CALIFORNIA
Water Boards

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ENVIRONMENTAL PROTECTION

Los Angeles Regional Water Quality Control Board

October 24, 2018

Steve Christie
Signal Hill XC, LLC
3010 Old Ranch Parkway, Suite 470
Seal Beach, CA 90740

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
CLAIM NO. 7017 2400 0000 3753 7929

SUBJECT: REVIEW AND COMMENTS ON HUMAN HEALTH RISK ASSESSMENT, OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT MEMO, SITE REDEVELOPMENT SOIL MANAGEMENT PLAN, AND SOIL REUSE PLAN PURSUANT TO CALIFORNIA LAND REUSE AND REVITALIZATION ACT, AND HEALTH AND SAFETY CODE SECTION 25395.94

SITE: FORMER CHEMOIL REFINERY, 2020 WALNUT AVENUE, SIGNAL HILL, CALIFORNIA 90755 (SCP NO. 1391, SITE ID NO. 2040510)

Dear Mr. Christie:

The California Regional Water Quality Control Board, Los Angeles (Regional Board) has reviewed the following technical documents for the subject site (Site):

- *Human Health Risk Assessment* (HHRA), dated May 31, 2018, submitted by Mearns Consulting, LLC (Mearns), on the behalf of the City of Signal Hill (City)
- Office of Environmental Health Hazard Assessment (OEHHA) Memo regarding the HHRA
- *Site Redevelopment Soil Management Plan*, submitted as Appendix G in the *Response Plan and Remedial Technology Evaluation* (Response Plan), dated July 13, 2017
- *Soil Reuse Plan,* dated April 13, 2018, submitted as a separate follow up document to the *Site Redevelopment Soil Management Plan*

This letter summarizes and provides comments on the above documents for use in the cleanup and redevelopment of the Site.

SUMMARY OF HHRA AND OEHHA MEMO

The HHRA was conducted as a baseline to evaluate the potential health risk to human receptors posed by concentrations of constituents detected in the soil matrix, soil vapor, and groundwater at the Site and as a requirement by the City under the California Environmental Quality Act.

The HHRA estimated the risks and hazards for two parcels of the Site: East and West. The risks and hazards were estimated for three scenarios: construction workers, commercial workers, and residential. A target cancer risk of 10^{-5} and 10^{-6} is considered acceptable for commercial worker and residential receptors, respectively. A hazard index (HI) value of less than one indicates that noncarcinogenic constituents of concerns are not expected to result in toxicity. The results of the HHRA were submitted to OEHHA for their review (see attached OEHHA Memo). The table below summarizes the risks and hazards results from Mearns and OEHHA.

	Mearns						OEHHA	
	Residential		Commercial		Construction		Construction	
	Risk	HI	Risk	HI	Risk	HI	Risk	HI
Eastern	$1.8x10^{-5}$	85	$7.8x10^{-7}$	9	$1.6x10^{-9}$	43	$5.3x10^{-6}$	80
Western	$1.1x10^{-2}$	427	$1.3x10^{-3}$	51	$6.0x10^{-8}$	14	$4.7x10^{-6}$	32

The OEHHA Memo indicates the difference between Mearns' and OEHHA's estimated values is due to OEHHA's incorporation of a volatilization factor, where available, for soil contaminants. Based on these results, mitigation and/or remediation is required at the Site. Although the estimated risks and hazards for future commercial workers and residents exceed the acceptable levels, a vapor barrier and a venting system have been proposed to be installed as mitigative measures for the Site redevelopment. However, both Mearns' and OEHHA's calculated hazard index for construction workers exceeded 1. OEHHA is also concerned that no inhalation risk is estimated for benzene and ethylbenzene, and no oral risk is estimated for naphthalene. Volatile organic compound concentrations in trenches, if any, are likely to be higher than those calculated for outdoor air.

SUMMARY OF SITE REDEVELOPMENT SOIL MANAGEMENT PLAN (SITE REDEVELOPMENT PLAN)

The purpose of the Site Redevelopment Plan is to provide guidance in properly handling and storing impacted and potentially impacted soil associated with future redevelopment such as soil excavation, trenching, and backfilling. The Site Redevelopment Plan proposes the following:

- Excavated soil will be stockpiled and covered with plastic sheeting, and not located near storm drains.
- Excavated areas and work zones will be controlled to prevent unauthorized persons accessing exposed soils.
- Active construction areas will be watered twice daily as dust/vapor control measures.

