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engineering contracting firm

ENVIRONMENTAL PROTECTION
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January 30, 1998
Project AA12

Ms. Madhula Logan
Alameda County Environmental Health Services
1131 Harbor Bay Parkway
Alameda, Ca. 94502-6577

Re: Former Signal Bulk Plant
2001 Versailles Avenue
Alameda, California

Dear Ms. Logan:

On behalf of Chevron Products Company, this letter provides further information in association with the addendum to the risk-based corrective action evaluation prepared for the referenced site. The original evaluation was completed by Touchstone Developments and presented in a document titled, "*Corrective Action Evaluation RBCA Tier 1*" dated June 13, 1997. The addendum was prepared at the request of the Alameda County Environmental Health Services (ACEHS) by RRM, Inc. and submitted in a letter dated October 1, 1997. In a recent conversation with Ms. Madhula Logan of the ACEHS regarding the addendum, Ms. Logan requested that the following additional information be submitted: (1) tabulated site-specific target level (SSTL) for residential enclosed space inhalation of benzene at a risk level of one in one hundred thousand (1E-05) additional probability; and (2) a comparison of discrete soil sample depths where benzene was identified with depth to groundwater measurements recorded at the site. These items are addressed below.

TABULATED SSTL

Table 1 presents the benzene SSTL for residential enclosed space inhalation at 1E-05 risk.

DEPTH TO BENZENE-AFFECTED SOIL SAMPLES VERSUS DEPTH TO GROUNDWATER

In the addendum prepared by RRM, a benzene SSTL was calculated and compared to area-average benzene concentrations. In calculating the benzene SSTL, the volumetric air content in soil pores was adjusted to account for the observation that on average, the soil impact is either below the groundwater table or at the capillary fringe. To confirm this postulate, the ACEHS requested that discrete soil sample depths where benzene was identified be shown relative to

groundwater depth. Figure 1 shows benzene concentration versus sample depth, along with the mean depth to groundwater and assumed capillary fringe thickness. As can be seen, two discrete soil samples that contained benzene in excess of the SSTL (SB-6 and 47708), were collected below the average capillary fringe depth.

The mean depth to groundwater was estimated using all the measurements presented in the original Tier 1 RBCA by Touchstone Developments. The mean depth to water for the data set is 6 feet below ground surface (bgs), the maximum is 9.12 feet bgs, and the minimum is 2 feet bgs. The capillary fringe was assumed to be 3 feet thick. This assumption considers soil type (sandy clay, *Corrective Action Evaluation RBCA Tier 1*), and a literature value for visual capillary water rise. The visual capillary water rise is associated with a level where the water saturation ratio is near one. (*reference: Fetter, C. W., Contaminant Hydrogeology, Macmillan Publishing Company, 1993)*

Based on the information presented, the postulation that on average the soil impact is either below the groundwater table or at the capillary fringe is valid. Even at the depth to water data set maximum, it is likely that capillary water occupies a large proportion of pore space above 6 feet bgs (i.e., capillary water above the visual capillary water rise within the funicular zone).

Please call me at (408) 475-8141 with questions or comments regarding this letter.

Sincerely,

RRM, Inc.

R. L. Giattino
Chemical Engineer

REGISTERED PROFESSIONAL ENGINEER
ROBERT L. GIATTINO
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Attachments: Table 1 - Area Specific Average Benzene Concentration in Soil Compared to SSTLs and RBSLs
Figure 1 - Benzene Concentration Versus Sample Location

cc: Mr. Phil Briggs, Chevron Products Company

Table 1

Area Specific Average Benzene Concentration in Soil Compared to SSTLs and RBSLs

Former Signal Bulk Plant
2001 Versailles Avenue
Alameda, California

for 10^{-5}

Area	Average Benzene Concentration (ppm)	SSTL Atmospheric Inhalation (ppm)				SSTL Enclosed Inhalation (ppm)						RBSL Ingestion/Dermal/Soil Inhalation (ppm)			
		Residential		Commercial		Residential			Commercial			Residential		Commercial	
		1.00E-04	1.00E-06	1.00E-04	1.00E-06	1.00E-04	1.00E-05	1.00E-06	1.00E-04	1.00E-05	1.00E-06	1.00E-04	1.00E-06	1.00E-04	1.00E-06
1	0.002	N	54	N	N	7	0.7	0.07	21	2.1	0.21	168.8	1.69	290	2.9
2	0.32	N	54	N	N	7	0.7	0.07	21	2.1	0.21	168.8	1.69	290	2.9
3	0.0025	N	54	N	N	7	0.7	0.07	21	2.1	0.21	168.8	1.69	290	2.9
4	0.08	N	54	N	N	7	0.7	0.07	21	2.1	0.21	168.8	1.69	290	2.9
5	0.21	N	54	N	N	7	0.7	0.07	21	2.1	0.21	168.8	1.69	290	2.9
6	0.047	N	54	N	N	7	0.7	0.07	21	2.1	0.21	168.8	1.69	290	2.9

Notes

ppm = parts per million, milligrams per kilogram
SSTL = site specific target level
RBSL = risk-based screening level
N = not necessary, most stringent SSTL not exceeded
= average benzene concentration exceeds SSTL

Figure 1
Benzene Concentration Versus Sample Location

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