

May 18, 2004  
Project 8371.001

Mr. Mark Johnson and  
Mr. Roger Brewer  
Regional Water Quality Control Board  
1515 Clay Street, #1400  
Oakland, California 94612

via Facsimile (510) 622-2460  
and U.S. Mail (4 pages)

**Subject:** Revised Remediation Levels  
Central Station Sites  
Wood Street between 10<sup>th</sup> Street and West Grand Avenue  
Oakland, California

Dear Messrs. Johnson and Brewer:

Geomatrix Consultants, Inc. (Geomatrix), has prepared this letter on behalf of HFH, Ltd., Central Station Land, LLC, Oakland Icehouse, LLC, and BUILD West Oakland, to present the revised remediation levels for various residential development plans on adjacent properties located along Wood Street and between 10<sup>th</sup> Street and West Grand Avenue in Oakland, California (the site). This letter was prepared following our May 10, 2004 meeting where these revised remediation levels were discussed.

Table 1 presents the revised soil remediation levels for chemicals detected in at least one soil sample collected across the site. These levels were developed considering the following criteria:

- Risk-based goals for the protection of human health (i.e., direct contact and inhalation of chemicals in indoor air) based on an unrestricted land use using a target lifetime incremental cancer risk of  $1 \times 10^{-5}$  for carcinogenic polyaromatic hydrocarbons (PAHs), a target lifetime incremental cancer risk of  $1 \times 10^{-6}$  for other carcinogenic chemicals, and a target hazard quotient of 0.2 for noncarcinogenic chemicals;
- Risk-based goals for total petroleum hydrocarbons (TPH) and volatile organic compounds (VOCs) based on the protection of groundwater quality from leaching of soil at levels that would result in groundwater concentrations above non drinking water standards;
- Naturally-occurring background concentrations for metals; and
- Ceiling limits based on nuisance odor concerns.

Risk-based levels based on the protection of groundwater quality for metals and organochlorine pesticides (OCPs), and ecological terrestrial habitats and receptors were not considered for the following reasons:

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- Based on the results of previous investigations, subsurface geology underlying the site is primarily composed of fill material consisting of clayey gravel with sand to a depth of approximately 4.5 feet below ground surface (ft bgs). The fill is underlain by a combination of clay and sand, to a depth of 10 ft bgs. Metals were likely constituents in these fill materials. Except for arsenic, the distribution of metals in soil are not representative of isolated source areas, but rather, the distribution of metals are more likely representative of background conditions in fill materials. Elevated concentrations of arsenic may be attributed to past use of arsenical pesticides along the railtracks;
- The distribution of OCPs in soil indicate that elevated concentrations of OCPs are limited in a lateral and vertical extent, suggesting that a widespread impact to shallow groundwater underlying the site is unlikely;
- Metals and OCPs are generally not considered highly mobile; migration of metals and OCPs in soil to groundwater is slow and limited;
- Elevated concentrations of metals (i.e., arsenic) and OCPs will be remediated allowing for unrestricted site use. Under this scenario, the source(s) will be removed and potential impacts to groundwater quality as a result of leaching will no longer be significant;
- Except for endosulfan, risk-based screening levels for OCPs based on direct contact are more stringent than screening levels for the protection of groundwater. Thus, the proposed remediation levels for each of the OCPs are also protective of groundwater quality. Endosulfan was detected in only one out of 23 soil samples collected from the site and is below the risk-based screening level for direct contact, suggesting that potential impacts to groundwater is unlikely significant;
- Except for isolated locations, groundwater samples collected from the site and analyzed for TPH and VOCs indicate that shallow groundwater has not been significantly affected by historical site related activities, suggesting that leaching of constituents in soil to groundwater is not a significant migration pathway;
- Although the migration of metals and OCPs in soil to groundwater is possible, shallow groundwater underlying the site, ranging from 1 to 6 ft bgs, is not anticipated to be used as a drinking water source in the foreseeable future. Potential exposures to constituents in shallow groundwater, either through consumption or direct contact pathways, are incomplete;

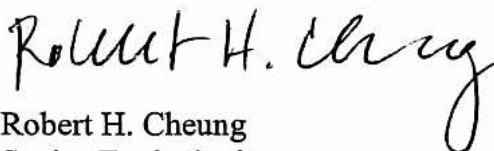
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- The site is located more than 1.5 miles from San Francisco Bay. Potential migration of metals and OCPs in soil to groundwater and into surface water bodies is not a significant pathway; and
- The site has historically been used for industrial activities. Endangered or threatened species do not exist in the vicinity of the site.

