

Appendix 7-6 Detailed Cumulative Risk Impact Assessment Results for Marine Mammals

Table 1a Pollutants Concentration at edge of ZID and Preys (Scenario 1)

Pollutants	C/D Effluent Conc. (mg/L)	Ambient Seawater Conc. (mg/L)	Conc. at edge of ZID (mg/L) – 10%tile dilution factor	Bioconc. Factor (water-to-fish) (L/kg)	Food Chain Multiplier (Trophic Level 4)	Conc. in Fish (mg/kg)	Bioconc. Factor (water-to-invertebrates) (L/kg)	Food Chain Multiplier (Trophic Level 3)	Conc. in Shellfish (mg/kg)
Chlorination By-products (COCs)	Refer to Appendix 7-3								
Aluminium	0.0159	0.0156	1.56E-02	2.7	1	4.21E-02	0.13	1	2.03E-03
Antimony	0.000721	0.000258	2.67E-04	40	1	1.07E-02	7	1	1.87E-03
Barium	0.0232	0.00665	6.96E-03	633	1	4.41E+00	200	1	1.39E+00
Chromium III	0.00958	0.00028	4.55E-04	19	1	8.65E-03	0.11	1	5.01E-05
Copper	0.00859	0.00002	1.82E-04	710	1	1.29E-01	3718	1	6.76E-01
Lead	0.000128	0.000055	5.64E-05	0.09	1	5.07E-06	5059	1	2.85E-01
Nickel	0.0262	0.00077	1.25E-03	78	1	9.75E-02	28	1	3.50E-02
Selenium	0.00031	0.00007	7.45E-05	129	1	9.61E-03	1262	1	9.41E-02
Silver	0.000182	0.000006	9.32E-06	87.7	1	8.17E-04	298	1	2.78E-03
Tin	0.000844	0.00014	1.53E-04	138	1	2.12E-02	138	1	2.12E-02
Vanadium	0.0295	0.00173	2.25E-03	-	-	-	-	-	-
Zinc	0.0141	0.00237	2.59E-03	2060	1	5.34E+00	4758	1	1.23E+01
Ammonia	22	0.23	6.41E-01	-	-	-	-	-	-
TCDD	1E-10	3.9E-11	4.02E-11	34400	27	3.73E-05	1560	14	8.77E-07
Toluene	0.012	0	2.26E-04	171	1	3.87E-02	11.6	1	2.63E-03
Diazinon	0.000048	0	9.06E-07	171	1	1.55E-04	94.3	1.2	1.02E-04
Malathion	0.000031	0	5.85E-07	13.1	1	7.66E-06	6.12	1	3.58E-06

Table 1b Pollutant Concentrations at edge of ZID and Preys (Scenario 2)

Pollutants	C/D Effluent Conc. (mg/L)	Ambient Seawater Conc. (mg/L)	Conc. at edge of ZID (mg/L) – 10%tile dilution factor	Bioconc. Factor (water-to-fish) (L/kg)	Food Chain Multiplier (Trophic Level 4)	Conc. in Fish (mg/kg)	Bioconc. Factor (water-to-invertebrates) (L/kg)	Food Chain Multiplier (Trophic Level 3)	Conc. in Shellfish (mg/kg)
Chlorination By-products (COCs)	Refer to Appendix 7-3								
Aluminium	0.0159	0.0156	1.56E-02	2.7	1	4.21E-02	0.13	1	2.03E-03
Antimony	0.000721	0.000258	2.67E-04	40	1	1.07E-02	7	1	1.87E-03
Barium	0.0232	0.00665	6.96E-03	633	1	4.41E+00	200	1	1.39E+00
Chromium III	0.00958	0.00028	4.55E-04	19	1	8.65E-03	0.11	1	5.01E-05
Copper	0.00859	0.00002	1.82E-04	710	1	1.29E-01	3718	1	6.76E-01
Lead	0.000128	0.000055	5.64E-05	0.09	1	5.07E-06	5059	1	2.85E-01
Nickel	0.0262	0.00077	1.25E-03	78	1	9.75E-02	28	1	3.50E-02
Selenium	0.00031	0.00007	7.45E-05	129	1	9.61E-03	1262	1	9.41E-02
Silver	0.000182	0.000006	9.32E-06	87.7	1	8.17E-04	298	1	2.78E-03
Tin	0.000844	0.00014	1.53E-04	138	1	2.12E-02	138	1	2.12E-02
Vanadium	0.0295	0.00173	2.25E-03	-	-	-	-	-	-
Zinc	0.0141	0.00237	2.59E-03	2060	1	5.34E+00	4758	1	1.23E+01
Ammonia	22	0.23	6.41E-01	-	-	-	-	-	-
TCDD	1E-10	3.9E-11	4.02E-11	34400	27	3.73E-05	1560	14	8.77E-07
Toluene	0.012	0	2.26E-04	171	1	3.87E-02	11.6	1	2.63E-03
Diazinon	0.000048	0	9.06E-07	171	1	1.55E-04	94.3	1.2	1.02E-04
Malathion	0.000031	0	5.85E-07	13.1	1	7.66E-06	6.12	1	3.58E-06

Table 1c Pollutant Concentrations at edge of ZID and Preys (Scenario 3)

