

APPENDIX D

**HAZARDS SCREENING LEVEL HEALTH
RISK ASSESSMENT MEMORANDUM**

Memorandum

Date: July 7, 2014
To: City of Los Angeles Department of Public Works,
Bureau of Engineering
From: AECOM
Subject: Taylor Yard River Parcel G2 Project – Hazards Screening Level Health
Risk Assessment

The purpose of this memorandum is to provide a qualitative assessment of potential risks to human health based on the most recent chemical characterization data available for the Taylor Yard River Parcel G2 project site (Parcel G2). The assessment consists of a comparison of site-detected concentrations to risk-based screening levels. These screening levels have been selected to be protective of the residential exposure scenario. Although the property is not currently used for residential purposes, comparison to these values will be indicative of concentrations to protect the site for the possibility of future unrestricted development.

The area of concern is primarily Parcel G2 of the former Taylor Yard railroad complex. This area is hereafter referred to as the Site. Soil, groundwater, and soil gas at the Site have been characterized and are summarized in two primary reports:

- Streamlined Risk Assessment, Union Pacific Taylor Yard, Los Angeles, California (CDM August 2009)
- Remedial Action Plan (RAP), Taylor Yard, Parcel G2, Los Angeles, California (CDM Smith, February 2014)

The data contained in this qualitative assessment came from the above listed reports.

This assessment uses the maximum detected concentration of each chemical detected in the soil and soil vapor at the Site. Although risk assessments often use concentrations of site chemicals more representative of typical or average levels experienced by site occupants, the maximum concentration is better suited for a qualitative assessment. However, the use of such extreme values can lead to bias in the risk results. This is discussed subsequently in this memorandum.

Although cancer and non-cancer risks are not developed in a qualitative assessment, site chemical concentrations are compared to risk-based concentrations to obtain an indication of whether the site chemicals may pose a health risk. These screening levels are specific for the receptor group selected for the assessment. In this case, this group is hypothetical future residential receptors. The screening level is developed to protect against either cancer or non-cancer risk. If a chemical may produce both types of risk, then the lowest level is selected as the screening level because it is protective of either toxicological endpoint. The screening levels for soil were selected using the guidance provided by the California Department of Toxic Substances Control in Office of Human and

Ecological Risk (HERO) Note 3.¹ Although the DTSC has developed a set of soil screening values called California Human Health Screening Levels (CHHSLs), these cover only a portion of the chemicals detected at the Site. The guidance in HERO Note 3 recommends using the Regional Screening levels (RSLs) developed by the U.S. Environmental Protection Agency (USEPA) with alternate screening levels for specific chemicals designated in the guidance.² This approach is better suited for this assessment because the RSLs and the alternate screening values were developed using a consistent approach to calculating potential risk over a wider range of chemicals. This approach accounts for the potential health risks associated with the exposure of chemicals via soil ingestion and dermal soil contact, as well as inhalation of non-volatile chemicals in fugitive dust and of volatile chemicals in outdoor air.

CHHSLs for soil vapor were used for this assessment because RSLs for soil vapor are not available. These values came from Table 3 of the revised CHHSL tables.³ Soil vapor CHHSLs were developed to protect indoor receptors from the inhalation of volatile chemicals present in the subsurface that might intrude into the indoor air space of a structure, such as a house.

A screening level assessment was not conducted for groundwater. A discussion of groundwater contamination presented in the RAP indicates that although groundwater is impacted by chemicals, cleanup goals were not developed for groundwater. The reasons given include the following:

- Most of the chemicals detected in Site groundwater (especially tetrachloroethene and trichloroethene) appear to have entered the Site from upgradient, and are not site-related.
- The concentration of chemicals detected in Site groundwater have decreased in recent years due to pumping and treatment operations upgradient of the site in the Pollock Well Field from 2009 to the present.
- Groundwater at the Site is not currently used as a source of drinking water.

