APPENDIX 8.3
Toxicity Criteria

TABLE 8.3.1
TOXICITY CRITERIA FOR CHEMICALS OF POTENTIAL CONCERN - INORGANICS
MISSION BAY LANDFILL
SEA WORLD DRIVE
SAN DIEGO, CALIFORNIA

COPC	REFERENCE DOSES				CANCER SLOPE FACTORS			
	Oral Reference Dose (RfD_o)[a] (mg/kg-day)		Inhalation Reference Dose (RfD_i) (mg/kg-day)		Oral Slope Factor (CSF_o)[b] $(mg/kg\text{-}day)^{-1}$		Inhalation Slope Factor (CSF_i) $(mg/kg\text{-}day)^{-1}$	
Inorganics								
Antimony	4.0E-04	IRIS, 2005	2.0E-01	OEHHA/ARB, 2003[c]	NC	--	NC	--
Arsenic	3.0E-04	IRIS, 2005	8.6E-06	OEHHA, 2005	9.50E+00	OEHHA, 2005	1.20E+01	OEHHA, 2005
Barium	7.0E-02	IRIS, 2005	1.4E-04	USEPA, 2004	NC	--	NC	--
Beryllium	2.0E-03	IRIS, 2005	2.0E-06	OEHHA, 2005	NC	--	8.40E+00	OEHHA, 2005
Cadmium	5.0E-04	IRIS, 2005	5.7E-06	OEHHA, 2005	3.80E-01	OEHHA, 2005	1.50E+01	OEHHA, 2005
Chromium	No Data	--	No Data	--	NC	--	4.20E+01	IRIS, 2005
Hexavalent Chromium	3.0E-03	IRIS, 2005	5.7E-05	OEHHA, 2005	No Data	--	5.10E+02	OEHHA, 2005
Cobalt	2.0E-02	USEPA, 2004	5.7E-06	USEPA, 2004	NC	--	9.80E+00	USEPA, 2004
Copper	4.0E-02	USEPA, 2004	6.9E-04	USEPA, 2004	4.00E-02	USEPA, 2004	No Data	--
Iron	3.0E-02	USEPA, 2004	No Data	--	NC	--	NC	--
Mercury	3.0E-04	USEPA, 2004	2.6E-05	OEHHA, 2005	NC	--	NC	--
Molybdenum	5.0E-03	IRIS, 2005	No Data	--	NC	--	NC	--
Nickel	2.0E-02	IRIS, 2005	1.4E-05	OEHHA, 2005	NC	--	9.10E-01	OEHHA, 2005
Selenium	5.0E-03	IRIS, 2005	5.7E-03	OEHHA, 2005	NC	--	NC	--
Silver	5.0E-03	IRIS, 2005	5.0E-03	OEHHA, 2005	NC	--	NC	--
Vanadium	1.0E-03	USEPA, 2004	No Data	--	NC	--	NC	--
Zinc	3.0E-01	IRIS, 2005	1.0E-02	OEHHA/ARB, 2003[b]	NC	--	NC	--

COPC = chemical of potential concern
CSF_i = inhalation cancer slope factor
COPC = chemical of potential concern

EPC = exposure point concentration
NA = Not available; insufficient data
NC = Not a suspected carcinogen

RfD_o = oral reference dose
RfD_i = inhalation reference dose
"--" = not available or applicable

Notes:

a. In the absence of dermal toxicity values, oral reference doses and/or cancer slope factors were used to evaluate exposure dermal exposure.

b. Inhalation RfD calculated from chronic inhalation reference exposure level (REL).

References:

IRIS, 2005. Integrated Risk Information System (IRIS), USEPA online database. http://www.epa.gov/iris/.

OEHHA/ARB, 2003. Office of Environmental Health Hazard Assessment (OEHHA)/Air Resources Board (ARB), California Environmental Protection Agency (Cal/EPA), OEHHA./ARB Approved Chronic Reference Exposure Levels and Target Organs Table. December 4, 2003.

OEHHA, 2005. Online Toxicity Criteria Database, Cal/EPA online database. http://www.oehha.ca.gov/risk/chemicaldb/index.asp.

TABLE 8.3.2
TOXICITY CRITERIA FOR CHEMICALS OF POTENTIAL CONCERN - ORGANICS
MISSION BAY LANDFILL
SEA WORLD DRIVE
SAN DIEGO, CALIFORNIA