Pollutants	C/D Effluent Conc. (mg/L)	Ambient Seawater Conc. (mg/L)	Conc. at edge of ZID (mg/L) – 10%tile dilution factor	Bioconc. Factor (water-to-fish) (L/kg)	Food Chain Multiplier (Trophic Level 4)	Conc. in Fish (mg/kg)	Bioconc. Factor (water-to-invertebrates) (L/kg)	Food Chain Multiplier (Trophic Level 3)	Conc. in Shellfish (mg/kg)
Chlorination By-products (COCs)	Refer to Appendix 7-3								
Aluminium	0.0159	0.0156	1.56E-02	2.7	1	4.21E-02	0.13	1	2.03E-03
Antimony	0.000721	0.000258	2.67E-04	40	1	1.07E-02	7	1	1.87E-03
Barium	0.0232	0.00665	6.99E-03	633	1	4.42E+00	200	1	1.40E+00
Chromium III	0.00958	0.00028	4.70E-04	19	1	8.93E-03	0.11	1	5.17E-05
Copper	0.00859	0.00002	1.95E-04	710	1	1.38E-01	3718	1	7.25E-01
Lead	0.000128	0.000055	5.65E-05	0.09	1	5.08E-06	5059	1	2.86E-01
Nickel	0.0262	0.00077	1.29E-03	78	1	1.01E-01	28	1	3.61E-02
Selenium	0.00031	0.00007	7.49E-05	129	1	9.66E-03	1262	1	9.45E-02
Silver	0.000182	0.000006	9.59E-06	87.7	1	8.41E-04	298	1	2.86E-03
Tin	0.000844	0.00014	1.54E-04	138	1	2.13E-02	138	1	2.13E-02
Vanadium	0.0295	0.00173	2.30E-03	-	-	-	-	-	-
Zinc	0.0141	0.00237	2.61E-03	2060	1	5.38E+00	4758	1	1.24E+01
Ammonia	22	0.23	6.74E-1	-	-	-	-	-	-
TCDD	1E-10	3.9E-11	4.02E-11	34400	27	3.74E-05	1560	14	8.79E-07
Toluene	0.012	0	2.45E-04	171	1	4.19E-02	11.6	1	2.84E-03
Diazinon	0.000048	0	9.80E-07	171	1	1.68E-04	94.3	1.2	1.11E-04
Malathion	0.000031	0	6.33E-07	13.1	1	8.29E-06	6.12	1	3.87E-06

Table 1d Pollutants Concentration at edge of ZID and Preys (Scenario 4)

Pollutants	C/D Effluent Conc. (mg/L)	Ambient Seawater Conc. (mg/L)	Conc. at edge of ZID (mg/L) – 10%tile dilution factor	Bioconc. Factor (water-to-fish) (L/kg)	Food Chain Multiplier (Trophic Level 4)	Conc. in Fish (mg/kg)	Bioconc. Factor (water-to-invertebrates) (L/kg)	Food Chain Multiplier (Trophic Level 3)	Conc. in Shellfish (mg/kg)
Chlorination By-products (COCs)	Refer to Appendix 7-3								
Aluminium	0.0159	0.0156	1.56E-02	2.7	1	4.21E-02	0.13	1	2.03E-03
Antimony	0.000721	0.000258	2.68E-04	40	1	1.07E-02	7	1	1.88E-03
Barium	0.0232	0.00665	7.01E-03	633	1	4.44E+00	200	1	1.40E+00
Chromium III	0.00958	0.00028	4.82E-04	19	1	9.16E-03	0.11	1	5.30E-05
Copper	0.00859	0.00002	2.06E-04	710	1	1.46E-01	3718	1	7.67E-01
Lead	0.000128	0.000055	5.66E-05	0.09	1	5.09E-06	5059	1	2.86E-01
Nickel	0.0262	0.00077	1.32E-03	78	1	1.03E-01	28	1	3.70E-02
Selenium	0.00031	0.00007	7.52E-05	129	1	9.70E-03	1262	1	9.49E-02
Silver	0.000182	0.000006	9.83E-06	87.7	1	8.62E-04	298	1	2.93E-03
Tin	0.000844	0.00014	1.55E-04	138	1	2.14E-02	138	1	2.14E-02
Vanadium	0.0295	0.00173	2.33E-03	-	-	-	-	-	-
Zinc	0.0141	0.00237	2.63E-03	2060	1	5.41E+00	4758	1	1.25E+01
Ammonia	22	0.23	7.03E-01	-	-	-	-	-	-
TCDD	1E-10	3.9E-11	4.03E-11	34400	27	3.75E-05	1560	14	8.81E-07
Toluene	0.012	0	2.61E-04	171	1	4.46E-02	11.6	1	3.03E-03
Diazinon	0.000048	0	1.04E-06	171	1	1.78E-04	94.3	1.2	1.18E-04
Malathion	0.000031	0	6.74E-07	13.1	1	8.83E-06	6.12	1	4.12E-06

Table 1e Pollutant Concentrations at edge of ZID and Preys (Scenario 5)