Given this situation, potential risks from exposure to groundwater were not assessed in the 2009 risk assessment document, and groundwater cleanup levels were not proposed in the RAP. In addition, a complete set of groundwater data were not provided in either source document used for this assessment.

The chemicals detected in soil, and the soil screening levels used for comparison, are presented in Table 1. The chemicals detected in soil vapor and the soil vapor screening levels used for comparison are presented in Table 2.

The results in Table 1 show that 70 chemicals were detected in soil. Of these, the maximum concentration of 18 of them exceeded their residential screening levels. The results in Table 2 show that all of the eight chemicals detected in soil vapor exceeded their respective soil vapor residential CHHSL values.

It is important to understand that even though a chemical may be present at a concentration greater than its residential screening level, this does not mean that this chemical poses a risk to the health of a residential receptor. The two main reasons for this are:

¹ California Department of Toxic Substances Control, May 2013.

² U.S. Environmental Protection Agency, May 2014, available at: www.epa.gov/region9/superfund/prg/

³ California Department of Toxic Substances Control, September 23, 2010, available at: www.oehha.org/risk/chhshtable.html

1. These screening levels are very health-protective and were developed using assumptions that intentionally over-estimate the degree of exposure that might occur under actual conditions, and
2. The comparison uses the maximum concentration detected at the Site and this concentration is likely to significantly over-predict the levels present at the Site as a whole and to which a potential receptor may be exposed.

For these reasons, the results in Tables 1 and 2 should be interpreted to mean that adverse health effects may result from exposure to site soil and to the inhalation of indoor air in the event that the Site is developed for residential use, but that these effects are not certain. This is not to downplay the potential risks to hypothetical future residential receptors. It should be noted that the results of the 2009 risk assessment showed a residential cumulative cancer risk of approximately 5×10^{-3} and a non-cancer Hazard Index (HI) of 106. Although these results were also based on the maximum detected concentrations, and thus likely over-estimate the potential health risks, they suggest it likely that if a more detailed assessment were conducted, the cumulative cancer and non-cancer risk results may still be above the levels considered to be acceptable (i.e., a cancer risk of 1×10^{-6} or less and an HI of 1).

Table 1
Comparison of Maximum Detected Soil Concentrations to Risk-Based Screening Levels

	Maximum Concentration ¹ (mg/kg)	Risk-Based Screening level ² (mg/kg)	Source	Does Site Concentration Exceed Screening Level ?
Antimony	290	31	e	Yes
Arsenic	61.8	0.062	h	Yes
Barium	470	15000	e	
Beryllium	2.7	16	h	
Cadmium	5.7	4	e	Yes
Chromium	460	120,000 / 0.3 *	e	
Cobalt	34	23	e	Yes
Copper	3200	3100	e	Yes
Lead	12400	80	h	Yes
Mercury	1.8	23	e	
Molybdenum	20	390	e	
Nickel	580	1500	e	
Selenium	20	390	e	
Silver	5	390	e	
Thallium	10	0.78	e	Yes
Vanadium	305	390	e	
Zinc	10400	23000	e	
1,1,1,2-Tetrachloroethane	0.5	2	e	
1,1,1-Trichloroethane	0.32	8100	e	
1,1,2,2-Tetrachloroethane	84	0.6	e	Yes
1,1,2-Trichloro trifluoroethane	10	40000	e	
1,1,2-Trichloroethane	0.046	1.1	e	
1,1-Dichloroethane	0.042	3.6	e	
1,2,3-Trichlorobenzene	0.015	49	e	
1,2,3-Trichloropropene	10	0.73	e	Yes
1,2,4-Trichlorobenzene	57	24	e	Yes
1,2,4-Trimethylbenzene	10	58	e	
1,2-Dibromomethane	83	0.036	e	Yes
1,2-Dichlorobenzene	0.038	1800	e	
1,3,5-Trimethylbenzene	0.5	21.3	h	
1,3-Dichlorobenzene	180	530	h	
Dichloromethane	1.2	NE	e	
Methylene chloride	0.041	9.1	h	
o-Xylene	0.19	650	e	
Pentachlorophenol	1.2	0.99	e	Yes
trans-1,2-Dichloroethene	0.038	1600	e	
trans-1,2-Dichloropropene	0.32	1.8	e	
Vinyl acetate	0.5	910	e	
2,4,5-Trichlorophenol	0.9	6200	e	
2,4-Dinitrophenol	3.5	120	e	
2-Methylnaphthalene	0.34	230	e	
3,3'-Dichlorobenzidine	0.73	1.2	e	
3-Nitroaniline	1.3	18	h	
4-Chlorophenyl phenyl ether	0.23	NE	e	
4-Nitroaniline	0.16	27	e	
Acenaphthene	2.1	3500	e	
Acenaphthylene	32	NE	e	
Anthracene	0.79	17000	e	
Benzo(a)anthracene	31	0.15	e	Yes

