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10 August 2001
C6-BRC-T-01-017

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, CA 90013

BOEING

Attention: John Geroch

Subject: **STOCKPILE PLACEMENT/DISPOSITION EVALUATION, SP-12 AND SP-14 FOR BOEING REALTY CORPORATION, FORMER C-6 FACILITY, 19503 SOUTH NORMANDIE AVENUE, LOS ANGELES, CA**

Dear Mr. Geroch:

Please find enclosed for your review, a copy of the subject document prepared by Haley & Aldrich, Inc. for Boeing Realty Corporation.

If you have any questions concerning this document, please contact the undersigned at 562-593-8623.

Sincerely,

Stephanie Sibbett
Boeing Realty Corporation

Cc: Mario Stavale, Boeing Realty Corporation

enclosure

HALEY & ALDRICH

ENGLAND GEOSYSTEM
ENVIRONMENTAL ENGINEERING

BOEING REALTY CORPORATION
FORMER C-6 FACILITY
LOS ANGELES, CALIFORNIA

TECHNICAL MEMORANDUM

STOCKPILE PLACEMENT/DISPOSITION EVALUATION
STOCKPILES SP-12 AND SP-14

To: **Mr. Brian Mossman**
Boeing Realty Corporation
3855 Lakewood Blvd.
Building 1A MC D001-0097
Long Beach, CA 90846

From: **Haley & Aldrich, Inc.**

Date: **August 1, 2001**

Re: **Stockpile Placement/Disposition Evaluation, Boeing Realty Corporation, Stockpiles SP-12 and SP-14, Former C-6 Facility – Parcel C, Los Angeles, California**

Haley & Aldrich, Inc. is herein providing this technical memorandum to summarize our recommendations regarding the onsite placement and offsite transport of temporarily stockpiled excavated materials at Parcel C of the Boeing Realty Corporation's (BRC's) Former C-6 Facility in Los Angeles, California (subject parcel). These stockpiles are herein identified as Stockpiles SP-12 and SP-14.

OVERVIEW/PURPOSE

Potentially impacted materials identified during demolition monitoring activities have been excavated to expedite potential onsite remediation activities, thus, reducing the potential for affecting the current redevelopment schedule at the subject parcel. These materials were segregated by the location from which they were excavated and by known or suspected chemical impacts. Representative samples collected from these materials were evaluated using human health risk assessment and groundwater protection evaluation procedures to determine which of the temporary soil stockpiles could be reused onsite and which should be transported offsite to regulated treatment/disposal facilities. The evaluation methodology and the onsite placement/offsite transport recommendations are presented herein.

IDENTIFICATION OF STOCKPILED SOIL

Materials, comprised primarily of soils, were identified for excavation based on field observations and the results of in-situ samples collected and analyzed following the Los Angeles Regional Water Quality Control Board (LARWQCB)-approved sampling and analysis plan for the subject parcel and the subsequent LARWQCB-approved addendum and supplements.

Two temporary stockpiles (SP-12 and SP-14) have been generated from onsite excavations at the subject parcel. Each of these stockpiles is comprised of soil. Stockpile SP-12 contains approximately 1,050 cubic yards of soil, and has been divided into seven approximately equal segregated segments. Stockpile SP-14 contains approximately 250 cubic yards of soil.

STOCKPILE CHARACTERIZATION METHODOLOGY

One representative sample was obtained from each of the seven segments of stockpile SP-12 and two representative soil samples were obtained from stockpile SP-14 to characterize the associated stockpiled soil. Each of the samples collected from stockpiles SP-12 and SP-14 was tested for suspected chemical constituents following the protocols presented in the LARWQCB-approved sampling and analysis plan for the subject parcel and the subsequent LARWQCB-approved addendum and supplements.

STOCKPILE EVALUATION METHODOLOGY

The stockpile sample results were evaluated using screening human health risk assessment procedures as described in the November 29, 2000 Risk Assessment Work Plan (RAWP) for the subject parcel following the decision process summarized in Figure 1. In addition, maximum volatile organic compound (VOC) concentrations for each stockpile or stockpile segment was evaluated to assess whether VOC concentrations in the stockpiles have the potential to degrade existing groundwater quality.