Pollutants	C/D Effluent Conc. (mg/L)	Ambient Seawater Conc. (mg/L)	Conc. at edge of ZID (mg/L) – 10%tile dilution factor	Bioconc. Factor (water-to-fish) (L/kg)	Food Chain Multiplier (Trophic Level 4)	Conc. in Fish (mg/kg)	Bioconc. Factor (water-to-invertebrates) (L/kg)	Food Chain Multiplier (Trophic Level 3)	Conc. in Shellfish (mg/kg)
Chlorination By-products (COCs)	Refer to Appendix 7-3								
Antimony	0.000721	0.000258	2.69E-04	40	1	1.08E-02	7	1	1.89E-03
Barium	0.0232	0.00665	7.02E-03	633	1	4.44E+00	200	1	1.40E+00
Chromium III	0.00958	0.00028	4.57E-04	19	1	8.69E-03	0.11	1	5.03E-05
Copper	0.00859	0.00002	1.64E-04	710	1	1.16E-01	3718	1	6.09E-01
Nickel	0.0262	0.00077	1.24E-03	78	1	9.66E-02	28	1	3.47E-02
Selenium	0.00031	0.00007	7.13E-05	129	1	9.20E-03	1262	1	9.00E-02
Silver	0.000182	0.000006	8.02E-06	87.7	1	7.04E-04	298	1	2.39E-03
Tin	0.000844	0.00014	1.47E-04	138	1	2.03E-02	138	1	2.03E-02
Vanadium	0.0295	0.00173	2.37E-03	-	-	-	-	-	-
Zinc	0.0141	0.00237	2.53E-03	2060	1	5.21E+00	4758	1	1.20E+01
Ammonia	4.2	0.23	3.16E-01	-	-	-	-	-	-
TCDD	1E-10	3.9E-11	3.95E-11	34400	27	3.67E-05	1560	14	8.63E-07
Diazinon	0.000048	0	1.26E-06	171	1	2.16E-04	94.3	1.2	1.43E-04
Malathion	0.000031	0	3.26E-07	13.1	1	4.27E-06	6.12	1	2.00E-06

Table 2a Exposure of Pollutants by Marine Mammals (Scenario 1)

Pollutants	Conc. at edge of ZID (mg/L)	Conc. in Fish (mg/kg)	Conc. in Shellfish (mg/kg)	Dolphins			Porpoises			Dolphins	Porpoises
				Daily Exposure via Ingestion of Fish (mg/kg-d)	Daily Exposure via Ingestion of Shellfish (mg/kg-d)	Daily Exposure via Ingestion of Seawater (mg/kg-d)	Total Daily Exposure (mg/kg-d)	Daily Exposure via Ingestion of Shellfish (mg/kg-d)	Daily Exposure via Ingestion of Seawater (mg/kg-d)	Total Daily Exposure (mg/kg-d)	Total Daily Exposure (mg/kg-d)
Chlorination By-products (COCs)	Refer to Appendix7-3										
Aluminium	1.56E-02	4.21E-02	2.03E-03	6.16E-04	3.30E-06	4.88E-05	2.37E-04	1.14E-05	2.93E-05	6.68E-04	2.78E-04
Antimony	2.67E-04	1.07E-02	1.87E-03	1.56E-04	3.03E-06	8.34E-07	6.00E-05	1.05E-05	5.00E-07	1.60E-04	7.10E-05
Barium	6.96E-03	4.41E+00	1.39E+00	6.45E-02	2.26E-03	2.18E-05	2.48E-02	7.83E-03	1.31E-05	6.67E-02	3.26E-02
Chromium III	4.55E-04	8.65E-03	5.01E-05	1.27E-04	8.14E-08	1.42E-06	4.87E-05	2.82E-07	8.54E-07	1.28E-04	4.98E-05
Copper	1.82E-04	1.29E-01	6.76E-01	1.89E-03	1.10E-03	5.68E-07	7.26E-04	3.80E-03	3.41E-07	2.99E-03	4.53E-03
Lead	5.64E-05	5.07E-06	2.85E-01	7.42E-08	4.63E-04	1.76E-07	2.85E-08	1.60E-03	1.06E-07	4.64E-04	1.60E-03
Nickel	1.25E-03	9.75E-02	3.50E-02	1.43E-03	5.69E-05	3.91E-06	5.48E-04	1.97E-04	2.34E-06	1.49E-03	7.48E-04
Selenium	7.45E-05	9.61E-03	9.41E-02	1.41E-04	1.53E-04	2.33E-07	5.41E-05	5.29E-04	1.40E-07	2.94E-04	5.83E-04
Silver	9.32E-06	8.17E-04	2.78E-03	1.20E-05	4.51E-06	2.91E-08	4.60E-06	1.56E-05	1.75E-08	1.65E-05	2.02E-05
Tin	1.53E-04	2.12E-02	2.12E-02	3.09E-04	3.44E-05	4.79E-07	1.19E-04	1.19E-04	2.87E-07	3.44E-04	2.38E-04
Vanadium	2.25E-03	-	-	-	-	7.04E-06	-	-	4.23E-06	7.04E-06	4.23E-06
Zinc	2.59E-03	5.34E+00	1.23E+01	7.81E-02	2.00E-02	8.10E-06	3.00E-02	6.94E-02	4.86E-06	9.81E-02	9.94E-02
Ammonia	6.41E-01	-	-	-	-	2.00E-03	-	-	1.20E-03	2.00E-03	1.20E-03
TCDD	4.02E-11	3.73E-05	8.77E-07	5.45E-07	1.42E-09	1.25E-13	2.10E-07	4.93E-09	7.53E-14	5.47E-07	2.15E-07
Toluene	2.26E-04	3.87E-02	2.63E-03	5.66E-04	4.27E-06	7.08E-07	2.18E-04	1.48E-05	4.25E-07	5.71E-04	2.33E-04
Diazinon	9.06E-07	1.55E-04	1.02E-04	2.26E-06	1.67E-07	2.83E-09	8.71E-07	5.76E-07	1.70E-09	2.43E-06	1.45E-06
Malathion	5.85E-07	7.66E-06	3.58E-06	1.12E-07	5.82E-09	1.83E-09	4.31E-08	2.01E-08	1.10E-09	1.20E-07	6.43E-08