- Field screening of the stockpiled soil will be measured using a photoionization detector (PID) and soil analysis will be conducted according to its PID measurements:

    - If PID measurements are less than 50 parts per million by volume (ppmv), the soil will be stockpiled and reused. No soil analysis will be conducted.

    - If PID measurements are greater than 50 ppmv but less than 1,000 ppmv, or less than 50 ppmv but with visual or odor indicators:

        - Contaminated soil must receive approval from the Regional Board and South Coast Air Quality Management District prior to being reused.
        - Specified areas will be identified and used for stockpiling these soils to prevent cross-contamination with clean soil.
        - Stockpile volume will not exceed more than 1,000 cubic yards and the soil will be placed on plastic liners of 30-millimeter or greater and covered with plastic sheeting.
        - One 4-point composite sample will be collected from stockpiles of less than 100 cubic yards.
        - Three 4-point composite samples will be collected for every 500 cubic yards in a stockpile containing up to 1,000 cubic yards.
        - Five 4-point composite samples will be collected for the first 1,000 cubic yards, and one sample for each additional 500 cubic yards in a stockpile containing up to 5,000 cubic yards.
        - Laboratory analysis will be conducted for the 4-point composite samples.
        - A separate workplan detailing proposed treatment methodologies of contaminated soils for on-Site reuse will be submitted to the Regional Board for review.

    - If PID measurements are greater than 1,000 ppmv, soil must be sealed in containers or loaded in trucks for immediate offsite disposal.

SUMMARY OF SOIL REUSE PLAN

The purpose of the Soil Reuse Plan is to notify the Regional Board of the intent to treat and reuse soil during the Site redevelopment activities. The grading plan requires existing surface soils to be removed, replaced, and compacted. As indicated in the Site Redevelopment Plan, Regional Board approval is required for contaminated soil with PID readings greater than 50 ppmv but less than 1,000 ppmv to be redeposited in predesignated areas as backfill for redevelopment purposes.

- The Soil Reuse Plan proposes placement and treatment of the contaminated soil as follows:

- A soil vapor extraction (SVE) system consisting of horizontal conveyance piping will be placed within the backfill of the contaminated soil and treated in place. Horizontal SVE piping will be connected to the vertical SVE wells installed to treat deeper vadose zone soil at the Site.

- The contaminated soil to be reused will be backfilled to a maximum of 4 feet in depth and placed only in areas that will be covered under some form of hardscape (e.g., asphalt pavement or structural slabs).

- Contaminated soil will be reused only at the West parcel, and not at the East parcel.

- Specific areas will be reserved for stock piled soil that does not pass field screening levels.
- A map will be provided that will document the locations of soil that is reused on the Site.

REGIONAL BOARD COMMENTS

In a letter dated September 15, 2017, the Regional Board approved the Response Plan dated July 13, 2017. In the Response Plan, a conceptual site model was developed and identified hypothetical human receptors (construction workers, commercial workers, and residents) and its potential exposure pathways based on the information that was available at the time. The initial calculated HI for construction workers in the East parcel was 2; HI was not calculated for the West parcel. Additional soil and soil vapor assessment has been conducted since the conceptual site model and new data has been provided from the HHRA, indicating the HI for both East and West parcel exceeds the value of 1. Based on the HI exceedances in both parcels, protection of future construction workers is necessary prior to the start of any field work, such as, but not limited to, redevelopment activities, Site grading, etc.

Based on the HHRA information and HI exceedances, you are required address OEHHA's comments and the hazard concerns for the construction workers prior to field work at the Site. Specifically, the Soil Reuse Plan must be revised. Additional comments for the Site Redevelopment Plan and Soil Reuse Plan include:

1. Regional Board staff does not concur with the proposal that if PID measurements are less than 50 ppm, the soil will be stockpiled and reused as backfill at the Site. All stockpiled soil must be properly characterized prior to reuse.

