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Appendix 2D
Recreational Based Cleanup Values

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APPENDIX 2D

Recreational Based Cleanup Values

NASA Supplemental EIS for Soil Cleanup Activities, SSFL, Ventura, California

Data Grouping	Parameter Name	Screening Level - HHRA Soil ^f	Units	Screening Level - ERA Soil ^f	Units
Aroclors	Aroclor 1016 ^a	3800	µg/kg	1200	µg/kg
Aroclors	Aroclor 1242 ^a	220	µg/kg	430	µg/kg
Aroclors	Aroclor 1248 ^a	220	µg/kg	64	µg/kg
Aroclors	Aroclor 1254 ^a	220	µg/kg	390	µg/kg
Aroclors	Aroclor 1260 ^a	230	µg/kg	250	µg/kg
Aroclors	Aroclor 5460 ^a	220	µg/kg	410	µg/kg
Aroclors	Co-Planar PCB TEQ (2005)	Not applicable	Not applicable	5	pg/g
Aroclors	PCBTEQM	4.7	pg/g	5	pg/g
Aroclors	PCBTEQM	4.7	pg/g	5	pg/g
Dioxins and Furans	2,3,7,8-TCDD TEQ	4.7	pg/g	5	pg/g
Dioxins and Furans	DIOXTEQM ^{b,c}	4.7	pg/g	5	pg/g
General Chemistry	Cyanides, Total	23	mg/kg	1.8	mg/kg
General Chemistry	Fluoride	3000	mg/kg	Not applicable	Not applicable
General Chemistry	Nitrogen, Nitrate (as N)	Not applicable	Not applicable	5200	mg/kg
General Chemistry	O-Phosphate as P	Not applicable	Not applicable	0.35	mg/kg
Metals	Aluminum	75000	mg/kg	440	mg/kg
Metals	Antimony	26	mg/kg	24	mg/kg
Metals	Arsenic	0.11	mg/kg	74	mg/kg
Metals	Barium	11000	mg/kg	1410	mg/kg
Metals	Beryllium	3	mg/kg	42	mg/kg
Metals	Boron	15000	mg/kg	100	mg/kg
Metals	Cadmium	5.2	mg/kg	0.56	mg/kg
Metals	Calcium	Not applicable	Not applicable	23	mg/kg
Metals	Chromium	36000	mg/kg	330	mg/kg
Metals	Chromium VI	0.3	mg/kg	30	mg/kg
Metals	Cobalt	23	mg/kg	850	mg/kg
Metals	Copper	3000	mg/kg	420	mg/kg
Metals	Lead	80	mg/kg	36	mg/kg
Metals	Lithium	150	mg/kg	170	mg/kg
Metals	Manganese	1100	mg/kg	10500	mg/kg
Metals	Mercury	8.8	mg/kg	0.29	mg/kg
Metals	Molybdenum	380	mg/kg	3.9	mg/kg
Metals	Nickel	490	mg/kg	84	mg/kg
Metals	Phosphorus	Not applicable	Not applicable	0.16	mg/kg
Metals	Selenium	380	mg/kg	7.2	mg/kg
Metals	Silver	230	mg/kg	220	mg/kg
Metals	Strontium	46000	mg/kg	1010	mg/kg
Metals	Thallium	0.76	mg/kg	12	mg/kg
Metals	Titanium	Not applicable	Not applicable	73	mg/kg
Metals	Vanadium	180	mg/kg	160	mg/kg
Metals	Zinc	23000	mg/kg	93	mg/kg
Metals	Zirconium	6.1	mg/kg	Not applicable	Not applicable
ORG	Dibutyltin	18000	µg/kg	Not applicable	Not applicable
Pesticides	4,4'-DDD	2500	µg/kg	850	µg/kg
Pesticides	4,4'-DDE	1700	µg/kg	280	µg/kg
Pesticides	4,4'-DDT	1800	µg/kg	580	µg/kg
Pesticides	Aldrin	34	µg/kg	570	µg/kg
Pesticides	Alpha-BHC	95	µg/kg	2900	µg/kg
Pesticides	Beta-BHC	330	µg/kg	2900	µg/kg
Pesticides	Chlordane	440	µg/kg	5600	µg/kg
Pesticides	Dieldrin	37	µg/kg	400	µg/kg
Pesticides	Endosulfan I	410000	µg/kg	4200	µg/kg
Pesticides	Endosulfan Sulfate	410000	µg/kg	4400	µg/kg

