ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
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November 27, 1996

Mr. Rodger Witham
Clark & Witham, Inc
3499 Edison Way,
Fremont, CA - 94538

Ref: Former BP Service Station- 22852 Foothill Boulevard, Hayward, CA

Dear Mr. Witham:

This Department is in receipt of the documents dated August 13, 1996 which includes a brief summary of the previous investigation conducted on the property and the laboratory report which includes the organic carbon content and the soil moisture content, submitted by Clark and Withams, Inc for the above referenced property.

Based on the information submitted, a risk evaluation was conducted by this Department using the ASTM's Risk Based Corrective Action (RBCA) (as defined in ASTM E-1739). The risk evaluation was conducted using the 95% upper confidence limit (UCL) of the mean of the maximum groundwater benzene concentrations that was found in the last 4 quarters for each of the groundwater monitoring wells located inside the property boundaries. The same methodology was used to analyze the soil samples, using only the results of the final soil samples that were collected subsequent to the excavation conducted around the tank pit area, and of the soil samples collected during the monitoring well installation. The 95% UCL of the average benzene concentrations for the soil and groundwater were found to be 0.16 ppm and .03 ppm respectively.

The most conservative of the possible exposure pathways " volatilization from groundwater into enclosed space" and "volatilization from subsurface soil into enclosed space" were evaluated for both residential and commercial scenarios to determine the site specific target levels (SSTLs) /cleanup levels that are specific for the referenced site. The worksheets indicating the various input parameters used for the cleanup evaluation and the calculated SSTLs for the different exposure pathway are included as attachments to this letter.

Based on the evaluation, the actual site concentrations of benzene were exceeded only for the pathway, "soil volatilization into enclosed space" for a residential scenario. Hence, this Department approves the site being developed for commercial use. However, please note that further evaluation or remediation of the site will be required for any residential/day care development.

This Department recommends that the following precautions be considered as site management tools:

- mitigate any potential negative impacts posed by the residual contamination remaining on site, by capping the site to the extent possible, use of vapor barriers beneath the buildings etc.
- develop a strategy to address any risk posed to the construction workers etc. during earth moving activities, etc.
- take precautions to avoid making vertical or lateral conduits like wells, drainage lines, water supply lines, etc that may cause cross contamination between the shallow and deeper aquifers.

If you have any questions, you can reach me at (510) 567-6764.

Sincerely,

Madhulla Logan

Madhulla Logan
Hazardous Material Specialist

C: **Kuo-Ren Lin,** CBF Petroleum Group, 54 St. James Place, Piedmont, CA- 94611
Hugh Murphy, City of Hayward Fire Department, 25151 Clawiter Road, Hayward, CA - 94545

RBCA TIER 1/TIER 2 EVALUATION

Output Table 1

Site Name: Former BP oil Job Identification:
Site Location: 22852 Foothill Boulevard, Hay Date Completed: 11/26/95
Completed By: Madhulla Logan

Software: GSI RBCA Spreadsheet
Version: v 1.0

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	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
Groundwater Pathways:				
GW.i	Groundwater Ingestion	FALSE	FALSE	
GW.v	Volatilization to Outdoor Air	FALSE	FALSE	
GW.b	Vapor Intrusion to Buildings	FALSE	TRUE	
Soil Pathways				
S.v	Volatiles from Subsurface Soils	FALSE	FALSE	
SS.v	Volatiles and Particulate Inhalation	FALSE	FALSE	FALSE
SS.d	Direct Ingestion and Dermal Contact	FALSE	FALSE	FALSE
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)		FALSE		FALSE
S	Inhalation receptor (cm)		FALSE		FALSE

