Detterman, Mark, Env. Health

From: Kyle S. Flory <kflory@pesenv.com>
Sent: Thursday, December 15, 2016 3:01 PM
To: Heriberto Robles
Cc: Roe, Dilan, Env. Health; Detterman, Mark, Env. Health
Subject: RE: Risk Assessment Work Plan for site located at 6701-6707 Shellmound Street in Emeryville
Attachments: Anton_Emeryville_HHRA_RTC_Letter.pdf

Categories: Red Category

Dr. Robles,

Attached is SLR's response to your comments on the HHRA prepared for the site.

Thank you,

Kyle

Kyle Flory, P.G.
PES Environmental, Inc.
7665 Redwood Boulevard, Suite 200
Novato, California 94945
415-899-1600

Note that we have recently moved to the address above. Please update your records.

From: Heriberto Robles [mailto:hrobles@enviro-tox.com]
Sent: Monday, December 05, 2016 5:05 PM
To: mark.detterman@acgov.org; Roe, Dilan, Env. Health
Cc: Kyle S. Flory
Subject: Re: Risk Assessment Work Plan for site located at 6701-6707 Shellmound Street in Emeryville

Hi Mr. Detterman and Ms. Roe:

I have completed review of the Human Health Risk Assessment report for the referenced site. In general, I agree with SLR in that cancer risks and health hazards estimated for future hypothetical residential receptors, construction workers and maintenance workers exceed levels considered acceptable to California health and environmental protection agencies. I also agree with SLR in that the site can be safely developed into a residential apartment complex provided that risk management and control measures are included during site redevelopment. My observations and comments are summarized in the attached memorandum. Please give me a call or send me a note if you have any comments or questions.

Thank you.

Heriberto Robles, M.S., Ph.D., D.A.B.T.
Enviro-Tox Services, Inc.
20 Corporate Park, Suite 220
Irvine, California 92606

hrobles@enviro-tox.com
ph: 949-387-0700

On Oct 24, 2016, at 12:51 PM, Heriberto Robles <hrobles@enviro-tox.com> wrote:

Hi Mr. Detterman and Ms. Roe:

I have completed review of the Human Health Risk Assessment Work Plan for the referenced site. I believe the Work Plan is complete as is and it meets EPA and DTSC risk assessment guidance and requirements. A formal letter summarizing my review is attached. Please give me a call or send me a note if you have any comments or questions.

Thank you.

December 15, 2016

To: Dr. Heriberto Robles, Ph.D., D.A.B.T. / Enviro-Tox Services, Inc.
Mr. Mark Detterman and Ms. Dilan Roe / Alameda County Health Care Services

Subject: Response to Enviro-Tox Comments on "Human Health Risk Assessment Report, 6701-6707 Shellmound Street, Emeryville, California" Prepared by SLR International Corporation

Dear Dr. Robles,

SLR International Corporation (SLR) has prepared this letter in response to comments provided by Enviro-Tox Services, Inc. (Enviro-Tox) on the November 2016 document titled "Human Health Risk Assessment Report, 6701-6707 Shellmound Street, Emeryville, California". Comments on the human health risk assessment (HHRA) Report were provided to Alameda County Health Care Services and to PES on December 5, 2016 and subsequently to SLR on December 6, 2016. This comment response letter was prepared in lieu of a revised HHRA Report, as agreed between Enviro-Tox, PES, and SLR in a December 9, 2016 teleconference. The six listed Enviro-Tox observations and recommendations are provided below in italicized font, followed by SLR's responses.

Comment #1

For one particular chemical, hazard index estimates obtained by SLR are different from those obtained by Enviro-Tox. The chemical is TPH-diesel. According to SLR, a soil TPH-diesel concentration of 152 milligrams per kilogram (mg/kg) has an estimated hazard index of 2.6 (Table 34). Using the same TPH-diesel soil concentration and the same exposure parameters used by SLR, Enviro-Tox obtained a hazard index of 0.1. The source of the discrepancy is not clear as Enviro-Tox used the same exposure parameters and toxicity values as those used by SLR. It should be noted that the Environmental Screening Level for TPH-diesel is 230 mg/kg (RWQCB 2016). Therefore, per the San Francisco Water Quality Control Board, TPH-diesel concentrations lower than 230 mg/kg should have estimated hazard indices lower than 1.0.