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Pesticides	Endrin	20000	µg/kg	79	µg/kg
Pesticides	Endrin Aldehyde	20000	µg/kg	92	µg/kg
Pesticides	Endrin ketone	20000	µg/kg	86	µg/kg
Pesticides	gamma-BHC	540	µg/kg	5600	µg/kg
Pesticides	Heptachlor	120	µg/kg	3600	µg/kg
Pesticides	Heptachlor Epoxide	61	µg/kg	6.5	µg/kg
Pesticides	Methoxychlor	340000	µg/kg	50000	µg/kg
Phthalates	Bis(2-ethylhexyl)phthalate	38000	µg/kg	65000	µg/kg
Phthalates	Butyl benzyl phthalate	280000	µg/kg	260000	µg/kg
Phthalates	Diethyl phthalate	49000000	µg/kg	23000	µg/kg
Phthalates	Dimethyl phthalate	49000000	µg/kg	45000	µg/kg
Phthalates	Di-n-butyl phthalate	6100000	µg/kg	1100	µg/kg
Phthalates	Di-n-octyl phthalate	610000	µg/kg	130000	µg/kg
Polycyclic Aromatic Hydrocarbon	1-Methylnaphthalene	16000	µg/kg	260000	µg/kg
Polycyclic Aromatic Hydrocarbon	2-Methylnaphthalene	220000	µg/kg	260000	µg/kg
Polycyclic Aromatic Hydrocarbon	Acenaphthene	3300000	µg/kg	12000	µg/kg
Polycyclic Aromatic Hydrocarbon	Acenaphthylene	3300000	µg/kg	3300	µg/kg
Polycyclic Aromatic Hydrocarbon	Anthracene	16000000	µg/kg	25000	µg/kg
Polycyclic Aromatic Hydrocarbon	Benzo(a)anthracene	1000	µg/kg	180000	µg/kg
Polycyclic Aromatic Hydrocarbon	Benzo(a)pyrene	16000	µg/kg	240000	µg/kg
Polycyclic Aromatic Hydrocarbon	Benzo(b)fluoranthene	1100	µg/kg	120000	µg/kg
Polycyclic Aromatic Hydrocarbon	Benzo(ghi)perylene	1600000	µg/kg	110000	µg/kg
Polycyclic Aromatic Hydrocarbon	Benzo(k)fluoranthene	11000	µg/kg	120000	µg/kg
Polycyclic Aromatic Hydrocarbon	Benzo[e]pyrene	1600000	µg/kg	120000	µg/kg
Polycyclic Aromatic Hydrocarbon	Chrysene	110000	µg/kg	130000	µg/kg
Polycyclic Aromatic Hydrocarbon	Dibenzo(a,h)anthracene	110	µg/kg	140000	µg/kg
Polycyclic Aromatic Hydrocarbon	Fluoranthene	2200000	µg/kg	930000	µg/kg
Polycyclic Aromatic Hydrocarbon	Fluorene	2200000	µg/kg	5400	µg/kg
Polycyclic Aromatic Hydrocarbon	Indeno(1,2,3-cd)pyrene	1100	µg/kg	120000	µg/kg
Polycyclic Aromatic Hydrocarbon	Naphthalene	1900	µg/kg	130000	µg/kg
Polycyclic Aromatic Hydrocarbon	PAHTEQM ^d	110	µg/kg	Not applicable	Not applicable
Polycyclic Aromatic Hydrocarbon	Perylene	1600000	µg/kg	220000	µg/kg
Polycyclic Aromatic Hydrocarbon	Phenanthrene	16000000	µg/kg	28000	µg/kg
Polycyclic Aromatic Hydrocarbon	Pyrene	1600000	µg/kg	140000	µg/kg
Semivolatile Organic Compound	2,4-Dimethylphenol	1200000	µg/kg	330000	µg/kg
Semivolatile Organic Compound	2,5-Dimethylfuran	9300	µg/kg	Not applicable	Not applicable
Semivolatile Organic Compound	2,6-bis(1,1-Dimethylethyl)-4-methylphenol	150000	µg/kg	Not applicable	Not applicable
Semivolatile Organic Compound	2-Chloronaphthalene	4900000	µg/kg	Not applicable	Not applicable
Semivolatile Organic Compound	2-Methylphenol	3000000	µg/kg	Not applicable	Not applicable
Semivolatile Organic Compound	3,5-Dimethyl phenol	61000	µg/kg	26000	µg/kg
Semivolatile Organic Compound	3+4-Methylphenol	6100000	µg/kg	Not applicable	Not applicable
Semivolatile Organic Compound	4-Methylphenol	6100000	µg/kg	43000	µg/kg
Semivolatile Organic Compound	Benzoic acid	240000000	µg/kg	45000	µg/kg
Semivolatile Organic Compound	Benzyl alcohol	6100000	µg/kg	45000	µg/kg
Semivolatile Organic Compound	Carbazole	6100000	µg/kg	15000	µg/kg
Semivolatile Organic Compound	Cresyl diphenylphosphate	1200000	µg/kg	Not applicable	Not applicable
Semivolatile Organic Compound	Dibenzofuran	72000	µg/kg	Not applicable	Not applicable
Semivolatile Organic Compound	n-Nitrosodimethylamine	2.3	µg/kg	79000	µg/kg
Semivolatile Organic Compound	n-Nitrosodiphenylamine	58000	µg/kg	28000	µg/kg
Semivolatile Organic Compound	Pentachlorophenol	960	µg/kg	10000	µg/kg
Semivolatile Organic Compound	Phenol	18000000	µg/kg	51000	µg/kg
Semivolatile Organic Compound	tert-Butyl alcohol	130000000	µg/kg	Not applicable	Not applicable
Volatile Organic Compound	1,1,1-Trichloroethane	1700000	µg/kg	6240000	µg/kg