2. Regional Board staff does not concur with backfilling contaminated soil with PID measurements greater than 50 ppmv but less than 1,000 ppmv and implementing an SVE system to treat the soil. Regional Board staff is concerned that the SVE system may not be effective to reduce the contaminant to screening levels, and reusing such soil will spread the contamination across the Site, as well as the

potential of residual contamination left in the soil that may be a continued threat to groundwater.

3. Stockpiled soil must be properly characterized and analyzed in a California certified lab for total petroleum hydrocarbon (TPH) and volatile organic compounds (VOCs). Laboratory analysis of the stockpiled soil must meet the Final Screening Levels for commercial/industrial scenario as provided in the Response Plan (see attached table) prior to reuse as backfill at the Site. Soil concentrations exceeding the Final Screening Levels for commercial/industrial must be sealed in containers or loaded in trucks for offsite disposal.

4. A Revised Soil Reuse Plan addressing the above comments is due to the Regional Board by **December 21, 2018**.

If you have any questions, please contact Ms. Jessica Pao, Case Manager, at (213) 576-6729 or Jessica.Pao@waterboards.ca.gov, or Ms. Jillian Ly, Site Cleanup Unit IV, Chief, at (213) 576-6664 or Jillian.Ly@waterboards.ca.gov.

Sincerely,

Renee A. Purdy
Acting Executive Officer

Attachment:
OEHHA Memo
Table 1: Soil Screening Level Table

cc (via email):
Mary Hashem, RE Solutions
Kirsten Duey, RMD
Colleen Doan, City of Signal Hill
Susan Mearns, Mearns Consulting LLC

Office of Environmental Health Hazard Assessment

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Matthew Rodriquez
Secretary for
Environmental Protection

Edmund G. Brown Jr.
Governor

DRAFT MEMORANDUM

TO: Elise McCaleb
City of Signal Hill
2175 Cherry Avenue
Signal Hill, CA 90755

FROM: James C. Carlisle, D.V.M., M.Sc., J.C.
Staff Toxicologist
Air and Site Assessment and Climate Indicator Branch

DATE: July 26, 2018

SUBJECT: HUMAN HEALTH RISK ASSESSMENT, FORMER CHEMOIL REFINERY, SIGNAL HILL, CALIFORNIA OEHHA #830142-00

Document reviewed

- Human Health Risk Assessment, Former Chemoil Refinery, 2020 Walnut Ave., Signal Hill, California, 90755, dated May 31, 2018, by Mearns Consulting LLC (Mearns)

Site characterization

- An accurate health assessment depends on adequate site characterization:
  - The sampling plan must be adequate to capture all significant contamination and yield representative results. Samples must be handled in a manner that prevents loss of chemicals prior to analysis, and they must be analyzed by an appropriate method for toxic chemicals that are likely to be at the site. These conditions appear to have been met.

Potential exposure pathways

- Future onsite commercial worker
  - Ingestion/dermal contact with surface soil
  - Inhalation of dust from soil in outdoor air
  - Inhalation of VOCs from soil vapor or ground water in indoor air
- Future construction worker
  - Ingestion/dermal contact with surface and subsurface soil
  - Inhalation of dust from soil in outdoor air
- Future onsite resident
  - Ingestion/dermal contact with surface and subsurface soil
  - Inhalation of dust that has migrated to indoor air.
  - Inhalation of VOCs from soil vapor or ground water in indoor air

Chemicals of potential concern (COPCs)

- All constituents detected at least one time in ground water and in soil vapor underlying the site were quantitatively assessed using the appropriate exposure pathway in this risk assessment. Inorganics deemed to be present at concentrations exceeding background were quantitatively assessed.

Exposure point concentrations (EPC)

- The maximum detected concentration of soil contaminants or the 95% upper confidence limit on the mean (UCL_{95}), whichever was lower, was used as the exposure point concentration for the residential, commercial worker, and construction worker scenarios.
- The maximum detected concentration of soil vapor contaminants was used as the exposure point concentration for the residential and indoor commercial worker scenarios.