Table 2b Exposure of Pollutants by Marine Mammals (Scenario 2)

Pollutants	Conc. at edge of ZID (mg/L)	Conc. in Fish (mg/kg)	Conc. in Shellfish (mg/kg)	Dolphins			Porpoises			Dolphins	Porpoises
				Daily Exposure via Ingestion of Fish (mg/kg-d)	Daily Exposure via Ingestion of Shellfish (mg/kg-d)	Daily Exposure via Ingestion of Seawater (mg/kg-d)	Total Daily Exposure (mg/kg-d)	Daily Exposure via Ingestion of Shellfish (mg/kg-d)	Daily Exposure via Ingestion of Seawater (mg/kg-d)	Total Daily Exposure (mg/kg-d)	Total Daily Exposure (mg/kg-d)
Chlorination By-products (COCs)	Refer to Appendix 7-3										
Aluminium	1.56E-02	4.21E-02	2.03E-03	6.16E-04	3.30E-06	4.88E-05	2.37E-04	1.14E-05	2.93E-05	6.68E-04	2.78E-04
Antimony	2.67E-04	1.07E-02	1.87E-03	1.56E-04	3.03E-06	8.34E-07	6.00E-05	1.05E-05	5.00E-07	1.60E-04	7.10E-05
Barium	6.96E-03	4.41E+00	1.39E+00	6.45E-02	2.26E-03	2.18E-05	2.48E-02	7.83E-03	1.31E-05	6.67E-02	3.26E-02
Chromium III	4.55E-04	8.65E-03	5.01E-05	1.27E-04	8.14E-08	1.42E-06	4.87E-05	2.82E-07	8.54E-07	1.28E-04	4.98E-05
Copper	1.82E-04	1.29E-01	6.76E-01	1.89E-03	1.10E-03	5.68E-07	7.26E-04	3.80E-03	3.41E-07	2.99E-03	4.53E-03
Lead	5.64E-05	5.07E-06	2.85E-01	7.42E-08	4.63E-04	1.76E-07	2.85E-08	1.60E-03	1.06E-07	4.64E-04	1.60E-03
Nickel	1.25E-03	9.75E-02	3.50E-02	1.43E-03	5.69E-05	3.91E-06	5.48E-04	1.97E-04	2.34E-06	1.49E-03	7.48E-04
Selenium	7.45E-05	9.61E-03	9.41E-02	1.41E-04	1.53E-04	2.33E-07	5.41E-05	5.29E-04	1.40E-07	2.94E-04	5.83E-04
Silver	9.32E-06	8.17E-04	2.78E-03	1.20E-05	4.51E-06	2.91E-08	4.60E-06	1.56E-05	1.75E-08	1.65E-05	2.02E-05
Tin	1.53E-04	2.12E-02	2.12E-02	3.09E-04	3.44E-05	4.79E-07	1.19E-04	1.19E-04	2.87E-07	3.44E-04	2.38E-04
Vanadium	2.25E-03	-	-	-	-	7.04E-06	-	-	4.23E-06	7.04E-06	4.23E-06
Zinc	2.59E-03	5.34E+00	1.23E+01	7.81E-02	2.00E-02	8.10E-06	3.00E-02	6.94E-02	4.86E-06	9.81E-02	9.94E-02
Ammonia	6.41E-01	-	-	-	-	2.00E-03	-	-	1.20E-03	2.00E-03	1.20E-03
TCDD	4.02E-11	3.73E-05	8.77E-07	5.45E-07	1.42E-09	1.25E-13	2.10E-07	4.93E-09	7.53E-14	5.47E-07	2.15E-07
Toluene	2.26E-04	3.87E-02	2.63E-03	5.66E-04	4.27E-06	7.08E-07	2.18E-04	1.48E-05	4.25E-07	5.71E-04	2.33E-04
Diazinon	9.06E-07	1.55E-04	1.02E-04	2.26E-06	1.67E-07	2.83E-09	8.71E-07	5.76E-07	1.70E-09	2.43E-06	1.45E-06
Malathion	5.85E-07	7.66E-06	3.58E-06	1.12E-07	5.82E-09	1.83E-09	4.31E-08	2.01E-08	1.10E-09	1.20E-07	6.43E-08

Table 2c Exposure of Pollutants by Marine Mammals (Scenario 3)