Human Health Risk Evaluation

The maximum concentrations detected in each stockpile were separately added to the maximum concentrations detected within each of three areas of subject parcel. These three areas of the subject parcel are identified as the Building 1 Exposure Area, the Building 2 West Exposure Area, and the Parcel C Exposure Area (Figure 2). The Building 1 and 2 Exposure Areas are defined by two areas of elevated VOC impacts at and in proximity to former Buildings 1 and 2, respectively. The remaining portion of the subject parcel (Parcel C Exposure Area) contains relatively lower chemical concentrations and/or smaller impacted areas. The risk assessment results for each area were then compared to the LARWQCB- and Office of Environmental Health Hazard Assessment (OEHHA)-approved target risk levels.

Groundwater Protection Evaluation

Even though shallow groundwater beneath and in proximity to the subject parcel is not used as a domestic water supply, the evaluation conservatively assumed potential downward chemical migration from soil resulting in possible degradation of the Bellflower aquitard to levels greater than the California drinking water standards (i.e. Maximum Contaminant Levels [MCLs]). The assessment was conducted assuming a conservative scenario regarding chemical migration and mixing in groundwater following approved EPA and LARWQCB methodology and assumptions. This evaluation was conducted by comparing maximum VOC concentrations to site-specific soil screening levels (SSLs) derived from primary MCLs.

BOE-C6-0232991

Initial site-specific SSLs were derived using the formula presented in Section 2.5 of the EPA document entitled *Soil Screening Guidance: Technical Background Document (TBD),* dated July 1996, and site-specific geotechnical parameters. The EPA SSL equation is a partitioning formula, which does not account for chemical attenuation during migration in soil or mixing with groundwater. To better represent contaminant migration in the soil column, an attenuation factor of 13 was applied to the initial SSL. This attenuation factor was obtained from Table 5-14 of the LARWQCB's May 1996 *Interim Site Assessment & Cleanup Guidebook*, assuming site-specific average soil particle size distributions, and a distance of 53 feet from soil impacts to the groundwater table (i.e., stockpiled material to be placed onsite at a maximum depth of 12 feet below ground surface (bgs) or shallower, and the water table is located at a depth of 65 feet bgs). An EPA default dilution attenuation factor (DAF) of 20 was also applied to the initial SSL to account for limited groundwater mixing. This EPA default value is presented in the above-referenced July 1996 EPA document, and was used by EPA to develop generic SSLs. The resulting site-specific SSL is, thus, equal to the initial SSL (assuming no soil attenuation or groundwater mixing) multiplied by the product of a soil attenuation factor of 13 and a groundwater mixing factor of 20.

RECOMMENDATIONS

The recommendation for onsite reuse of each stockpile is based on whether the target risk levels of the area of the subject parcel are exceeded after addition of the maximum concentrations detected in that stockpile and on whether maximum VOC concentrations may degrade groundwater quality to concentrations greater than MCLs. If the estimated risk remains below the target risk levels for that area of the subject parcel and VOC concentrations would not degrade groundwater quality to concentrations greater than MCLs, it is recommended that the stockpile be reused in that area of the subject parcel. If the estimated risk is greater than a target risk level or if VOC concentrations may degrade groundwater quality to concentrations greater than MCLs, it is recommended that the stockpile be transported offsite at a regulated treatment/disposal facility.

A summary of the recommendations for the stockpiles is presented in Table 1. The laboratory data for the stockpile samples is presented in Appendix A, and the SSL calculations are presented in Appendix B.

BOE-C6-0232992

Should you have any questions concerning the contents of this memorandum or require additional information, please contact either of the undersigned.

Sincerely yours,
HALEY & ALDRICH, INC.