COPC	REFERENCE DOSES				CANCER SLOPE FACTORS			
	Oral Reference Dose (RfD_o)[a] (mg/kg-day)		Inhalation Reference Dose (RfD_i) (mg/kg-day)		Oral Slope Factor (CSF_o)[b] $(mg/kg\text{-}day)^{-1}$		Inhalation Slope Factor (CSF_i) $(mg/kg\text{-}day)^{-1}$	
Organics								
1,2-Dichlorobenzene	9.00E-02	IRIS, 2005	5.70E-02	USEPA, 2004	NC	--	NC	--
1,4-Dichlorobenzene	3.00E-02	NCEA	2.29E-01	OEHHA, 2005	5.4E-03	OEHHA, 2005	4.0E-02	OEHHA, 2005
1,2-Dichloropropane	1.10E-03	R	1.10E-03	IRIS, 2005	3.60E-02	OEHHA, 2005	3.60E-02	OEHHA, 2005
2-Butanone (Methyl Ethyl Ketone)	6.00E-01	IRIS, 2005	1.43E+00	IRIS, 2005	NC	--	NC	--
2-Methylnaphthalene	No Data	--	No Data	--	No Data	--	No Data	--
4,4-DDD	No Data	--	No Data	--	2.4E-01	OEHHA, 2005	2.40E+00	OEHHA, 2005
4,4-DDE	No Data	--	No Data	--	3.4E-01	OEHHA, 2005	3.40E-01	OEHHA, 2005
Acetone	9.00E-01	IRIS, 2005	9.00E-01	IRIS, 2005 [R]	NC	--	NC	--
Aldrin	3.00E-05	IRIS, 2005	3.00E-05	R	1.7E+01	OEHHA, 2005	1.70E+01	OEHHA, 2005
alpha-BHC	No Data	--	No Data	--	2.7E+00	OEHHA, 2005	2.7	OEHHA, 2005
alpha-Endosulfan I[1]	6.0E-03	IRIS, 2005	6.0E-03	R	No Data	--	No Data	--
Anthracene	3.0E-01	IRIS, 2005	3.0E-01	R	NC	--	NC	--
Benzene	4.0E-03	IRIS, 2005	1.7E-02	OEHHA, 2005	1.0E-01	OEHHA, 2005	1.00E-01	OEHHA, 2005
Benzo(a)anthracene[2]	3.0E-01	IRIS, 2005	3.0E-01	R	Evaluated as Benzo(a)pyrene Equivalent			
Benzo(a)pyrene	3.0E-02	IRIS, 2005	3.0E-02	R	1.2E+01	OEHHA, 2005	3.9E+00	OEHHA, 2005
Benzo(b)fluoranthene	4.0E-02	IRIS, 2005	4.0E-02	R	Evaluated as Benzo(a)pyrene Equivalent			
Benzo(ghi)perylene[3]	3.0E-02	IRIS, 2005	3.0E-02	R	NC	--	NC	--
Benzo(k)fluoranthene	4.0E-02	IRIS, 2005	4.0E-02	R	Evaluated as Benzo(a)pyrene Equivalent			
Beta-Endosufan[1]	6.0E-03	IRIS, 2005	6.0E-03	R	No Data	--	No Data	--
Bis(2-ethylhexyl)phthalate	2.0E-02	IRIS, 2005	2.0E-02	R	NC	--	NC	--
Butyl Benzyl Phthalate	2.0E-01	IRIS, 2005	2.0E-01	R	No Data	--	No Data	--
Chlorobenzene	2.00E-02	IRIS, 2005	2.86E-01	OEHHA, 2005	NC	--	NC	--
Chlorodifluoromethane (Freon 22)	1.4E+01	R	1.4E+01	IRIS, 2005	NC	--	NC	--
Chloroethane (Ethyl Chloride)	4.00E-01	USEPA, 2004	8.57E+00	OEHHA, 2005	2.9E-03	USEPA, 2004	2.90E-03	R
Chrysene	3.0E-02	IRIS, 2005	3.0E-02	R	Evaluated as Benzo(a)pyrene Equivalent			
cis-1,2-Dichloroethene	1.0E-02	USEPA, 2004	1.0E-02	USEPA, 2004	NC	--	NC	--
Dibenzo(a,h)anthracene	3.0E-01	IRIS, 2005	3.0E-01	R	Evaluated as Benzo(a)pyrene Equivalent			
Dibutylphthalate	1.0E-01	IRIS, 2005	1.0E-01	R	NC	--	NC	--
Dichlorodifluoromethane (Freon 12)	2.0E-01	USEPA, 2004	5.7E-02	USEPA, 2004	NC	--	NC	--
Dichlorofluoromethane (Freon 21)[4]	1.4E+01	R	1.4E+01	IRIS, 2005	NC	--	NC	--
Dieldrin	5.0E-05	IRIS, 2005	5.0E-05	R	1.6E+01	OEHHA, 2005	1.6E+01	OEHHA, 2005
Diethyl Ether	2.0E-01	IRIS, 2005	2.0E-01	R	No Data	--	No Data	--
Dioctylphthalate	2.0E-02	IRIS, 2005	2.0E-02	R	NC	--	NC	--
Diphenylamine	2.5E-02	IRIS, 2005	2.50E-02	R	NC	--	NC	--