Pollutants	Conc. at edge of ZID (mg/L)	Conc. in Fish (mg/kg)	Conc. in Shellfish (mg/kg)	Dolphins			Porpoises			Dolphins	Porpoises
				Daily Exposure via Ingestion of Fish (mg/kg-d)	Daily Exposure via Ingestion of Shellfish (mg/kg-d)	Daily Exposure via Ingestion of Seawater (mg/kg-d)	Total Daily Exposure (mg/kg-d)	Daily Exposure via Ingestion of Shellfish (mg/kg-d)	Daily Exposure via Ingestion of Seawater (mg/kg-d)	Total Daily Exposure (mg/kg-d)	Total Daily Exposure (mg/kg-d)
Chlorination By-products (COCs)	Refer to Appendix 7-3										
Aluminium	1.56E-02	4.21E-02	2.03E-03	6.16E-04	3.30E-06	4.88E-05	2.37E-04	1.14E-05	2.93E-05	6.68E-04	2.78E-04
Antimony	2.67E-04	1.07E-02	1.87E-03	1.56E-04	3.04E-06	8.36E-07	6.02E-05	1.05E-05	5.01E-07	1.60E-04	7.12E-05
Barium	6.99E-03	4.42E+00	1.40E+00	6.47E-02	2.27E-03	2.18E-05	2.49E-02	7.86E-03	1.31E-05	6.70E-02	3.28E-02
Chromium III	4.70E-04	8.93E-03	5.17E-05	1.31E-04	8.40E-08	1.47E-06	5.02E-05	2.91E-07	8.81E-07	1.32E-04	5.14E-05
Copper	1.95E-04	1.38E-01	7.25E-01	2.02E-03	1.18E-03	6.09E-07	7.78E-04	4.08E-03	3.65E-07	3.20E-03	4.85E-03
Lead	5.65E-05	5.08E-06	2.86E-01	7.44E-08	4.64E-04	1.77E-07	2.86E-08	1.61E-03	1.06E-07	4.65E-04	1.61E-03
Nickel	1.29E-03	1.01E-01	3.61E-02	1.47E-03	5.86E-05	4.03E-06	5.66E-04	2.03E-04	2.42E-06	1.53E-03	7.71E-04
Selenium	7.49E-05	9.66E-03	9.45E-02	1.41E-04	1.54E-04	2.34E-07	5.43E-05	5.32E-04	1.40E-07	2.95E-04	5.86E-04
Silver	9.59E-06	8.41E-04	2.86E-03	1.23E-05	4.64E-06	3.00E-08	4.73E-06	1.61E-05	1.80E-08	1.70E-05	2.08E-05
Tin	1.54E-04	2.13E-02	2.13E-02	3.12E-04	3.46E-05	4.82E-07	1.20E-04	1.20E-04	2.89E-07	3.47E-04	2.40E-04
Vanadium	2.30E-03	-	-	-	-	7.18E-06	-	-	4.31E-06	7.18E-06	4.31E-06
Zinc	2.61E-03	5.38E+00	1.24E+01	7.86E-02	2.02E-02	8.15E-06	3.02E-02	6.98E-02	4.89E-06	9.88E-02	1.00E-01
Ammonia	6.74E-01	-	-	-	-	2.11E-03	-	-	1.26E-03	2.11E-03	1.26E-03
TCDD	4.02E-11	3.74E-05	8.79E-07	5.47E-07	1.43E-09	1.26E-13	2.10E-07	4.94E-09	7.55E-14	5.48E-07	2.15E-07
Toluene	2.45E-04	4.19E-02	2.84E-03	6.12E-04	4.62E-06	7.65E-07	2.36E-04	1.60E-05	4.59E-07	6.18E-04	2.52E-04
Diazinon	9.80E-07	1.68E-04	1.11E-04	2.45E-06	1.80E-07	3.06E-09	9.42E-07	6.24E-07	1.84E-09	2.63E-06	1.57E-06
Malathion	6.33E-07	8.29E-06	3.87E-06	1.21E-07	6.29E-09	1.98E-09	4.66E-08	2.18E-08	1.19E-09	1.29E-07	6.96E-08

Table 2d Exposure of Pollutants by Marine Mammals (Scenario 4)