Table 1
Comparison of Maximum Detected Soil Concentrations to Risk-Based Screening Levels

	Maximum Concentration ¹ (mg/kg)	Risk-Based Screening level ² (mg/kg)	Source	Does Site Concentration Exceed Screening Level ?
Benzo(a)pyrene	0.34	0.015	e	Yes
Benzo(b)fluoranthene	77	0.15	e	Yes
Benzo(g,h,i)perylene	1.3	NE	e	
Benzo(k)fluoranthene	1.1	0.38	h	Yes
Benzoic acid	0.25	250000	e	
Benzyl alcohol	5.6	6200	e	
bis(2-chloroethoxy)ether	0.04	NE	e	
bis(2-chloroethoxy)methane	0.54	180	e	
bis(2-ethyl hexyl)phthalate	27	38	e	
Chrysene	1.2	3.8	h	
Dibenzo(a,h)anthracene	11	0.015	e	Yes
Dibenzofuran	0.82	72	e	
Di-n-butyl phthalate	2.1	6200	e	
Hexachlorobenzene	56	0.33	e	Yes
Hexachlorocyclopentadiene	0.88	370	e	
Isophorone	0.08	560	e	
Naphthalene	2.5	3.8	e	
Nitrobenzene	1	5.1	e	
N-nitrosodiphenylamine	40	110	e	
Phenanthrene	2.7	NE	e	
Phenol	0.64	18000	e	

Notes:

¹ Maximum detected concentration reported for 0-10 feet bgs, table 3-4, Streamlined Risk Assessment, Taylor yard, CDM, August 2009.

² Risk-based concentration in soil to protect the residential exposure scenario.

* Residential soil RSL for trivalent and hexavalent chromium are presented.

NE = Not established

h = DTSC HERO Note 3

e = USEPA Region 9 Regional Screening Levels

Table 2
Comparison of Maximum Detected Soil Vapor Concentrations to Risk-Based Screening Levels

Analyte	Maximum Concentration ¹ (ug/m ³)	Risk-Based Screening level ² (ug/m ³)	Does Site Concentration Exceed Screening Level ?
Benzene	1,693	36	Yes
1,2-Dichloroethane	1,900	50	Yes
cis-1,2-Dichloroethene	640,000	16000	Yes
Ethylbenzene	4,775	420	Yes
Naphthalene	110	32	Yes
Tetrachlorethene	555,960	180	Yes
Trichloroethene	53,700	530	Yes
Vinyl chloride	1,700,000	13	Yes

Notes:

1. Concentrations as reported in Table 3-2 of the Remedial Action plan (CDM, February 2014) but omitting the five chemicals that were not detected, as discussed in text.
2. Risk-based concentration in soil vapor to protect the residential exposure scenario. DTSC CHHSLs from revised Table 3 (www.oehha.org/risk/chhstable.html) September 2010.

ug/m³ = Micrograms per cubic meter