Western Parcel

Estimated risks and hazards – construction workers

- Mearns estimated the combined commercial hazard index and risk from vapor intrusion and soil exposure as 14 and 6×10^{-8}, respectively.
- OEHHA's risk estimate for construction workers exceeded Mearns' estimate by 78-fold. However, both estimates are below the workplace benchmark of 10^{-5}.
- OEHHA's hazard quotients for construction workers exceeded Mearns' estimates by 2.3-fold. Both estimates exceed the workplace benchmark of 1.
- The difference between the two estimates is largely due to OEHHA's incorporation of a volatilization factor, where available, for soil contaminants. (Basing inhalation risk and hazard only on a particulate emission factor (PEF), OEHHA's hazard quotients were generally less than Mearns' estimates.)
- OEHHA is concerned that the list of soil COPCs in Table 14 is abbreviated compared to Table 11.
- OEHHA is concerned that no inhalation risk is estimated for benzene and ethylbenzene and no oral risk is estimated for naphthalene.
- VOC concentrations in trenches, if any, are likely to be higher than those calculated for outdoor air.

Estimated risks and hazards – commercial workers

- Mearns estimated the combined commercial hazard index and risk from vapor intrusion and soil exposure as 51 and 1.3×10^{-3}, respectively.
- OEHHA did not attempt to verify these numbers as they are driven largely by vapor intrusion and OEHHA understands that a vapor barrier and passive vent system will be required for methane mitigation.

Estimated risks and hazards – residents

- Mearns estimated the combined residential hazard index and risk from vapor intrusion and soil exposure as 427 and 1.1 x 10^{-2}, respectively.
- OEHHA did not attempt to verify these numbers as they are driven largely by vapor intrusion and OEHHA understands that a vapor barrier and passive vent system will be required for methane mitigation.

Eastern Parcel

Estimated risks and hazards – construction workers

- Mearns estimated the combined commercial hazard index and risk from vapor intrusion and soil exposure as 43 and 1.6 x 10^{-9}, respectively.
- OEHHA's risk estimate for construction workers exceeded Mearns' estimate by 330-fold. However, both estimates are below the workplace benchmark of 10^{-5}.
- OEHHA's hazard quotients for construction workers exceeded Mearns' estimates by 1.9-fold. Both estimates exceed the workplace benchmark of 1.
- The difference between the two estimates is largely due to OEHHA's incorporation of a volatilization factor, where available, for soil contaminants.
- OEHHA is concerned that the list of soil COPCs in Table 24 is abbreviated compared to table 26.
- OEHHA is concerned that no inhalation risk is estimated for ethylbenzene and no oral risk is estimated for naphthalene.
- VOC concentrations in trenches, if any, are likely to be higher than those calculated for outdoor air.

Estimated risks and hazards – commercial workers

- Mearns estimated the combined commercial hazard index and risk from vapor intrusion and soil exposure as 9 and 7.8 x 10^{-7}, respectively.
- OEHHA did not attempt to verify these numbers. The risk is driven largely by vapor intrusion.

Estimated risks and hazards – residents

- Mearns estimated the combined residential hazard index and risk from vapor intrusion and soil exposure as 85 and 1.8 x 10^{-5}, respectively.
- OEHHA did not attempt to verify these numbers.
  However, for a residential scenario, OEHHA typically recommends using the maximum or point-by-point concentrations rather than the UCL as the EPC.

Summary and Conclusions

The following table summarizes the HHRA results:

	Mearns						OEHHA	
	residential		Commercial		Construction		Construction	
	Risk	HI	Risk	HI	Risk	HI	Risk	HI
Eastern	1.8×10^{-5}	85	7.8×10^{-7}	9	1.6×10^{-9}	43	5.3×10^{-6}	80
Western	1.1×10^{-2}	427	1.3×10^{-3}	51	6.0×10^{-8}	14	4.7×10^{-6}	32

- Mearns estimated residential risk and hazard index exceed the typically applied thresholds for residents.
- Mearns estimated commercial risk exceeds the typically applied thresholds for workers in the Western parcel but not in the Eastern parcel. Hazard indices (HI) exceed the target value of ≤1 for workers in both parcels.
- Although OEHHA's construction worker risk estimates were higher than Mearns' estimates, both estimates were below the typically applied threshold for workers. Both hazard index (HI) estimates exceed the target value of 1.