Pollutants	Conc. at edge of ZID (mg/L)	Conc. in Fish (mg/kg)	Conc. in Shellfish (mg/kg)	Dolphins			Porpoises			Dolphins	Porpoises
				Daily Exposure via Ingestion of Fish (mg/kg-d)	Daily Exposure via Ingestion of Shellfish (mg/kg-d)	Daily Exposure via Ingestion of Seawater (mg/kg-d)	Total Daily Exposure (mg/kg-d)	Daily Exposure via Ingestion of Shellfish (mg/kg-d)	Daily Exposure via Ingestion of Seawater (mg/kg-d)	Total Daily Exposure (mg/kg-d)	Total Daily Exposure (mg/kg-d)
Chlorination By-products (COCs)	Refer to Appendix 7-3										
Aluminium	1.56E-02	4.21E-02	2.03E-03	6.16E-04	3.30E-06	4.88E-05	2.37E-04	1.14E-05	2.93E-05	6.68E-04	2.78E-04
Antimony	2.68E-04	1.07E-02	1.88E-03	1.57E-04	3.05E-06	8.38E-07	6.03E-05	1.06E-05	5.03E-07	1.61E-04	7.14E-05
Barium	7.01E-03	4.44E+00	1.40E+00	6.49E-02	2.28E-03	2.19E-05	2.50E-02	7.89E-03	1.31E-05	6.72E-02	3.29E-02
Chromium III	4.82E-04	9.16E-03	5.30E-05	1.34E-04	8.62E-08	1.51E-06	5.15E-05	2.98E-07	9.04E-07	1.36E-04	5.27E-05
Copper	2.06E-04	1.46E-01	7.67E-01	2.14E-03	1.25E-03	6.45E-07	8.24E-04	4.31E-03	3.87E-07	3.39E-03	5.14E-03
Lead	5.66E-05	5.09E-06	2.86E-01	7.45E-08	4.65E-04	1.77E-07	2.86E-08	1.61E-03	1.06E-07	4.65E-04	1.61E-03
Nickel	1.32E-03	1.03E-01	3.70E-02	1.51E-03	6.02E-05	4.13E-06	5.80E-04	2.08E-04	2.48E-06	1.57E-03	7.91E-04
Selenium	7.52E-05	9.70E-03	9.49E-02	1.42E-04	1.54E-04	2.35E-07	5.46E-05	5.34E-04	1.41E-07	2.96E-04	5.89E-04
Silver	9.83E-06	8.62E-04	2.93E-03	1.26E-05	4.76E-06	3.07E-08	4.85E-06	1.65E-05	1.84E-08	1.74E-05	2.13E-05
Tin	1.55E-04	2.14E-02	2.14E-02	3.13E-04	3.48E-05	4.85E-07	1.21E-04	1.21E-04	2.91E-07	3.49E-04	2.41E-04
Vanadium	2.33E-03	-	-	0.00E+00	0.00E+00	7.29E-06	0.00E+00	0.00E+00	4.38E-06	7.29E-06	4.38E-06
Zinc	2.63E-03	5.41E+00	1.25E+01	7.91E-02	2.03E-02	8.20E-06	3.04E-02	7.03E-02	4.92E-06	9.94E-02	1.01E-01
Ammonia	7.03E-01	-	-	0.00E+00	0.00E+00	2.20E-03	0.00E+00	0.00E+00	1.32E-03	2.20E-03	1.32E-03
TCDD	4.03E-11	3.75E-05	8.81E-07	5.48E-07	1.43E-09	1.26E-13	2.11E-07	4.95E-09	7.56E-14	5.49E-07	2.16E-07
Toluene	2.61E-04	4.46E-02	3.03E-03	6.52E-04	4.92E-06	8.15E-07	2.51E-04	1.70E-05	4.89E-07	6.58E-04	2.68E-04
Diazinon	1.04E-06	1.78E-04	1.18E-04	2.61E-06	1.92E-07	3.26E-09	1.00E-06	6.64E-07	1.96E-09	2.80E-06	1.67E-06
Malathion	6.74E-07	8.83E-06	4.12E-06	1.29E-07	6.70E-09	2.11E-09	4.97E-08	2.32E-08	1.26E-09	1.38E-07	7.41E-08

Table 2e Exposure of Pollutants by Marine Mammals (Scenario 5)

Pollutants	Conc. at edge of ZID (mg/L)	Conc. in Fish (mg/kg)	Conc. in Shellfish (mg/kg)	Dolphins			Porpoises			Dolphins	Porpoises
				Daily Exposure via Ingestion of Fish (mg/kg-d)	Daily Exposure via Ingestion of Shellfish (mg/kg-d)	Daily Exposure via Ingestion of Seawater (mg/kg-d)	Total Daily Exposure (mg/kg-d)	Daily Exposure via Ingestion of Shellfish (mg/kg-d)	Daily Exposure via Ingestion of Seawater (mg/kg-d)	Total Daily Exposure (mg/kg-d)	Total Daily Exposure (mg/kg-d)
Chlorination By-products (COCs)	Refer to Appendix 7-3										
Antimony	2.69E-04	1.08E-02	1.89E-03	1.58E-04	3.06E-06	8.42E-07	6.06E-05	1.06E-05	5.05E-07	1.62E-04	7.17E-05
Barium	7.02E-03	4.44E+00	1.40E+00	6.50E-02	2.28E-03	2.19E-05	2.50E-02	7.90E-03	1.32E-05	6.73E-02	3.29E-02
Chromium III	4.57E-04	8.69E-03	5.03E-05	1.27E-04	8.18E-08	1.43E-06	4.89E-05	2.83E-07	8.58E-07	1.29E-04	5.00E-05
Copper	1.64E-04	1.16E-01	6.09E-01	1.70E-03	9.89E-04	5.12E-07	6.54E-04	3.42E-03	3.07E-07	2.69E-03	4.08E-03
Nickel	1.24E-03	9.66E-02	3.47E-02	1.41E-03	5.63E-05	3.87E-06	5.43E-04	1.95E-04	2.32E-06	1.47E-03	7.41E-04
Selenium	7.13E-05	9.20E-03	9.00E-02	1.35E-04	1.46E-04	2.23E-07	5.17E-05	5.06E-04	1.34E-07	2.81E-04	5.58E-04
Silver	8.02E-06	7.04E-04	2.39E-03	1.03E-05	3.88E-06	2.51E-08	3.96E-06	1.34E-05	1.50E-08	1.42E-05	1.74E-05
Tin	1.47E-04	2.03E-02	2.03E-02	2.96E-04	3.29E-05	4.59E-07	1.14E-04	1.14E-04	2.75E-07	3.30E-04	2.28E-04
Vanadium	2.37E-03	-	-	-	-	7.42E-06	-	-	4.45E-06	7.42E-06	4.45E-06
Zinc	2.53E-03	5.21E+00	1.20E+01	7.63E-02	1.96E-02	7.91E-06	2.93E-02	6.77E-02	4.75E-06	9.58E-02	9.71E-02
Ammonia	3.16E-01	-	-	-	-	9.88E-04	-	-	5.93E-04	9.88E-04	5.93E-04
TCDD	3.95E-11	3.67E-05	8.63E-07	5.37E-07	1.40E-09	1.23E-13	2.06E-07	4.85E-09	7.41E-14	5.38E-07	2.11E-07
Diazinon	1.26E-06	2.16E-04	1.43E-04	3.15E-06	2.32E-07	3.94E-09	1.21E-06	8.03E-07	2.36E-09	3.39E-06	2.02E-06
Malathion	3.26E-07	4.27E-06	2.00E-06	6.25E-08	3.24E-09	1.02E-09	2.40E-08	1.12E-08	6.11E-10	6.67E-08	3.59E-08