Anita Broughton, REA, CIH
Risk Assessment Task Manager

Richard M. Farson, PE
Senior Engineer

Attachments:

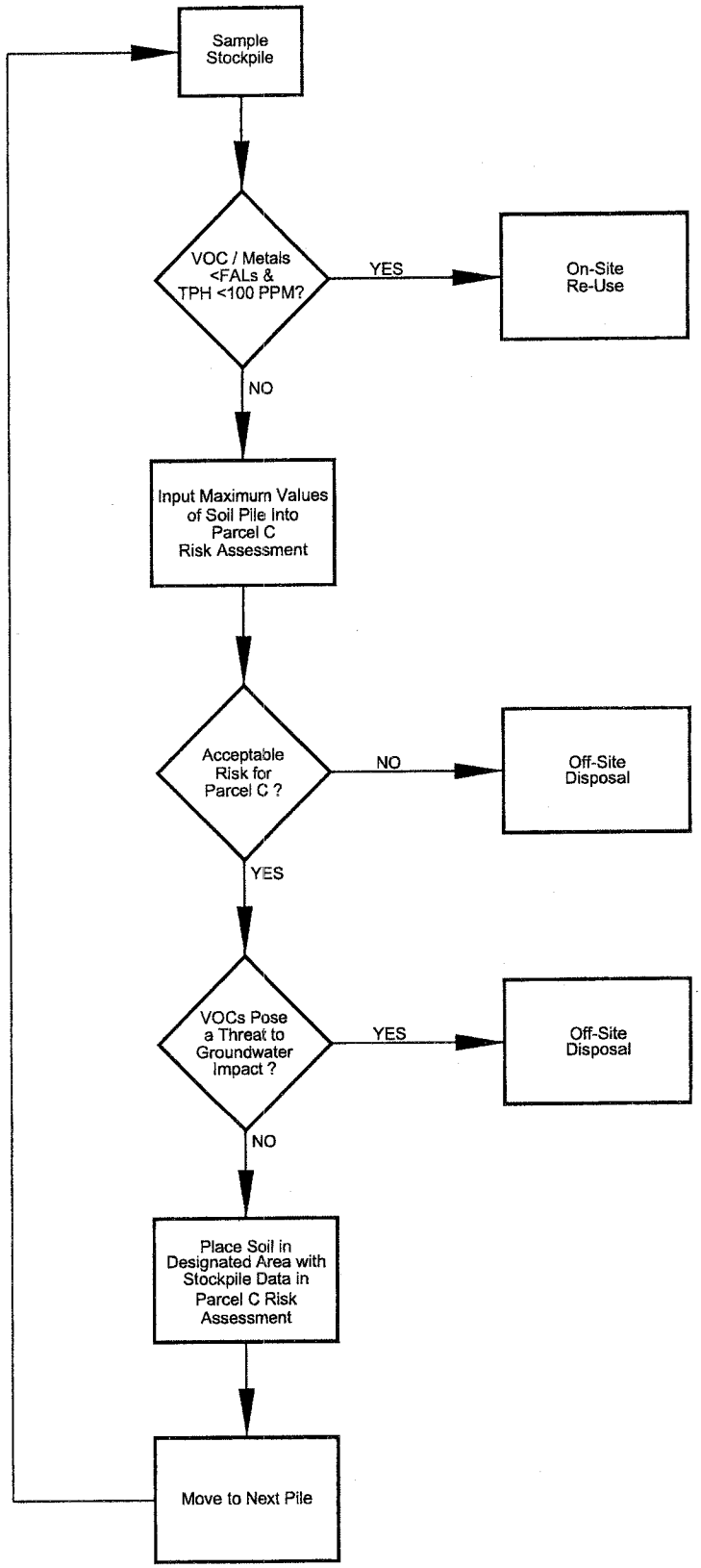
Figure 1	Soil Stockpile Reuse Protocol
Figure 2	Parcel C Exposure Areas
Table 1	Recommendations for Stockpiles SP-12 and SP-14
Appendix A	Compact Disc of Laboratory Reports
Appendix B	Soil Screening Level (SSL) Calculations