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Volatiles Organic Compound	1,1,2,2-Tetrachloroethane	600	µg/kg	Not applicable	Not applicable
Volatiles Organic Compound	1,1,2-Trichloro-1,2,2-trifluoroethane	6700000	µg/kg	Not applicable	Not applicable
Volatiles Organic Compound	1,1,2-Trichloroethane	1100	µg/kg	100000	µg/kg
Volatiles Organic Compound	1,1-Dichloroethane	3600	µg/kg	Not applicable	Not applicable
Volatiles Organic Compound	1,1-Dichloroethene	83000	µg/kg	18000	µg/kg
Volatiles Organic Compound	1,2,3-Trichlorobenzene	40000	µg/kg	37000	µg/kg
Volatiles Organic Compound	1,2,4-Trichlorobenzene	24000	µg/kg	37000	µg/kg
Volatiles Organic Compound	1,2,4-Trimethylbenzene	300000	µg/kg	4000	µg/kg
Volatiles Organic Compound	1,2-Dibromo-3-chloropropane	22	µg/kg	1400	µg/kg
Volatiles Organic Compound	1,2-Dibromoethane (EDB)	36	µg/kg	Not applicable	Not applicable
Volatiles Organic Compound	1,2-Dichloro-1,1,2-trifluoroethane	6700000	µg/kg	Not applicable	Not applicable
Volatiles Organic Compound	1,2-Dichlorobenzene	1800000	µg/kg	130000	µg/kg
Volatiles Organic Compound	1,2-Dichloroethane	460	µg/kg	Not applicable	Not applicable
Volatiles Organic Compound	1,2-Dichloroethenes	18000	µg/kg	250000	µg/kg
Volatiles Organic Compound	1,2-Dichloropropane	1000	µg/kg	160000	µg/kg
Volatiles Organic Compound	1,2-Dichlorotetrafluoroethane	6700000	µg/kg	Not applicable	Not applicable
Volatiles Organic Compound	1,3,5-Trimethylbenzene	270000	µg/kg	4100	µg/kg
Volatiles Organic Compound	1,3-Dichlorobenzene	2600	µg/kg	110000	µg/kg
Volatiles Organic Compound	1,4-Dichlorobenzene	2600	µg/kg	28000	µg/kg
Volatiles Organic Compound	1,4-Dioxane (P-Dioxane)	4700	µg/kg	4600	µg/kg
Volatiles Organic Compound	2-Butanone (MEK)	27000000	µg/kg	21100000	µg/kg
Volatiles Organic Compound	2-Chloro-1,1,1-trifluoroethane	1200000	µg/kg	Not applicable	Not applicable
Volatiles Organic Compound	2-Chloroethyl vinyl ether	20	µg/kg	910000	µg/kg
Volatiles Organic Compound	2-Chlorotoluene	470000	µg/kg	63000	µg/kg
Volatiles Organic Compound	2-Hexanone	200000	µg/kg	170000	µg/kg
Volatiles Organic Compound	4-Ethyltoluene	Not applicable	Not applicable	Not applicable	Not applicable
Volatiles Organic Compound	4-Methyl-2-pentanone (MIBK)	33000000	µg/kg	45000	µg/kg
Volatiles Organic Compound	Acetone	61000000	µg/kg	230000	µg/kg
Volatiles Organic Compound	Benzene	330	µg/kg	730000	µg/kg
Volatiles Organic Compound	Benzyl Chloride	Not applicable	Not applicable	Not applicable	Not applicable
Volatiles Organic Compound	Bromobenzene	290000	µg/kg	43000	µg/kg
Volatiles Organic Compound	Bromodichloromethane	280	µg/kg	51000	µg/kg
Volatiles Organic Compound	Bromoform	18000	µg/kg	Not applicable	Not applicable
Volatiles Organic Compound	Bromomethane	6800	µg/kg	16000	µg/kg
Volatiles Organic Compound	Carbon Disulfide	770000	µg/kg	Not applicable	Not applicable
Volatiles Organic Compound	Carbon tetrachloride	98	µg/kg	Not applicable	Not applicable
Volatiles Organic Compound	Chlorobenzene	280000	µg/kg	43000	µg/kg
Volatiles Organic Compound	Chloroethane	14000000	µg/kg	Not applicable	Not applicable
Volatiles Organic Compound	Chloromethane	110000	µg/kg	16000	µg/kg
Volatiles Organic Compound	Chlorotrifluoroethylene	6700000	µg/kg	Not applicable	Not applicable
Volatiles Organic Compound	cis-1,2-Dichloroethene	18000	µg/kg	220000	µg/kg
Volatiles Organic Compound	cis-1,3-Dichloropropene	570	µg/kg	Not applicable	Not applicable
Volatiles Organic Compound	Dibromochloromethane	940	µg/kg	Not applicable	Not applicable
Volatiles Organic Compound	Dichlorodifluoromethane	87000	µg/kg	410000	µg/kg
Volatiles Organic Compound	Ethylbenzene	5800	µg/kg	240000	µg/kg
Volatiles Organic Compound	Formaldehyde	11000	µg/kg	380000	µg/kg
Volatiles Organic Compound	Hexachlorobutadiene	1200	µg/kg	Not applicable	Not applicable
Volatiles Organic Compound	Isopropanol	5600000	µg/kg	Not applicable	Not applicable
Volatiles Organic Compound	Isopropylbenzene	1900000	µg/kg	13000	µg/kg
Volatiles Organic Compound	m,p-Xylenes	550000	µg/kg	4200	µg/kg
Volatiles Organic Compound	Methylene chloride	11000	µg/kg	230000	µg/kg
Volatiles Organic Compound	Methyl-tert-butyl Ether (MTBE)	47000	µg/kg	Not applicable	Not applicable
Volatiles Organic Compound	n-butylbenzene	1200000	µg/kg	180000	µg/kg