Peer reviewed by:

Amanda Palumbo

Amanda Palumbo, PhD
Staff Toxicologist

Table 1
Summary of Soil Screening Levels
Former ChemOil Refinery
Signal Hill, California

Chemical	Direct Contact with Soil					Protection of Groundwater, Aquifer Is Not a Source of Drinking Water				Final Screening Levels [7]		
	Residential		Construction	Commercial/Industrial				Groundwater at 20 feet bgs [6]				
								100X LARWQCB Soil SLs [6] (0 to 10 ft bgs)	100X LARWQCB Soil SLs [6] (10 to 20 ft bgs)	Residential	Construction	Commercial/ Industrial
	SFBRWQCB ESL [1] (mg/kg)	USEPA RSL/DTSC SL [2] (mg/kg)	SFBRWQCB ESL [1] (mg/kg)	SFBRWQCB ESL [1] (mg/kg)	USEPA RSL/DTSC SL [2] (mg/kg)	SFBRWQCB ESL [3] (mg/kg)	USEPA RSL [4] (mg/kg)	LARWQCB Soil SL [5] (mg/kg)	LARWQCB Soil SL [5] (mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Total Petroleum Hydrocarbons (TPH)												
TPHg (C4-C12)	7.4E+02	8.2E+01	2.8E+03	3.9E+03	4.2E+02	--	--	1.0E+03	1.0E+03	8.2E+01	1.0E+03	4.2E+02
TPH (C5-C12)	7.4E+02	8.2E+01	2.8E+03	3.9E+03	4.2E+02	--	--	1.0E+03	1.0E+03	8.2E+01	1.0E+03	4.2E+02
TPH (C13-C22)	2.3E+02	9.6E+01	8.8E+02	1.1E+03	4.4E+02	--	--	1.0E+04	1.0E+04	9.6E+01	8.8E+02	4.4E+02
TPH (C23-C44)	1.1E+04	2.5E+03	3.2E+04	1.4E+05	3.3E+04	--	--	5.0E+04	5.0E+04	2.5E+03	3.2E+04	3.3E+04
Volatile Organic Compounds (VOCs)												
Acetone	5.9E+04	6.1E+04	2.6E+05	6.3E+05	6.7E+05	--	--	1.6E+02	1.5E+02	1.5E+02	1.5E+02	1.5E+02
Benzene	2.3E-01	3.3E-01	2.4E+01	1.0E+00	1.4E+00	--	--	6.2E-01	1.5E-01	1.5E-01	1.5E-01	1.5E-01
(8) TBA	NV	1.3E+05	NV	NV	1.5E+06	--	--	1.3E+00	1.2E+00	1.2E+00	1.2E+00	1.2E+00
tert-Butylbenzene	NV	2.2E+03	NV	NV	1.2E+04	--	--	2.8E+01	2.6E+01	2.6E+01	2.6E+01	2.6E+01
sec-Butylbenzene	NV	2.2E+03	NV	NV	1.2E+04	--	--	2.8E+01	2.6E+01	2.6E+01	2.6E+01	2.6E+01
n-Butylbenzene	NV	1.2E+03	NV	NV	6.4E+03	--	--	2.8E+01	2.6E+01	2.6E+01	2.6E+01	2.6E+01
Ethylbenzene	5.1E+00	5.8E+00	4.8E+02	2.2E+01	2.5E+01	--	--	6.8E+01	3.2E+01	5.1E+00	3.2E+01	2.2E+01
Isopropylbenzene	NV	1.9E+03	NV	NV	9.9E+03	--	--	8.4E+01	7.7E+01	7.7E+01	7.7E+01	7.7E+01
(9) 4-Isopropyltoluene	NV	1.9E+03	NV	NV	9.9E+03	--	--	8.4E+01	7.7E+01	7.7E+01	7.7E+01	7.7E+01
MTBE	4.2E+01	4.7E+01	3.7E+03	1.8E+02	2.1E+02	--	--	1.3E+00	1.3E+00	1.3E+00	1.3E+00	1.3E+00
Naphthalene	3.3E+00	3.8E+00	3.5E+02	1.4E+01	1.7E+01	--	--	1.8E+00	1.7E+00	1.7E+00	1.7E+00	1.7E+00