BOE-C6-0232993

Figures

BOE-C6-0232994

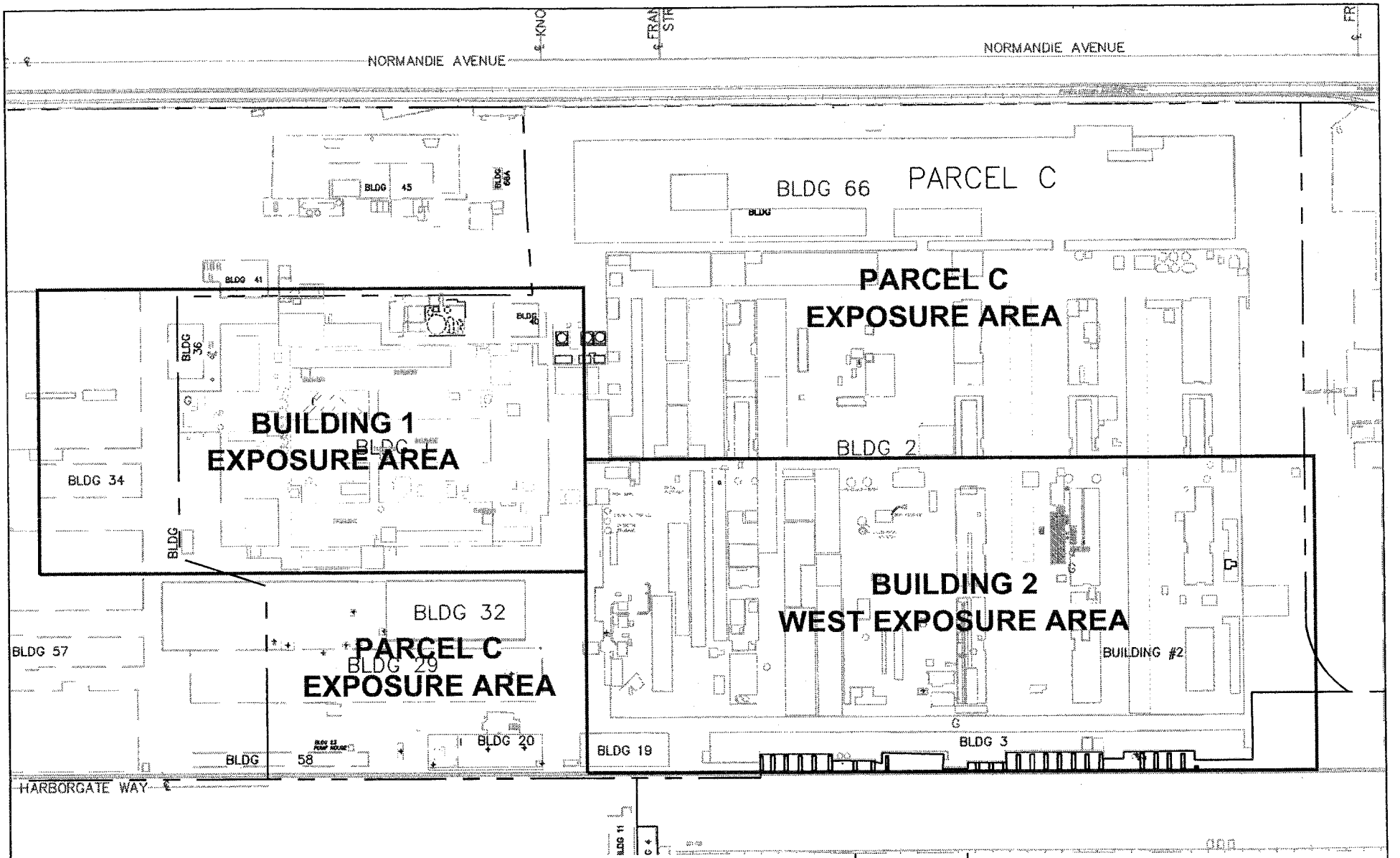
FORMER C-6 FACILITY
SOIL STOCKPILE RE-USE PROTOCOL



ENGLAND GEOSYSTEM
ENVIRONMENTAL ENGINEERING

FIGURE 1

HALEY & ALDRICH



FORMER BOEING C-6 FACILITY
LOS ANGELES, CALIFORNIA

HALEY & ALDRICH
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

PARCEL C
EXPOSURE AREAS

FIGURE 2

18 JULY, 2001

BOE-C6-0232996

Tables

BOE-C6-0232997

Table 1
Recommendations for Stockpiles SP-12 and SP-14
BRC Former C-6 Facility, Los Angeles, California