Table 3a Cumulative Ecological Risk to Marine Mammals due to Chlorination By-products and other Pollutants (Scenario 1)

Pollutants	Toxicity Reference Dose (mg/kg/d)	Total Daily Exposure (mg/kg-d) - Dolphins	Total Daily Exposure (mg/kg-d) - Porpoises	Hazard Quotient – Dolphins	Hazard Quotient – Porpoises
Chlorination By-products (COCs)				1.19E-03	7.51E-04
Aluminium	6.125	6.68E-04	2.78E-04	1.09E-04	4.53E-05
Antimony	0.015625	1.60E-04	7.10E-05	1.02E-02	4.55E-03
Barium	1.875	6.67E-02	3.26E-02	3.56E-02	1.74E-02
Chromium III	342.125	1.28E-04	4.98E-05	3.74E-07	1.46E-07
Copper	1.5	2.99E-03	4.53E-03	1.99E-03	3.02E-03
Lead	1	4.64E-04	1.60E-03	4.64E-04	1.60E-03
Nickel	5	1.49E-03	7.48E-04	2.97E-04	1.50E-04
Selenium	0.02625	2.94E-04	5.83E-04	1.12E-02	2.22E-02
Silver	2.7775	1.65E-05	2.02E-05	5.94E-06	7.29E-06
Tin	2.925	3.44E-04	2.38E-04	1.18E-04	8.15E-05
Vanadium	0.02625	7.04E-06	4.23E-06	2.68E-04	1.61E-04
Zinc	20	9.81E-02	9.94E-02	4.91E-03	4.97E-03
Ammonia	5.15	2.00E-03	1.20E-03	3.89E-04	2.33E-04
TCDD	8.88E-06	5.47E-07	2.15E-07	6.16E-02	2.42E-02
Toluene	3.25	5.71E-04	2.33E-04	1.76E-04	7.17E-05
Diazinon	1.5	2.43E-06	1.45E-06	1.62E-06	9.66E-07
Malathion	4.4875	1.20E-07	6.43E-08	2.67E-08	1.43E-08
			Hazard Index	1.29E-01	7.95E-02

Table 3b Cumulative Ecological Risk to Marine Mammals due to Chlorination By-products and other Pollutants (Scenario 2)

Pollutants	Toxicity Reference Dose (mg/kg/d)	Total Daily Exposure (mg/kg-d) - Dolphins	Total Daily Exposure (mg/kg-d) - Porpoises	Hazard Quotient – Dolphins	Hazard Quotient – Porpoises
Chlorination By-products (COCs)				1.19E-03	7.51E-04
Aluminium	6.125	6.68E-04	2.78E-04	1.09E-04	4.53E-05
Antimony	0.015625	1.60E-04	7.10E-05	1.02E-02	4.55E-03
Barium	1.875	6.67E-02	3.26E-02	3.56E-02	1.74E-02
Chromium III	342.125	1.28E-04	4.98E-05	3.74E-07	1.46E-07
Copper	1.5	2.99E-03	4.53E-03	1.99E-03	3.02E-03
Lead	1	4.64E-04	1.60E-03	4.64E-04	1.60E-03
Nickel	5	1.49E-03	7.48E-04	2.97E-04	1.50E-04
Selenium	0.02625	2.94E-04	5.83E-04	1.12E-02	2.22E-02
Silver	2.7775	1.65E-05	2.02E-05	5.94E-06	7.29E-06
Tin	2.925	3.44E-04	2.38E-04	1.18E-04	8.15E-05
Vanadium	0.02625	7.04E-06	4.23E-06	2.68E-04	1.61E-04
Zinc	20	9.81E-02	9.94E-02	4.91E-03	4.97E-03
Ammonia	5.15	2.00E-03	1.20E-03	3.89E-04	2.33E-04
TCDD	8.88E-06	5.47E-07	2.15E-07	6.16E-02	2.42E-02
Toluene	3.25	5.71E-04	2.33E-04	1.76E-04	7.17E-05
Diazinon	1.5	2.43E-06	1.45E-06	1.62E-06	9.66E-07
Malathion	4.4875	1.20E-07	6.43E-08	2.67E-08	1.43E-08
			Hazard Index	1.29E-01	7.95E-02

Table 3c Cumulative Ecological Risk to Marine Mammals due to Chlorination By-products and other Pollutants (Scenario 3)