n-Prepylbenzene	NV	3.8E+03	NV	NV	2.4E+04	--	--	2.8E+01	2.6E+01	2.6E+01	2.6E+01	2.6E+01
Toluene	9.7E+02	1.1E+03	4.1E+03	4.6E+03	5.4E+03	--	--	2.5E+01	1.6E+01	1.6E+01	1.6E+01	1.6E+01
1,3,5-TMB	NV	2.1E+02	NV	NV	1.1E+03	--	--	3.6E+01	3.3E+01	3.3E+01	3.3E+01	3.3E+01
1,2,4-TMB	NV	5.6E+01	NV	NV	2.4E+02	--	--	3.6E+01	3.3E+01	3.3E+01	3.3E+01	3.3E+01
o-Xylene	NV	6.5E+02	NV	NV	2.8E+03	--	--	NV	NV	6.5E+02	0.0E+00	2.8E+03
(10) m,p-Xylenes	NV	5.5E+02	NV	NV	2.4E+03	--	--	NV	NV	5.5E+02	0.0E+00	2.4E+03
Total Xylenes	5.6E+02	5.8E+02	2.4E+03	2.4E+03	2.5E+03	--	--	2.3E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02
Polycyclic Aromatic Hydrocarbons (PAHs)												
Acenaphthene	3.6E+03	3.6E+03	1.0E+04	4.5E+04	4.5E+04	1.9E+01	5.5E+00	NV	NV	5.5E+00	5.5E+00	5.5E+00
(11) Acenaphthylene	3.6E+03	3.6E+03	1.0E+04	4.5E+04	4.5E+04	1.3E+01	5.5E+00	NV	NV	5.5E+00	5.5E+00	5.5E+00
Anthracene	1.8E+04	1.8E+04	5.0E+04	2.3E+05	2.3E+05	2.8E+00	5.8E+01	NV	NV	2.8E+00	2.8E+00	2.8E+00
Benz(a)anthracene	1.6E-01	1.6E-01	1.6E+01	2.9E+00	2.9E+00	1.2E+01	4.2E-03	NV	NV	4.2E-03	4.2E-03	4.2E-03
Benzo(a)pyrene	1.6E-02	1.6E-02	1.6E+00	2.9E-01	2.9E-01	1.3E+02	4.0E-03	NV	NV	4.0E-03	4.0E-03	4.0E-03
Benzo(b)fluoranthene	1.6E-01	1.6E-01	1.6E+01	2.9E+00	2.9E+00	6.4E+02	4.1E-02	NV	NV	4.1E-02	4.1E-02	4.1E-02
Benzo(g,h,i)perylene	NV	NV	NV	NV	NV	2.7E+01	NV	NV	NV	2.7E+01	2.7E+01	2.7E+01
Benzo(k)fluoranthene	1.6E+00	1.6E+00	1.5E+02	2.9E+01	2.9E+01	3.7E+01	4.0E-01	NV	NV	4.0E-01	4.0E-01	4.0E-01
Chrysene	1.5E+01	1.6E+01	1.5E+03	2.6E+02	2.9E+02	2.3E+01	1.2E+00	NV	NV	1.2E+00	1.2E+00	1.2E+00
Dibenzo(a,h)anthracene	1.6E-02	1.6E-02	1.6E+00	2.9E-01	2.9E-01	1.4E+02	1.3E-02	NV	NV	1.3E-02	1.3E-02	1.3E-02
Fluoranthene	2.4E+03	2.4E+03	6.7E+03	3.0E+04	3.0E+04	6.0E+01	8.9E+01	NV	NV	6.0E+01	6.0E+01	6.0E+01
Fluorene	2.4E+03	2.4E+03	6.7E+03	3.0E+04	3.0E+04	8.9E+00	5.4E+00	NV	NV	5.4E+00	5.4E+00	5.4E+00
Indeno(1,2,3-cd)pyrene	1.6E-01	1.6E-01	1.6E+01	2.9E+00	2.9E+00	7.0E+01	1.3E-01	NV	NV	1.3E-01	1.3E-01	1.3E-01
Naphthalene	3.3E+00	3.8E+00	3.5E+02	1.4E+01	1.7E+01	--	--	1.8E+00	1.7E+00	1.7E+00	1.7E+00	1.7E+00
(12) Phenanthrene	1.8E+04	1.8E+04	5.0E+04	2.3E+05	2.3E+05	1.1E+01	5.8E+01	NV	NV	1.1E+01	1.1E+01	1.1E+01
Pyrene	1.8E+03	1.8E+03	5.0E+03	2.3E+04	2.3E+04	8.5E+01	1.3E+01	NV	NV	1.3E+01	1.3E+01	1.3E+01
Metals												
Lead	8.0E+01	8.0E+01	1.6E+02	3.2E+02	3.2E+02	NV	NV	NV	NV	8.0E+01	1.6E+02	3.2E+02