Stockpile No.	Sample IDs	Approx. Volume	Analyses	Acceptable for Onsite Reuse? (Yes or No)	Restrictions on Parcel C Placement?	Recommendations
SP-12A/H	SP_12H@1.2	~ 150 cy	VOCs, SVOCs, TPH	Yes	None	Acceptable for reuse in any portion of Parcel C. Addition of VOC and SVOC concentrations result in health risk below target risk levels, and detected VOCs do not pose a threat to groundwater quality at levels greater than MCLs.
SP-12B/I	SP_12B@1.5	~ 150 cy	VOCs, SVOCs, TPH	Yes	None	Acceptable for reuse in any portion of Parcel C. Addition of VOC and SVOC concentrations result in health risk below target risk levels, and detected VOCs do not pose a threat to groundwater quality at levels greater than MCLs.
SP-12C/J	SP_12J@1.5	~ 150 cy	VOCs, SVOCs, TPH, Metals, PCBs	No	NA	Not acceptable for onsite reuse due to elevated VOC results. Treat/dispose of offsite at a regulated facility.
SP-12D/K	SP_12D@2	~ 150 cy	VOCs, SVOCs, TPH, Metals, PCBs	No	NA	Not acceptable for onsite reuse due to elevated VOC results. Treat/dispose of offsite at a regulated facility.
SP-12E/L	SP_12L@1.5	~ 150 cy	VOCs, SVOCs, TPH	Yes	None	Acceptable for reuse in any portion of Parcel C. Addition of VOC and SVOC concentrations result in health risk below target risk levels, and detected VOCs do not pose a threat to groundwater quality at levels greater than MCLs.
SP-12F/M	SP_12F@1	~ 150 cy	VOCs, SVOCs, TPH	Yes	Not acceptable for placement outside of the Building 1 area	Acceptable for reuse in Building 1 area only. Addition of VOC and PAH concentrations result in health risk below target risk levels, and detected VOCs do not pose a threat to groundwater quality at levels greater than MCLs.

BOE-C6-0232998

Table 1
Recommendations for Stockpiles SP-12 and SP-14
BRC Former C-6 Facility, Los Angeles, California

SP-12G/N	SP_12N@1	~ 150 cy	VOCs, SVOCs, TPH	Yes	Not acceptable for placement outside of the Building 1 area	Acceptable for reuse in Building 1 area only. Addition of VOC and PAH concentrations result in health risk below target risk levels, and detected VOCs do not pose a threat to groundwater quality at levels greater than MCLs.
SP-14	SP_14_071901_6", SP_14_071901_1'	~ 250 cy	VOCs, SVOCs, PAHs, TPH	No	NA	Not acceptable for onsite reuse due to elevated PAH results. Treat/dispose of offsite at a regulated facility.

cy = cubic yards
NA = Not Applicable
PAH risk drivers include benzo(a)pyrene and dibenzo(a,h)anthracene.

Appendix A

BOE-C6-0233000

APPENDIX A

LABORATORY REPORTS

Appendix A
Boeing C-6 Lab Reports
SP12+SP14
MB • CD-R

Appendix B

BOE-C6-0233003

APPENDIX B

SOIL SCREENING LEVEL (SSL) CALCULATIONS

Site-specific Soil screening Levels (SSLs) Assuming Impacts at Depths of 12 Feet bgs