SLR Response #1

The source of this discrepancy was identified as an error in the averaging time used in the HHRA to calculate the hazard quotient (HQ) for TPH-diesel. A combined child plus adult exposure duration of 26 years was used to estimate the HQ, while the averaging time (exposure duration x 365 days/year) incorporated the child-only exposure duration of six years. Correcting for this error results in a HQ of 0.6 for TPH-diesel based on the dust and vapor inhalation pathway, and a multi-pathway HI for TPH-diesel of 0.7. The dust inhalation HQ for arsenic is also reduced from 0.001 to 0.0003; the change to this negligible HQ does not affect the multipathway HI for arsenic. This correction reduces the cumulative multi-pathway HI estimate for the future resident receptor across all soil

COPCs to 28. The revised HQ and HI calculations are shown in the attached revised HHRA Table 34. The attached HHRA Table 37 has also been revised to show the corrected cumulative HI for the future resident receptor. Also note the TPH-diesel concentration used to estimate the HQ and HI for the future resident receptor (HHRA Table 31) was 157 mg/kg rather than the 152 mg/kg concentration noted in the comment.

Comment #2

According to Section 6.3.3.1, vinyl chloride detected in groundwater poses a potential cancer risk of 2E-05 for future hypothetical residential receptors. This estimated cancer risk exceeds the DTSC benchmark value of 1E-06. Based on these results, risk-based cleanup levels for vinyl chloride in groundwater should be developed for the site. Cleanup levels should be developed following the same methodology as that applied to develop risk-based cleanup levels for vinyl chloride in soil vapor.

SLR Response #2

Two groundwater samples with concentrations of vinyl chloride (maximum concentration of 7.3 micrograms per liter [µg/L]) greater than the environmental screening level (ESL) developed by the Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) for vapor intrusion from groundwater in a residential setting (2.0 µg/L) have been detected at the site (HHRA Table 23). These two samples are located on the southern edge of the property and are not beneath the footprint of the future building (HHRA Plate 6). The groundwater flow direction beneath the property is to the southwest. Three groundwater samples were collected beneath the footprint of the future building (HHRA Plate 6); two did not contain vinyl chloride at or above the laboratory reporting limit, and one contained vinyl chloride at a concentration of 1.6 µg/L (HHRA Table 23). PES has conducted research indicating that vinyl chloride in soil vapor is not sourced from groundwater. PES estimated that the concentration of vinyl chloride in groundwater would need to be approximately 961 µg/L in order to act as a source of the maximum vinyl chloride concentrations detected in soil gas. While the lifetime excess cancer risk (LECR) estimate for vinyl chloride in groundwater is above the DTSC benchmark as noted above, the LECR resulting from vinyl chloride in soil vapor is three orders of magnitude higher than that based on groundwater. Soil vapor, rather than groundwater, is therefore the primary medium of focus for potential remediation efforts, which are currently planned for the property. Groundwater remediation would likely be ineffective based on the potential for recontamination from the overlying soil/soil vapor matrix. An interim remedial measure consisting of soil vapor extraction (SVE) has been implemented to reduce concentrations of volatile chemicals in the subsurface prior to, and possibly during, the initiation of the planned development activities. Health risk-based target cleanup levels were developed for soil vapor as part of the HHRA to help guide SVE system operation. A vapor mitigation system consisting of impermeable vapor barriers with passive venting is also planned for the future development to mitigate potential risks due to vapor intrusion; the planned system should effectively eliminate potential vapor intrusion from groundwater as well as from the primary source of potential vapor intrusion (soil vapor). Development of a groundwater cleanup level for vinyl chloride is therefore not necessary.

Comment #3

According to Section 6.3.3.1, groundwater data was used to evaluate potential vapor intrusion risks for future residents and commercial workers. However, only the risk estimated for residential receptors were found in the report and in Appendix C. It is recommended that potential vapor intrusion risks and hazards from groundwater volatilization be evaluated and included in the report and in Appendix C. If estimated risks and hazards exceed acceptable levels, risk-based cleanup levels for the protection of future onsite workers should be developed and presented in the report.