Notes:
C4-C12 = Carbon range.
ft bgs = feet below ground surface.
mg/kg = milligram per kilogram.
NV = No published value.
100X = One hundred times.
TBA = tert-Butyl alcohol.
MTBE = Methyl-tert-butyl ether.
TMB = Trimethylbenzene.
TPHg = TPH as gasoline.
USEPA RSL = U.S. Environmental Protection Agency Regional Screening Level (USEPA, 2016).
LARWQCB Soil SL = Los Angeles Regional Water Quality Control Board Soil Screening Level (LARWQCB, 1996).
DTSC SL = Department of Toxic Substances Control Screening Level (DTSC, 2016).
SFBRWQCB ESL = San Francisco Bay Regional Water Quality Control Board Environmental Screening Level (SFBRWQCB, 2016)

[1] SFBRWQCB ESLs for soil for direct contact exposure pathways. Screening levels for TPH (C5-C12), TPH (C13-C22), and TPH (C23-C44) represent ESLs for TPH gasoline (C5-C12), TPH diesel (C10-C24), and TPH motor oil (C24-C36), respectively.

[2] USEPA RSLs/DTSC SLs for soil for direct contact exposure pathways represents the lowest of the available DTSC SL or USEPA RSL. Screening levels for TPH (C5-C12), TPH (C13-C22), and TPH (C23-C44) represent lowest of aliphatic and aromatic USEPA RSLs for TPH Low (C5-C8), TPH Middle (C9-C18), and TPH High (C17-C32), respectively.

[3] SFBRWQCB ESL respresents soil SL for protection of groundwater, assuming groundwater aquifer is not a source of drinking water. Screening levels for TPH (C5-C12), TPH (C13-C22), and TPH (C23-C44) represent ESLs for TPH gasoline (C5-C12), TPH diesel (C10-C24), and TPH motor oil (C24-C36), respectively.

[4] USEPA RSL respresents soil SL for protection of groundwater, assuming groundwater aquifer is not a source of drinking water. Screening levels for TPH (C5-C12), TPH (C13-C22), and TPH (C23-C44) represent lowest of aliphatic and aromatic USEPA RSLs for TPH Low (C5-C8), TPH Middle (C9-C18), and TPH High (C17-C32), respectively.

[5] LARWQCB SL respresents soil SL for protection of groundwater at 20 ft bgs, assuming groundwater aquifer is not a source of drinking water. As recommended by LARWQCB (1996), for non-drinking water aquifers, screening level for TPH carbon ranges represent the LARWQCB SLs for TPH where distance above groundwater is greater than 150 feet (>150 feet). Values from LARWQCB (1996) for PAHs were not available.

[6] As recommended by LARWQCB (1996), for non-drinking water aquifers, benzene, toluene, ethylbenzene, and xylene (BTEX) screening levels are set at 100 times (100X) respective maximum contaminant levels (MCLs) as preliminary levels to be protection of human health and the environment. This method was applied to all VOCs.

[7] Final screening level represents the lowest available screening level for each exposure scenario/receptor.

[8] If screening level for tert-butyl alcohol was not available; therefore, the value for sec-butyl alcohol was used.

[9] If screening level for 4-isopropyltoluene was not available; therefore, the value for isopropylbenzene was used.

[10] Screening level for m,p-xylenes represents the value for m-xylene.

[11] If screening level for acenaphthylene was not available; therefore, the value for acenaphthene was used.

[12] If screening level for phenanthrene was not available; therefore, the value for anthracene was used.

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