Pollutants	Toxicity Reference Dose (mg/kg/d)	Total Daily Exposure (mg/kg-d) - Dolphins	Total Daily Exposure (mg/kg-d) - Porpoises	Hazard Quotient – Dolphins	Hazard Quotient – Porpoises
Chlorination By-products (COCs)				1.29E-03	8.13E-04
Aluminium	6.125	6.68E-04	2.78E-04	1.09E-04	4.53E-05
Antimony	0.015625	1.60E-04	7.12E-05	1.03E-02	4.56E-03
Barium	1.875	6.70E-02	3.28E-02	3.57E-02	1.75E-02
Chromium III	342.125	1.32E-04	5.14E-05	3.86E-07	1.50E-07
Copper	1.5	3.20E-03	4.85E-03	2.13E-03	3.24E-03
Lead	1	4.65E-04	1.61E-03	4.65E-04	1.61E-03
Nickel	5	1.53E-03	7.71E-04	3.07E-04	1.54E-04
Selenium	0.02625	2.95E-04	5.86E-04	1.12E-02	2.23E-02
Silver	2.7775	1.70E-05	2.08E-05	6.11E-06	7.50E-06
Tin	2.925	3.47E-04	2.40E-04	1.19E-04	8.20E-05
Vanadium	0.02625	7.18E-06	4.31E-06	2.73E-04	1.64E-04
Zinc	20	9.88E-02	1.00E-01	4.94E-03	5.00E-03
Ammonia	5.15	2.11E-03	1.26E-03	4.09E-04	2.45E-04
TCDD	8.88E-06	5.48E-07	2.15E-07	6.18E-02	2.42E-02
Toluene	3.25	6.18E-04	2.52E-04	1.90E-04	7.75E-05
Diazinon	1.5	2.63E-06	1.57E-06	1.76E-06	1.05E-06
Malathion	4.4875	1.29E-07	6.96E-08	2.89E-08	1.55E-08
			Hazard Index	1.29E-01	8.00E-02

Table 3d Cumulative Ecological Risk to Marine Mammals due to Chlorination By-products and other Pollutants (Scenario 4)

Pollutants	Toxicity Reference Dose (mg/kg/d)	Total Daily Exposure (mg/kg-d) - Dolphins	Total Daily Exposure (mg/kg-d) - Porpoises	Hazard Quotient – Dolphins	Hazard Quotient – Porpoises
Chlorination By-products (COCs)				1.37E-03	8.66E-04
Aluminium	6.125	6.68E-04	2.78E-04	1.09E-04	4.53E-05
Antimony	0.015625	1.61E-04	7.14E-05	1.03E-02	4.57E-03
Barium	1.875	6.72E-02	3.29E-02	3.58E-02	1.75E-02
Chromium III	342.125	1.36E-04	5.27E-05	3.96E-07	1.54E-07
Copper	1.5	3.39E-03	5.14E-03	2.26E-03	3.43E-03
Lead	1	4.65E-04	1.61E-03	4.65E-04	1.61E-03
Nickel	5	1.57E-03	7.91E-04	3.15E-04	1.58E-04
Selenium	0.02625	2.96E-04	5.89E-04	1.13E-02	2.24E-02
Silver	2.7775	1.74E-05	2.13E-05	6.26E-06	7.68E-06
Tin	2.925	3.49E-04	2.41E-04	1.19E-04	8.25E-05
Vanadium	0.02625	7.29E-06	4.38E-06	2.78E-04	1.67E-04
Zinc	20	9.94E-02	1.01E-01	4.97E-03	5.03E-03
Ammonia	5.15	2.20E-03	1.32E-03	4.27E-04	2.56E-04
TCDD	8.88E-06	5.49E-07	2.16E-07	6.19E-02	2.43E-02
Toluene	3.25	6.58E-04	2.68E-04	2.03E-04	8.26E-05
Diazinon	1.5	2.80E-06	1.67E-06	1.87E-06	1.11E-06
Malathion	4.4875	1.38E-07	7.41E-08	3.07E-08	1.65E-08
			Hazard Index	1.30E-01	8.06E-02

Table 3e Cumulative Ecological Risk to Marine Mammals due to Chlorination By-products and other Pollutants (Scenario 5)

Pollutants	Toxicity Reference Dose (mg/kg/d)	Total Daily Exposure (mg/kg-d) - Dolphins	Total Daily Exposure (mg/kg-d) - Porpoises	Hazard Quotient – Dolphins	Hazard Quotient – Porpoises
Chlorination By-products (COCs)				1.20E-03	7.78E-04
Antimony	0.015625	1.62E-04	7.17E-05	1.03E-02	4.59E-03
Barium	1.875	6.73E-02	3.29E-02	3.59E-02	1.76E-02
Chromium III	342.125	1.29E-04	5.00E-05	3.76E-07	1.46E-07
Copper	1.5	2.69E-03	4.08E-03	1.79E-03	2.72E-03
Nickel	5	1.47E-03	7.41E-04	2.94E-04	1.48E-04
Selenium	0.02625	2.81E-04	5.58E-04	1.07E-02	2.13E-02
Silver	2.7775	1.42E-05	1.74E-05	5.11E-06	6.27E-06
Tin	2.925	3.30E-04	2.28E-04	1.13E-04	7.81E-05
Vanadium	0.02625	7.42E-06	4.45E-06	2.82E-04	1.69E-04
Zinc	20	9.58E-02	9.71E-02	4.79E-03	4.85E-03
Ammonia	5.15	9.88E-04	5.93E-04	1.92E-04	1.15E-04
TCDD	8.88E-06	5.38E-07	2.11E-07	6.06E-02	2.38E-02
Diazinon	1.5	3.39E-06	2.02E-06	2.26E-06	1.35E-06
Malathion	4.4875	6.67E-08	3.59E-08	1.49E-08	7.99E-09
			Hazard Index	1.26E-01	7.61E-02