CAS No.	Chemical	MCL (mg/L)	K_{oc} [1,2]	f_{oc} [3]	K_d [4]	H' [1]	O_w [3]	O_a [3]	P_b [3]	AF_T	Site-specific SSL (mg/kg) at AF_T = 1	Site-specific SSL (mg/kg) at AF_T at D=53' x DAF
100-41-4	Ethylbenzene	7.00E-01	2.0E+02	5.19E-04	--	3.2E-01	2.53E-01	2.07E-01	1.44E+00	13	2.28E-01	6.12E+01
108-88-3	Toluene	1.50E-01	1.4E+02	5.19E-04	--	2.7E-01	2.53E-01	2.07E-01	1.44E+00	13	4.30E-02	1.16E+01
71-55-6	1,1,1-Trichloroethane (1,1,1-TCA)	2.00E-01	1.4E+02	5.19E-04	--	7.1E-01	2.53E-01	2.07E-01	1.44E+00	13	7.01E-02	1.88E+01
79-01-6	Trichloroethylene	5.00E-03	9.4E+01	5.19E-04	--	4.2E-01	2.53E-01	2.07E-01	1.44E+00	13	1.42E-03	3.82E-01
1330-20-7	Xylene (total)	1.75E+00	2.0E+02	5.19E-04	--	3.0E-01	2.53E-01	2.07E-01	1.44E+00	13	5.64E-01	1.52E+02

Notes:

An SSL was not derived for chemicals that do not have promulgated primary MCLs. These chemicals were not included in the assessment of potential for groundwater degradation at concentrations greater than MCLs.

Initial SSL derived using EPA July 1996 Soil Screening Guidance: Technical Background Document, where SSL = MCL (Koc * foc + (Ow + Oa*H'/Pb).
AF_{Tavg} calcuated from LARWQCB May 1996 Interim Site Assessment and Cleanup Guidebook which accounts for attenuation in the soil assuming site-specific soil particle distribution and distance between impacts and groundwater table of 53 feet, and default DAF for EPA SSLs of 20 as presented in EPA July 1996 Soil Screening Guidance: Technical Background Document which accounts for limited groundwater mixing.

AF_{Tavg} = Average attenuation factor based on site lithology (distance to groundwater = 53 feet, 30% sand, 57% silt, and 13% clay).

na = not available
K_{oc} = soil organic carbon-water partition coefficient (L/kg)
f_{oc} = site-specific organic carbon content of soil (kg/kg)
K_d = soil-water partition coefficient (L/kg), K_{oc} x f_{oc}
H' = dimensionless Henry's law constant
O_w = site-specific average water-filled porosity (by volume)
O_a = site-specific average air-filled porosity (by volume)
P_b = dry soil bulk density (kg/L)

[1] Obtained from EPA Region 9 preliminary remediation goal (PRG) physical-chemical data for volatile organic compounds, November 2000
[2] Obtained from Risk Assessment Information System (RAIS) Toxicity & Chemical-Specific Factors Data Base, January 2001, http://risk.lsd.ornl.gov/cgi-bin/tox/TOX_select?select=csf
[3] Site-specific average values
[4] Obtained from EPA Soil Screening Guidance: Technical Background Document (TBD), EPA/540/R-95/128, July 1996, http://www.epa.gov/oerrpage/superfund/resources/soil/toc.htm

