briggs
Chevron U.S.A. Products Company
P.O. Box 6004
San Ramon, CA 94583-0904

RE: Chevron, 609 Oak Street, Oakland, CA 94607

Dear Mr. Briggs:

This office has reviewed your Risk Assessment & Threshold Limits. On-site monitoring wells, C-1, C-2, and CR-1 and off-site well C-5 must be monitored on a semi-annual basis. After two years, if the groundwater from the on-site wells contains less than 720 ppb of benzene, and the groundwater from the off-site well has less than 100 ppb of benzene, this site can be re-evaluated for closure.

If you have any questions, please contact me at (510) 567-6774.

Sincerely,

Larry Seto

cc: Madhulla Logan, Environmental Health

Comments on Risk Assessment submitted for 609 Oak Street, Oakland
August 28, 1997

Jennifer.

I have reviewed the updates for the risk assessment for 609 Oak street, Oakland. As you may be aware in the beginning, the risk assessment failed due to the high concentrations found in the composite sample 87087T3#283 (in Table 1), i.e about 150 ppm of benzene. So TerraVac re-sampled the area again near the composite sample location and this time probably due to biodegradation, they did not get significant concentrations. Terravac plugged in the new results instead of previous 150 ppm result, and averaged the soil concentrations. Only those concentrations above 8 feet were taken into consideration, since below 8 feet, it is close to groundwater. They got 3.6 ppm as the average concentrations in the soil. Hence both the average soil and groundwater concentration appear to be less than the SSTL's derived for a 10-5 risk. So, I guess the site passes the risk assessment.

benzene

And also, they have a management threshold concentration of ***720 ppb*** *for groundwater for on site wells (C-1, C-2, C-5 and CR-1) which means they are going to continue monitoring for a while and check to see if these concentrations of 720 ppb exceed on site. If it does exceed, then the site needs to be re-evaluated.*

Madhulla

TERRA VAC
1651 Alvarado Street, San Leandro, CA 94577-2636
Tel (510) 351-8900 ❑ Fax (510) 351-0221

August 11, 1997

2nd Update

Ms. Madhulla Logan
Alameda County Health Care Services
Department of Environmental Health
1131 Harbor Way Parkway, Suite 250
Alameda, CA 94502-6577

Subject: Risk Assessment & Threshold Limits
Former Chevron Service Station #9-4587
609 Oak Street
Oakland, CA

Dear Ms. Logan:

As per your request, and to clarify the information regarding the hand augered soil samples and resultant risk model, I am forwarding the following:

1) A revised soil sample table, with the addition of the results of the hand augered samples;

2) GSI-RBCA printouts for inhalation risk from benzene residual in subsurface soil, using the sample results included. The 1987 composite sample has been excluded and the four hand augered samples have been used with the three other vadose zone samples. The GSI software gives the option of utilizing the maximum concentration, the mean or the upper confidence limit mean of the sample set, but does not calculate the actual average. The representative concentration in the soil, shown as 0.27 mg/kg benzene, differs significantly from the average of 3.6 mg/kg. Both values, though, are below the 3.9 mg/kg SSTL derived to keep from exceeding a 10^{-5} risk.

how did they get this from the table

3) The GSI printout for site-specific parameters utilized for SSTL derivation. Modifications include the porosity value of 0.31 (as determined by PTS Laboratories on a sample from five feet below grade at DVE-3), a building air exchange rate of two exchanges per hour (as per the Uniform Building Code), a reduction of the crack fraction to 0.005, and use of the Most Likely Exposure duration of 4 years for commercial. ?

8-7

5

TERRA VAC

Utilizing this site specific data, the management plan threshold limits can be revised upward. Even with the more conservative risk basis of 10^{-6} for groundwater, an average of 1800 ppb benzene (the SSTL calculated with the GSI software) in groundwater samples from the listed onsite wells of C-1, C-2 and CR-1 would require notification to Alameda County, resampling and, if initial results are confirmed, a reevaluation of site conditions and further activities.

If you have any questions or comments, please call me at (510) 351-8900.