TABLE 8.3.2
TOXICITY CRITERIA FOR CHEMICALS OF POTENTIAL CONCERN - ORGANICS
MISSION BAY LANDFILL
SEA WORLD DRIVE
SAN DIEGO, CALIFORNIA

COPC	REFERENCE DOSES				CANCER SLOPE FACTORS			
	Oral Reference Dose (RfD_o)[a] (mg/kg-day)		Inhalation Reference Dose (RfD_i) (mg/kg-day)		Oral Slope Factor (CSF_o)[b] $(mg/kg\text{-}day)^{-1}$		Inhalation Slope Factor (CSF_i) $(mg/kg\text{-}day)^{-1}$	
Ethylbenzene	1.00E-01	IRIS, 2005	5.71E-01	OEHHA, 2005	NC	--	NC	--
Fluorene	4.0E-02	IRIS, 2005	4.0E-02	R	NC	--	NC	--
Fluoranthene	4.0E-02	IRIS, 2005	4.0E-02	R	NC	--	NC	--
Heptachlor	5.0E-04	IRIS, 2005	5.0E-04	R	4.1E+00	OEHHA, 2005	4.10E+00	OEHHA, 2005
Hydrogen Sulfide	3.00E-03	USEPA, 2004	5.71E-04	IRIS, 2005	NC	--	NC	--
Methylene Chloride	6.0E-02	IRIS, 1005	1.1E-01	OEHHA, 2005	1.4E-02	OEHHA, 2005	3.50E-03	OEHHA, 2005
Methyl Tert-Butyl Ether	2.3E+00	R	2.3E+00	OEHHA, 2005	1.8E-03	OEHHA, 2005	9.10E-04	OEHHA, 2005
n-Butane[5]	No Data	--	2.0E+00	OEHHA, 2005	NC	--	NC	--
n-Hexane	No Data	--	2.0E+00	OEHHA, 2005	NC	--	NC	--
Pentane[5]	No Data	--	2.0E+00	OEHHA, 2005	NC	--	NC	--
Propane[5]	No Data	--	2.0E+00	OEHHA, 2005	NC	--	NC	--
Phenanthrene[6]	3.0E-01	IRIS, 2005	3.0E-01	R	NC	--	NC	--
Pyrene	3.0E-02	IRIS, 2005	3.0E-02	R	NC	--	NC	--
Toluene	2.0E-01	IRIS, 2005	8.6E-02	OEHHA, 2005	NC	--	NC	--
Total Non-Methane Hydrocarbons as Methane	No Data	--	No Data	--	NC	--	NC	--
Trichloroethene	3.00E-04	USEPA, 2004	1.71E-01	OEHHA, 2005	1.3E-02	OEHHA, 2005	7.00E-03	OEHHA, 2005
Vinyl Chloride	3.9E-03	IRIS, 2005	2.9E-02	IRIS, 2005	2.7E-01	OEHHA, 2005	2.70E-01	OEHHA, 2005
Total Xylenes	2.00E-01	IRIS, 2005	2.00E-01	OEHHA, 2005	NC	--	NC	--

Abbreviations:

COPC = chemical of potential concern
CSF_o = oral cancer slope factor
CSF_i = inhalation cancer slope factor
COPC = chemical of potential concern
EPC = exposure point concentration
mg/kg-day = milligrams per kilogram body weight/day
NA = Not available; insufficient data
NC = Not a suspected carcinogen
RfD_o = oral reference dose
RfD_i = inhalation reference dose
"--" = not available or applicable

Notes:

a. In the absence of dermal toxicity values, oral reference doses and/or cancer slope factors were used to evaluate exposure dermal exposure.
b. Inhalation RfD calculated from chronic inhalation reference exposure level (REL).
1. Reference doses not available for alpha-endosulfan I and beta-endosulfan; references doses for the surrogate compound endosulfan used.
2. Reference dose not available for benzo(a)anthracene; reference dose for the surrogate compound anthracene used.
3. Reference dose not available for benzo(ghi)perylene; reference dose for the surrogate compound pyrene used.
4. Reference dose not available for Dichlorofluoromethane (Freon 21); reference dose for the surrogate compound chlorodifluoromethane (Freon 22) used.
5. Reference doses not available for n-butane, pentane, propane; reference dose for the surrogate compound n-hexane used.
6. Reference dose not available for phenanthrene; reference dose for the surrogate compound anthracene used.

References:

IRIS, 2005. Integrated Risk Information System (IRIS), USEPA online database. http://www.epa.gov/iris/.
OEHHA/ARB, 2003. Office of Environmental Health Hazard Assessment (OEHHA)/Air Resources Board (ARB), California Environmental Protection Agency (Cal/EPA), OEHHA./ARB Approved Chronic Reference Exposure Levels and Target Organs Table. December 4, 2003.
OEHHA, 2005. Online Toxicity Criteria Database, Cal/EPA online database. http://www.oehha.ca.gov/risk/chemicaldb/index.asp.