SLR Response #3

Groundwater data were used as a secondary line of evidence to evaluate potential risks and hazards resulting from the vapor intrusion pathway. The first step of this evaluation was to identify chemicals of potential concern (COPCs) by comparing maximum chemical concentrations detected in groundwater to RWQCB ESLs. As described in Section 6.3.3.1 of the HHRA Report, only vinyl chloride was identified as a groundwater COPC for the residential receptor, and no chemicals were detected in groundwater at concentrations above vapor intrusion ESLs for the commercial worker receptor. Because no COPCs were identified for commercial workers, vapor intrusion from groundwater was not further evaluated for this receptor. Therefore, development of risk-based cleanup levels was not necessary for chemicals detected in groundwater.

Comment #4

Appendix B. Soil gas sampling depth for ethylbenzene was set at 152.4 centimeters (cm). Sampling depth for all other chemicals evaluated was set at 304.8 cm. It is not clear why the sampling depth of ethylbenzene was different from that used for other chemicals. An explanation should be provided in the report.

SLR Response #4

As described in Section 6.3.2 of the HHRA Report, soil vapor sample depths used for vapor intrusion modeling corresponded to the maximum detected COPC concentrations. As shown in HHRA Table 36, the maximum concentration of ethylbenzene was detected at a depth of five feet (152.4 cm), while the maximum concentrations of all other COPCs were detected at ten feet (304.8 cm). The shallower depth was therefore used for ethylbenzene corresponding to the sample result used for modeling, while the deeper depth was used for other chemicals.

Comment #5

According to Section 3.1.3 of the report (page 12), methane was detected in soil gas at the site. Methane is not considered toxic and was not evaluated in SLR's risk assessment. Enviro-Tox agrees with this decision. However, it is Enviro-Tox opinion that methanogenic conditions at the site should be considered when designing and evaluating risk management options for the site. We know methane can act as a carrier gas for potentially toxic gases and vapors (USEPA 2015). The active generation of methane *because of anaerobic biodegradation processes increases subsurface pressures. The resulting increased pressure differentials are known to drive the migration of gases and vapors up to the surface where human receptors can be exposed (USEPA 2015). Methane can drive the advective migration of volatiles and gases at higher levels than the levels driven exclusively by pressure differentials caused by building indoor conditions (USEPA 2015).*

SLR Response #5

Comment acknowledged.

Comment #6

Finding methane in the subsurface at the site is also of concern because degradation of organic matter is known to produce methane and hydrogen sulfide (USEPA 2015; DTSC 2015a; DTSC 2015b). The potential presence of hydrogen sulfide and its associated nuisance odor and health hazards should be considered and evaluated when designing risk control measures for the site.

SLR Response #6

Comment acknowledged.

Thank you for the opportunity to provide this response to comments on the HHRA Report. We trust that these responses adequately address the comments and that the HHRA Report can be approved in combination with these responses and the attached revised HHRA Tables 34 and 37. Please feel free to contact me (425-402-8800; abailey@slrconsulting.com) or Dr. Mark Stelljes of SLR (925-229-1411; mstelljes@slrconsulting.com) if you have any questions regarding this comment response letter.

Sincerely,

Amanda Bailey, M.S.
Associate Risk Assessment Scientist
SLR International Corporation

Attachment: Revised HHRA Tables 34 and 37

Table 34
Risk Characterization for the Future Resident Receptor - Soil
Human Health Risk Assessment Report
6701-6707 Shellmound Street
Emeryville, California

Chemical of Potential Concern (COPC)	Noncancer Hazard Quotient (HQ) [a,d]				Lifetime Excess Cancer Risk (LECR) [b,d]			
	Soil Ingestion	Dermal Soil Contact	Dust / Vapor Inhalation	Multi-Pathway	Soil Ingestion	Dermal Soil Contact	Dust / Vapor Inhalation	Multi-Pathway
PCBs								
Aroclor-1260	--	--	--	--	1.0E-05	4.5E-06	5.2E-10	1.4E-05
Metals								
Arsenic	25	2.2	0.00032	27	9.3E-05	9.0E-06	5.9E-09	1.0E-04
Lead	--	--	--	--	1.4E-06	0.0E+00	3.5E-10	1.4E-06
TPH								
TPH-Diesel	0.10	0.029	0.57	0.70	--	--	--	--
Total HI or LECR [c]	25	2	1	28	1.E-04	1.E-05	7.E-09	1.E-04

Abbreviations:
-- = not applicable; toxicity or pathway-specific value not available
HI = hazard index
PCBs = polychlorinated biphenyls
TPH = total petroleum hydrocarbons