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Volatiles Organic Compound	n-Octane	Not applicable	Not applicable	Not applicable	Not applicable
Volatiles Organic Compound	n-Propylbenzene	3800000	µg/kg	220000	µg/kg
Volatiles Organic Compound	o-Xylene	650000	µg/kg	4300	µg/kg
Volatiles Organic Compound	p-Isopropyltoluene	1900000	µg/kg	37000	µg/kg
Volatiles Organic Compound	sec-Butylbenzene	2200000	µg/kg	9800	µg/kg
Volatiles Organic Compound	Styrene	5600000	µg/kg	420000	µg/kg
Volatiles Organic Compound	tert-Butylbenzene	2200000	µg/kg	Not applicable	Not applicable
Volatiles Organic Compound	Tetrachloroethene	590	µg/kg	11000	µg/kg
Volatiles Organic Compound	Toluene	1100000	µg/kg	590000	µg/kg
Volatiles Organic Compound	Total 1,2-Dichloroethene	18000	µg/kg	250000	µg/kg
Volatiles Organic Compound	trans-1,2-Dichloroethene	130000	µg/kg	240000	µg/kg
Volatiles Organic Compound	trans-1,3-Dichloropropene	570	µg/kg	Not applicable	Not applicable
Volatiles Organic Compound	Trichloroethene	940	µg/kg	18000	µg/kg
Volatiles Organic Compound	Trichlorofluoromethane	1200000	µg/kg	850000	µg/kg
Volatiles Organic Compound	Trichloromethane (Chloroform)	320	µg/kg	190000	µg/kg
Volatiles Organic Compound	Vinyl Acetate	910000	µg/kg	Not applicable	Not applicable
Volatiles Organic Compound	Vinyl chloride	8.2	µg/kg	7800	µg/kg
Volatiles Organic Compound	Xylenes, Total	550000	µg/kg	4200	µg/kg