Geotechnical Parameters for the BRC Former C-6 Facility, Los Angeles, California

Sample ID	Date Sampled	Depth (feet bgs)	Sieve Analysis (Soil Type)	Dry Bulk Density (kg/L)	Moisture Content (percent by weight)	Total Porosity (fraction by volume)	Air-filled Porosity (fraction by volume)	Water-filled Porosity (fraction by volume)	TOC* (mg/kg)	f_{oc} (fraction by weight)
EIA290176-001 (I-34-5)	1/29/2001	5	Silt	1.51	15.9	0.43	0.19	0.24	520	0.0005
EIA290176-010 (D-29-5)	1/29/2001	5	Silt	1.44	20.3	0.46	0.16	0.29	2350	0.0024
EIA29176-018 (I-25-5)	1/29/2001	5	Silt	1.34	17.8	0.49	0.26	0.24	690	0.0007
Average				**1.43**	**18.0**	**0.46**	**0.20**	**0.26**	**1187**	**0.0012**
EIA290176-004 (I-34-20)	1/29/2001	20	Silt	1.54	17.5	0.42	0.15	0.27	330	0.0003
EIA290176-012 (D-29-20)	1/29/2001	20	Silt	1.55	17.0	0.41	0.15	0.26	430	0.0004
EIA29176-021 (I-25-20)	1/29/2001	20	Silt	1.37	20.2	0.48	0.20	0.28	410	0.0004
Average				**1.49**	**18.2**	**0.44**	**0.17**	**0.27**	**390**	**0.0004**
EIA290176-007 (I-34-50)	1/29/2001	50	Fine sand	1.35	4.4	0.51	0.45	0.06	230	0.0002
EIA29176-015 (D-29-50)	1/29/2001	50	Fine sand	1.36	19.5	0.49	0.22	0.26	560	0.0006
EIA29176-024 (I-25-50)	1/29/2001	50	Silt	1.34	24.3	0.51	0.18	0.32	470	0.0005
Average				**1.35**	**16.1**	**0.50**	**0.28**	**0.22**	**420**	**0.0004**
Weighted Fraction by weight (depths 12 to 65 feet bgs)				1.44		0.46	0.21	0.25		0.0005

The weighted fraction by weight assumes the 5-foot sample is representative of the top 20 feet, the 20-foot sample of depths between 20 and 50 feet, and the 50-foot sample of depths between 50 and 65 feet bgs.

Notes:

The laboratory report will be provided as an appendix of the Soil Assessment Report which is being prepared by Kennedy/Jenks, Inc. and will be submitted to the RWQCB under separate cover.

The air-filled porosity values were calculated from gravimetric data, not volumetric data.

* f_{oc} = the weight fraction of organic carbon in soil = TOC/1,000,000

Soil Particle Size Distribution for the BRC Former C-6 Facility, Los Angeles, California

Sample ID	Date Sampled	Depth (feet bgs)	Sieve Analysis (Soil Type)	Median Grain Size (mm)	Particle Size Distribution, wt. Percent						
					Gravel	Sand Size				Silt	Clay
						Coarse	Medium	Fine	TOTAL		
EIA290176-001 (I-34-5)	1/29/2001	5	Silt	0.029	0.00	0.00	0.22	17.60	17.82	69.80	12.37
EIA290176-010 (D-29-5)	1/29/2001	5	Silt	0.027	0.00	0.00	0.02	17.00	17.02	68.41	14.58
EIA29176-018 (I-25-5)	1/29/2001	5	Silt	0.026	0.00	0.00	0.39	14.86	15.25	68.78	15.97
Average									**16.70**	**69.00**	**14.31**
EIA290176-004 (I-34-20)	1/29/2001	20	Silt	0.032	0.00	0.00	0.00	31.19	31.19	54.83	13.99
EIA290176-012 (D-29-20)	1/29/2001	20	Silt	0.036	0.00	0.00	0.90	27.59	28.49	59.67	11.85
EIA29176-021 (I-25-20)	1/29/2001	20	Silt	0.020	0.00	0.00	0.00	11.21	11.21	69.07	19.72
Average									**23.63**	**61.19**	**15.19**
EIA290176-007 (I-34-50)	1/29/2001	50	Fine sand	0.151	0.00	0.00	0.57	79.33	79.90	17.39	2.71
EIA29176-015 (D-29-50)	1/29/2001	50	Fine sand	0.083	0.00	0.00	3.26	47.93	51.19	39.79	9.01
EIA29176-024 (I-25-50)	1/29/2001	50	Silt	0.027	0.00	0.00	0.04	21.27	21.31	64.99	13.70
Average									**50.80**	**40.72**	**8.47**

Weighted Fraction by weight (depths 12 to 65 feet bgs)	0.30	0.57	0.13

The weighted fraction by weight assumes the 5-foot sample is representative of the top 20 feet, the 20-foot sample of depths between 20 and 50 feet, and the 50-foot sample of depths between 50 and 65 feet bgs.