Footnotes:
[a] HQ soil ingestion= [(EPCr x IRs x EF x ED x CF1) / (BW x ATnc)] / RfDo
HQ dermal soil contact = [(EPCr x SA x AF x ABS x EF x ED x CF1) / (BW x ATnc)] / RfDd
HQ dust inhalation (non-volatiles) = [(EPCr x 1/PEF x ET x EF x ED x CF2 x CF3) / ATnc] / RfCi
HQ dust and vapor inhalation (volatiles) = [(EPCr x (1/PEF + 1/VF) x ET x EF x ED x CF2 x CF3) / ATnc] / RfCi
HQ multi-pathway = sum of HQs for soil ingestion, dermal soil contact, and dust and/or vapor inhalation
HQ estimates for soil ingestion and dermal contact are for child residents only; the lower child body weight results in higher HQ estimates than for adult residents. For inhalation, HQs are based on the the total child + adul
[b] LECR soil ingestion= [(EPCr x IFSadj x EF x CF1) / (ATc)] x SFo
LECR dermal soil contact = [(EPCr x DFSadj x ABS x EF x CF1) / (ATc)] x SFd
LECR dust inhalation (non-volatiles) = [(EPCr x 1/PEF x ET x EF x ED x CF2 x CF3) / ATc] * IUR
LECR dust and vapor inhalation (volatiles) = [(EPCr x (1/PEF + 1/VF) x ET x EF x ED x CF2 x CF3) / ATc] * IUR
LECR multi-pathway = sum of LECRs for soil ingestion, dermal soil contact, and dust and/or vapor inhalation
LECR estimates use age-adjusted intake rates for soil ingestion and dermal contact, and the total child + adult ED for inhalation.
[c] Total HI or LECR = sum of chemical-specific HQs or LECRs, respectively, for each pathway or for all pathways combined (i.e., multi-pathway)
[d] Refer to Table 29 for toxicity values and sources. Refer to Tables 30 and 31 for explanation of acronyms used in equations.

Table 37
Summary of Human Health Risk Characterization Results
Human Health Risk Assessment Report
6701-6707 Shellmound Street
Emeryville, California

Exposure Pathway	**Receptor-, Medium, and/or Pathway-Specific Hazard and Risk Estimates**							
	Construction Worker		**Maintenance/Utility Worker**		**Commercial/Industrial Worker**		**Resident**	
	HI	**LECR**	**HI**	**LECR**	**HI**	**LECR**	**HI**	**LECR**
COPC Risk Estimates [a]								
Soil Pathways								
Ingestion	10	6E-06	0.3	6E-06	--	--	25	1E-04
Dermal Contact	5	5E-06	0.2	8E-06	--	--	2	1E-05
Outdoor Air Inhalation	2	1E-06	0.2	6E-07	--	--	0.6	7E-09
All Soil Pathways	17	1E-05	0.6	2E-05	--	--	28	1E-04
Groundwater Pathways								
Dermal Contact	15	1E-06	0.7	1E-06	--	--	--	--
Air Pathways								
Indoor Air Inhalation	--	--	--	--	2	2E-03	17	2E-02
Multi-Pathway Totals [b]	32	1E-05	1	2E-05	2	2E-03	45	2E-02
Non-COPC Screening Level Quotients [c]								
All Soil Pathways	3	7E-07	2	8E-07	--	--	1	5E-08
Indoor Air Inhalation	--	--	--	--	0.2	1E-06	1	3E-06
Multi-Pathway Totals [b]	3	7E-07	2	8E-07	0.2	1E-06	2	3E-06
Total Estimates for COPCs and Non-COPCs [d]	35	1E-05	4	2E-05	2	2E-03	47	2E-02

Abbreviations:
HI = pathway-specific hazard index
LECR = pathway-specific lifetime excess cancer risk
COPC = chemical of potential concern
-- = not applicable

Footnotes:
[a] Pathway specific estimates for COPCs are provided in detail in Tables 32 through 36.
[b] Multi-pathway HI for each receptor is the sum of pathway-specific HIs. Multi-pathway LECR is the sum of pathway-specific LECRs.
For non-COPCs, multi-pathway values are based on screening level quotients evuivalent to HI or LECR estimates.
[c] Screening level quotients for non-COPCs are provided in detail in Tables 37 and 38.
[d] Total estimates are equal to the sums of multi-pathway totals for COPCs and non-COPCs.