The site is under consideration for medium to high-density multi-family residential redevelopment, where exposed soil will be covered by buildings, roadways, and/or ornamental landscaping. Thus, potential exposures to chemicals in soil from incidental ingestion and dermal contact by future residential receptors are incomplete. However, except for TPH, the proposed remediation levels will be applied to the top three feet below ground surface or to the top of the water table. As indicated in Table 1, separate remediation levels for TPH are proposed for surficial soil (i.e., soil less than 3 feet or to the top of groundwater) and subsurface soil, defined as soil at depths of more than three feet below ground surface.

We trust that the information presented in this letter and the attached table is sufficient for your approval so that the proposed remedial approaches can proceed. Please call either of the undersigned if you have questions, comments, or need further information.

Sincerely yours,  
GEOMATRIX CONSULTANTS, INC.



Robert H. Cheung  
Senior Toxicologist



Jennifer L. Patterson, P.E. #59161  
Senior Engineer

Table 1

cc: Mark Johnson, RWQCB  
Andrew Lundgren, RWQCB  
Andrew Getz, HFH, Ltd.  
Kevin Wakelin, Central Station Land, LLC; Oakland Icehouse, LLC  
Terezia Nemeth, BUILD West Oakland, LLC  
Tom Graf

**TABLE 1**  
**REVISED SOIL REMEDIAL CLEANUP GOALS**  
 Central Station Sites  
 Oakland, California

Concentrations in milligrams per kilogram (mg/kg)

Chemical <sup>1</sup>	Maximum Detection <sup>1</sup>	Ceiling Limit <sup>2</sup>	Urban Ecotoxicity Criteria <sup>2</sup>	Human Health - Direct Exposure <sup>2</sup>	Human Health - Indoor Air Impacts <sup>2</sup>	Groundwater Protection <sup>2</sup>	Background <sup>3</sup>	Surface Soil Cleanup Goal <sup>4</sup>	Subsurface Soil Cleanup Goal <sup>5</sup>	Criteria <sup>6</sup>
Antimony	2.67	1000	20	6.3	NA	NA	10	6.3	6.3	Direct 0.2
Arsenic	1187	1000	20	5.5	NA	NA	14	14	14	Background
Barium	910	1000	750	1100	NA	NA	410	1000	1000	Ceiling
Beryllium	0.67	1000	4	31	NA	NA	1.1	31	31	Direct 0.2
Cadmium	4.46	1000	12	7.8	NA	NA	5.6	7.8	7.8	Direct 0.2
Chromium	527	1000	NA	58	NA	NA	120	120	120	Background
Cobalt	58.8	1000	40	94	NA	NA	25	94	94	Direct Trench
Copper	516	1000	230	630	NA	NA	63	630	630	Direct 0.2
Lead	3900	1000	200	255	NA	NA	57	255	255	DTSC
Mercury	560	500	10	2.5	NA	NA	0.5	2.5	2.5	Direct 0.2
Molybdenum	4.96	1000	40	78	NA	NA	5	78	78	Direct 0.2
Nickel	37000	1000	150	310	NA	NA	270	310	310	Direct 0.2
Selenium	9400	1000	10	78	NA	NA	5.1	78	78	Direct 0.2
Silver	9400	1000	20	78	NA	NA	3	78	78	Direct 0.2
Thallium	130	1000	NA	1	NA	NA	10	10	10	Background
Vanadium	12000	1000	200	110	NA	NA	90	110	110	Direct 0.2
Zinc	100000	1000	600	4700	NA	NA	140	1000	1000	Ceiling
TPH as gasoline	13000	100	NA	500	NA	400	NA	100	500	Ceiling
TPH as diesel	36500	500	NA	500	NA	500	NA	500	1000	Ceiling
TPH as motor oil	33000	500	NA	500	NA	1000	NA	500	1000	Ceiling
Benzene	3.4	500	25	0.18	0.18	2	NA	0.18	0.18	Indoor Air
Toluene	8.8	500	NA	130	180	9.3	NA	9.3	9.3	Leaching
Ethylbenzene	51	230	NA	8.7	4.7	32.0	NA	4.7	4.7	Indoor Air
Xylenes	100	210	NA	54	45	1.5	NA	1.5	1.5	Leaching
Methylene Chloride	56	500	NA	4.3	0.52	34.0	NA	0.52	0.52	Indoor Air
Acenaphthene	0.72	1000	NA	730	130	19	NA	130	130	Indoor Air
Acenaphthylene	13	500	NA	550	NA	13	NA	500	500	Ceiling
Anthracene	52.2	500	40	4400	6.1	2.8	NA	6.1	6.1	Indoor Air
Benzo(a)anthracene	16	500	40	0.38	NA	12	NA	3.8	3.8	Direct 10 <sup>-5</sup>
Benzo(a)pyrene	63.6	500	40	0.038	NA	130	NA	0.38	0.38	Direct 10 <sup>-5</sup>
Benzo(b)fluoranthene	26	500	NA	0.38	NA	46	NA	3.8	3.8	Direct 10 <sup>-5</sup>
Benzo(k)fluoranthene	31.8	500	40	0.38	NA	37	NA	3.8	3.8	Direct 10 <sup>-5</sup>
Benzo(g,h,i)perylene	43.5	500	40	460	NA	27	NA	460	460	Direct 0.2
Chrysene	29.8	1000	40	3.8	NA	23	NA	38	38	Direct 10 <sup>-5</sup>
Dibenz(a,h)anthracene	3.9	500	NA	0.11	NA	140	NA	1.1	1.1	Direct 10 <sup>-5</sup>
Fluoranthene	37000	500	40	460	NA	60	NA	460	460	Direct 0.2
Fluorene	0.59	500	NA	550	160	8.9	NA	160	160	Indoor Air
Indeno(1,2,3-cd)pyrene	43.8	500	40	0.38	NA	7.7	NA	3.8	3.8	Direct 10 <sup>-5</sup>
Naphthalene	105	500	40	11	4.5	4.8	NA	4.5	4.5	Indoor Air
Phenanthrene	19	500	40	550	NA	11	NA	500	500	Ceiling
Pyrene	53.3	500	NA	460	85	85	NA	85	85	Indoor Air
PCBs-Aroclor	0.49	500	NA	0.22	NA	6.3	NA	0.22	0.22	Direct 10 <sup>-6</sup>
4,4 DDD	2.51	500	NA	2.4	NA	750	NA	2.4	2.4	Direct 10 <sup>-6</sup>
4,4 DDT	5.65	500	4	1.7	NA	1100	NA	1.7	1.7	Direct 10 <sup>-6</sup>
4,4 DDE	1.30	1000	4	1.7	NA	4.3	NA	1.7	1.7	Direct 10 <sup>-6</sup>
Endosulfan I	0.32	500	NA	73	NA	0.0046	NA	73	73	Direct 10 <sup>-6</sup>
Endosulfan II	0.13	500	NA	73	NA	0.0046	NA	73	73	Direct 10 <sup>-6</sup>
Chlordane (tech)	0.088	1000	NA	0.44	NA	15	NA	0.44	0.44	Direct 10 <sup>-6</sup>