Notes:

- a Individual PCB coplanars and congeners are not listed in the table as they are accounted for under the Aroclor parameters.
- b DIOXINTEQM is listed in the LUT as 2,3,7,8-TCDD TEQ.
- c Individual dioxins and furans congeners included in the TEQ calculation (DIOXINTEQM) are not listed in the table; results were compared against the calculated TEQ, which takes the individual congeners into account.
- d PAHTEQM is calculated as benzo(a)pyrene TEQ. Benzo(a)pyrene equivalence was developed based on the sum of carcinogenic PAHs. To evaluate benzo(a)pyrene equivalence, carcinogenic PAHs need to meet respective background study MRLs.
- e Screening value shown reflects the accepted site background concentration and/or Look-up Table (LUT) screening value, which was greater than the risk-based screening value.
- f Alternative cleanups may implement soil, sediment, and soil gas remedial goals that vary; for the purpose of this document, screening values shown are reduced to soil media.

µg/kg = microgram(s) per kilogram

µg/m³ = microgram(s) per cubic meter

BHC = hexachlorocyclohexane

DDD = dichlorodiphenyldichloroethane

DDE = dichlorodiphenyldichloroethylene

DDT = dichlorodiphenyltrichloroethane

DIOXINTEQM = dioxins and furans toxic equivalency

ERA = ecological risk assessment

HHRA = human health risk assessment

mg/kg = milligram(s) per kilogram

MRL = method reporting limit

PAHTEQM = PAHs toxic equivalency

PCB = polychlorinated biphenyl

pg/g = picogram(s) per gram

TEQ = toxic equivalence quotient