Sincerely,
Terra Vac Corporation

Robert A. Dahl
Project Manager

cc: Phil Briggs, Chevron
30-0219.10

Table 2
Management PlanThreshold Limits
Former Chevron Station 9-4587
609 Oak Street
Oakland, CA

Well ID	Benzene Concentration (ppb) Highest Observed (ppb)	Benzene Concentration 12/19/96 (ppb)	Benzene Concentration Threshold Limit (ppb)
C-1	11,000	<0.5	*1800
C-2	8,200	<0.5	*1800
C-5	330	4.2	100
CR-1	9400	0.9	*1800
			*as average for onsite

Average = 1·2875

RBCA TIER 1/TIER 2 EVALUATION

Output Table 1

Site Name: Chevron 9-4587 | Job Identification: 30-0219 | Software: GSI RBCA Spreadsheet
Site Location: Oak Street, Oakland | Date Completed: 8/2/97 | Version: v 1.0
Completed By: R.A. Dahl

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

DEFAULT PARAMETERS

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	[illegible]	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			7.9E+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			-6.9E+01	
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?	TRUE				

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

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)	3.0E+04	FALSE	3.0E+04	FALSE
S	Inhalation receptor (cm)		FALSE		TRUE

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

Surface Parameters	Definition (Units)	Residential	Commercial/Industrial Chronic	Commercial/Industrial Construction
t	Exposure duration (yr)	30	4	1
A	Contaminated soil area (cm^2)	***1.9E+06***		1.0E+06
W	Length of affected soil parallel to wind (cm)	***1.2E+03***		1.0E+03
W.gw	Length of affected soil parallel to groundwater (c	***1.4E+03***		
Uair	Ambient air velocity in mixing zone (cm/s)	2.3E+02		
delta	Air mixing zone height (cm)	2.0E+02		
Lss	Definition of surficial soils (cm)	***9.1E+01***		
Pe	Particulate areal emission rate (g/cm^2/s)	2.2E-10		

Groundwater	Definition (Units)	Value
delta.gw	Groundwater mixing zone depth (cm)	2.0E+02
I	Groundwater infiltration rate (cm/yr)	3.0E+01
Ugw	Groundwater Darcy velocity (cm/yr)	***1.9E+02***
Ugw.tr	Groundwater Transport velocity (cm/yr)	***5.0E+02***
Ks	Saturated Hydraulic Conductivity(cm/s)	
grad	Groundwater Gradient (cm/cm)	
Sw	Width of groundwater source zone (cm)	1.8E+03
Sd	Depth of groundwater source zone (cm)	3.0E+02
BC	Biodegradation Capacity (mg/L)	
BIO?	Is Bioattenuation Considered	TRUE
phi.eff	Effective Porosity in Water-Bearing Unit	3.8E-01
foc.sat	Fraction organic carbon in water-bearing unit	1.0E-03

Soil	Definition (Units)	Value		
hc	Capillary zone thickness (cm)	***3.0E+00***		
hv	Vadose zone thickness (cm)	***2.6E+02***		
rho	Soil density (g/cm^3)	***1.8***		
foc	Fraction of organic carbon in vadose zone	***0.02***		
phi	Soil porosity in vadose zone	***0.31***		
Lgw	Depth to groundwater (cm)	***2.6E+02***		
Ls	Depth to top of affected soil (cm)	***7.6E+01***		
Lsubs	Thickness of affected subsurface soils (cm)	***1.8E+02***		
pH	Soil/groundwater pH	6.5		
		capillary	vadose	foundation
phi.w	Volumetric water content	***0.29***	***0.11***	***0.11***
phi.a	Volumetric air content	***0.02***	***0.2***	***0.2***

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	***5.8E-04***
Lcrk	Foundation crack thickness (cm)	1.5E+01	
eta	Foundation crack fraction	***0.005***	

Dispersive Transport Parameters	Definition (Units)	Residential	Commercial
Groundwater			
ax	Longitudinal dispersion coefficient (cm)	3.0E+03	
ay	Transverse dispersion coefficient (cm)	1.0E+03	
az	Vertical dispersion coefficient (cm)	1.5E+02	
Vapor			
dcy	Transverse dispersion coefficient (cm)		
dcz	Vertical dispersion coefficient (cm)		

RBCA SITE ASSESSMENT

Tier 2 Worksheet 9.2

Site Name: Chevron 9-4587
Site Location: Oak Street, Oakland

Completed By: R.A. Dahl
Date Completed: 8/2/1997

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

■ MCL exposure limit?
☐ PEL exposure limit?