<sup>1</sup> Chemicals that were detected in at least one soil sample collected from various investigations across the Central Station Sites, as presented in the October 20, 2003 Proposed Remediation Levels

<sup>2</sup> Table B-1, Screening Risk Criteria from S.F. Bay Regional Water Quality Control Board's Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater (June, 2003).

<sup>3</sup> Background = Represents the 99th percentile of background; arsenic is based on the 95th percentile, Lawrence Berkeley National Laboratory (LBNL), 2002

<sup>4</sup> To be applied to the top 3 feet of soil or to the top of the water table.

<sup>5</sup> To be applied to soil at depths greater than 3 feet below ground surface.

<sup>6</sup> Basis for Proposed Remediation Goal:

Direct 0.2 = based on direct contact and a target hazard quotient of 0.2; Direct 10<sup>-5</sup> or 10<sup>-6</sup> = Based on a target carcinogenic risk of 1x10<sup>-5</sup> or 1 x10<sup>-6</sup>, respectively.

Background = LBNL, 99th percentile; arsenic based on the 95th percentile

Leaching = Soil criteria based on the protection of groundwater quality

NA = Not Available

Ceiling = Ceiling Level as published by RWQCB, 2003

DTSC = Department of Toxic Substances Control

Indoor Air = Screening Level for the protection of indoor air quality

Trench = Based on trench workers

Note the site has historically been used for industrial activities; endangered or threatened ecological receptors do not exist on the site.

Risk-based levels based on the protection of groundwater quality for metals, polyaromatic hydrocarbons (PAHs), and organochlorine pesticides were not considered because these constituents are generally not considered highly mobile; migration of these constituents in subsurface soil to groundwater is slow and limited. Please refer to May 18, 2004 letter for further details.