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

Surface Parameters	Definition (Units)	Residential	Commercial/Industrial Chronic	Commercial/Industrial Construction
t	Exposure duration (yr)	30	25	1
A	Contaminated soil area (cm^2)	***2.3E+06***		1.0E+06
W	Length of affected soil parallel to wind (cm)	***1.5E+03***		1.0E+03
W.gw	Length of affected soil parallel to groundwater (c	***1.5E+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)	1.0E+02		
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)	2.5E+03
Ugw.tr	Groundwater Transport 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)	
BC	Biodegradation Capacity (mg/L)	
BIO?	Is Bioattenuation Considered	FALSE
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)	5.0E+00		
hv	Vadose zone thickness (cm)	***2.5E+02***		
rho	Soil density (g/cm^3)	1.7		
foc	Fraction of organic carbon in vadose zone	***0.08***		
phi	Soil porosity in vadose zone	***0.3***		
Lgw	Depth to groundwater (cm)	***2.6E+02***		
Ls	Depth to top of affected soil (cm)	***2.1E+02***		
Lsubs	Thickness of affected subsurface soils (cm)	***9.1E+01***		
pH	Soil/groundwater pH	6.5		
		capillary	vadose	foundation
phi.w	Volumetric water content	***0.27***	***0.06***	***0.06***
phi.a	Volumetric air content	***0.03***	***0.24***	***0.24***

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	***0.005***	

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

RBCA SITE ASSESSMENT | Tier 2 Worksheet 9.2

Site Name: Former BP oil
Site Location: 22852 Foothill Boulevard, Hayward, CA

Completed By: Madhulla Logan
Date Completed: 11/26/1995

SUBSURFACE SOIL SSTL VALUES (> 3 FT BGS)

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

☐ MCL exposure limit?
☐ PEL exposure limit?

Calculation Option: 2

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

CONSTITUENTS OF CONCERN		Representative Concentration		Soil Leaching to Groundwater			X	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	1.6E-1		NA	NA	NA		NA	1.7E-1	NA	NA	1.7E-1	☐	<1

Software: GSI RBCA Spreadsheet
Version: v 1.0

Serial: G-385-FRX-508

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

Site Name: Former BP oil
Site Location: 22852 Foothill Boulevard, Hayward, CA

Completed By: Madhulla Logan
Date Completed: 11/26/1995

SUBSURFACE SOIL SSTL VALUES (> 3 FT BGS)

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

☐ MCL exposure limit?
☐ PEL exposure limit?

Calculation Option: 2

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

CONSTITUENTS OF CONCERN		Representative Concentration		Soil Leaching to Groundwater			X	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	1.6E-1		NA	NA	NA		6.7E-2	NA		NA	NA	6.7E-2	■	2.0E+00

Software: GSI RBCA Spreadsheet
Version: v 1.0

Serial: G-385-FRX-508

RBCA SITE ASSESSMENT

Tier 2 Worksheet 9.3

Site Name: Former BP oil
Site Location: 22852 Foothill Boulevard, Hayward, CA

Completed By: Madhulla Logan
Date Completed: 11/26/1995

GROUNDWATER SSTL VALUES

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

☐ MCL exposure limit?
☐ PEL exposure limit?

Calculation Option: 2

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

CONSTITUENTS OF CONCERN		Representative Concentration	Groundwater Ingestion			X	Groundwater Volatilization to Indoor Air		Groundwater Volatilization to Outdoor Air		Applicable SSTL	Exceeded ?	Required CRF
CAS No.	Name	(mg/L)	Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)		Residential: (on-site)	Commercial: (on-site)	Residential (on-site)	Commercial: (on-site)	(mg/L	"■" If yes	Only if "yes" left
71-43-2	Benzene	3.2E-2	NA	NA	NA		3.4E-2	NA	NA	NA	3.4E-2	☐	<1

RBCA SITE ASSESSMENT

Tier 2 Worksheet 9.3

Site Name: Former BP oil
Site Location: 22852 Foothill Boulevard, Hayward, CA

Completed By: Madhulla Logan
Date Completed: 11/26/1995

GROUNDWATER SSTL VALUES

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

☐ MCL exposure limit?
☐ PEL exposure limit?

Calculation Option: 2

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

CONSTITUENTS OF CONCERN		Representative Concentration		Groundwater Ingestion			X Groundwater Volatilization to Indoor Air		Groundwater Volatilization to Outdoor Air		Applicable SSTL	Exceeded ?	Required CRF
CAS No.	Name	(mg/L)	Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)	Residential: (on-site)	Commercial: (on-site)	Residential (on-site)	Commercial: (on-site)	(mg/L	"■" If yes	Only if "yes" left
71-43-2	Benzene	3.2E-2	NA	NA	NA	NA	1.1E-1	NA	NA	1.1E-1	☐	<1

Software: GSI RBCA Spreadsheet
Version: v 1.0

Serial: G-385-FRX-508