Calculation Option: 2

SUBSURFACE SOIL SSTL VALUES (> 3 FT BGS)

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

CONSTITUENTS OF CONCERN		Representative Concentration	Soil Leaching to Groundwater			X Soil Volatilization to Indoor Air		X Soil Volatilization to Outdoor Air		Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	Name	(mg/kg)	Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)	Residential: (on-site)	Commercial: (on-site)	Residential: (on-site)	Commercial: (on-site)	(mg/kg)	"■" If yes	Only if "yes" left
71-43-2	Benzene	2.7E-1	NA	NA	NA	NA	3.9E+0	NA	1.3E+2	3.9E+0	☐	<1

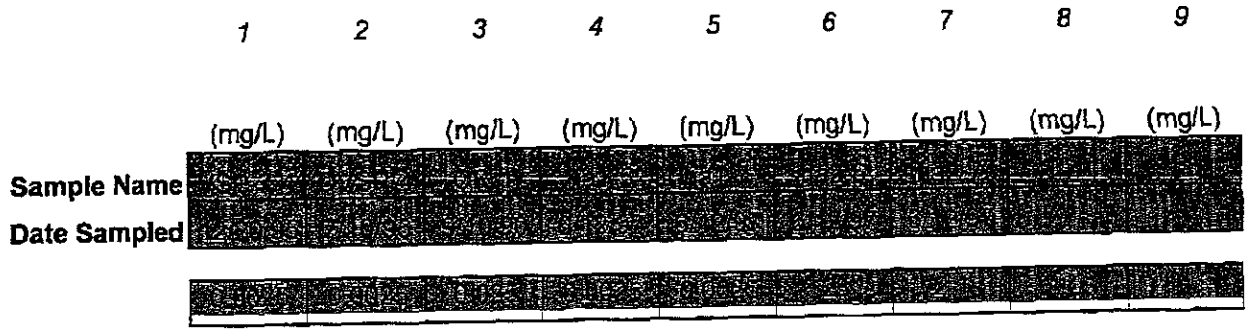
Software: GSI RBCA Spreadsheet
Version: v 1.0

Serial: G-337-YAX-542

UCL Percentile

[redacted] (must be 0.9 or 0.95)

Analytical Data (Up to 50 Data Points)



RBCA SITE ASSESSMENT

Tier 2 Worksheet 9.3

Site Name: Chevron 9-4587
Site Location: Oak Street, Oakland

Completed By: R.A. Dahl
Date Completed: 8/2/1997

GROUNDWATER SSTL VALUES

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

■ MCL exposure limit?
☐ PEL exposure limit?

Calculation Option: 2

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

CONSTITUENTS OF CONCERN		Representative Concentration	X Groundwater Ingestion			X Groundwater Volatilization to Indoor Air		X Groundwater Volatilization to Outdoor Air		Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	Name	(mg/L)	Residential: 1000 feet	Commercial: (on-site)	Regulatory(MCL): 1000 feet	Residential (on-site)	Commercial: (on-site)	Residential (on-site)	Commercial: (on-site)	(mg/L	"■" if yes	Only if "yes" left
71-43-2	Benzene	3.5E-3	>Sol	NA	>Sol	NA	1.8E+1	NA	7.1E+2	1.8E+1	☐	<1

Software: GSI RBCA Spreadsheet
Version: v 1.0

Serial: G-337-YAX-542

Choose UCL Percentile

(must be 0.9 or 0.95)

Analytical Data (Up to 50 Data Points)

	1	2	3	4	5	6	7	8	9
	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Well Name									
Date Sampled									

30-0219
Groundwater samples