

APPENDIX P

Tier 2 Soil-to-Groundwater PCL Calculation Sheets



Appendix P: Tier 2 Soil-to-Groundwater PCL Calculation Sheet

Summary of Soil-to-Groundwater ($\rho_{GW}^{Soil_{ing}}$), Soil-to-Groundwater-to-Surface Water (ρ_{SW-GW}^{Soil}), and

Soil-to-Groundwater-to-Sediment (ρ_{SW-GW}^{Soil}) PCLs

Former ASARCO Smelter Site

	K_d^1	H'^2	K_{SW}^3	$\rho_{GW}^{GW_{ing}} Res(mg/L)$	Tier 2 Res $\rho_{GW}^{Soil_{ing}} (mg/kg)$	$\rho_{GW}^{GW_{ing}} C/I(mg/L)$	Tier 2 C/I $\rho_{GW}^{Soil_{ing}} (mg/kg)$	$\rho_{SW}^{GW} (mg/L)$	$\rho_{SW-GW}^{Soil} (mg/kg)$	$\rho_{Sed}^{GW} (mg/L)$	$\rho_{Sed-GW}^{Soil}^4 (mg/kg)$
Antimony	22		0.045	0.006	1.33	0.006	1.33	0.509	112	0.43	96
Arsenic	31		0.032	0.02	6.2	0.02	6.2	0.848	264	0.69	213
Barium	52		0.019	2	1,042	2	1,042	170	88,000	520	271,000
Cadmium	4,300		0.00023	0.005	215	0.005	215	0.047	2,000	0.011	460
Chromium	4,300,000		0.0000002	0.1	1,000,000	0.1	1,000,000	8.48	1,000,000	0.00002	974
Cobalt	45		0.022	0.24	107	0.73	327	7.05	3156	0.04	19
Copper	40		0.025	1.3	519	1.3	519	2.06	800	1.99	794
Iron	NE		NE	0.704	NE	0.704	NE	NE	NE	NE	NE
Lead ^[a]	597		0.0017	0.015	90	0.015	90	0.619	3,700	0.14	820
Mercury ^[b]	200	0.474	0.0050	0.002	4.0	0.002	4.0	0.00102	2.04	0.005	10
Molybdenum	20		0.050	0.122	24	0.37	74	10.34	2070	89	17,846
Nickel	1,900		0.00053	0.49	9,310	1.5	28,501	9.4	179,000	0.20	3,796
Selenium	2.2		0.436	0.05	1.15	0.05	1.15	0.147	4	0.54	12
Silver	110		0.009	0.12	132	0.37	407	0.022	24	0.009	10
Thallium	96		0.0104	0.002	1.9	0.002	1.9	0.010	9.8	NE	NE
Zinc	530		0.0019	7.3	38,697	22	116,621	31	164,000	3.05	16,000

Notes:

1 - K_d (soil-to-water partitioning coefficient) based on values published in TRRP rule [30 TAC 350.73(f)] based on pH of 8.0.

2 - H' (unitless Henry's Constant) based on values published in TRRP rule [30 TAC 350.73(f)].

3 - K_{SW} (soil leachate partitioning factor) based on the following equation: $K_{SW} = \rho_b / (\theta_{ws} + K_d\rho_b + H'\theta_{as})$.

where:

K_{SW} - Soil-leachate partitioning factor for COC (mg/L - water / mg/kg - soil)

ρ_b - Soil bulk density (g/cm³) - 1.67

H' - Dimensionless Henry's Law constant - 30 TAC 350.73(f)

K_d - Soil-to-water partitioning coefficient (cm³ - water / g - soil) - chemical specific

θ_{as} - Volumetric air content soil in vadose zone (cm³ - air / cm³ - soil) - 0.21

θ_{ws} - Volumetric water content of soil in vadose zone (cm³ - water / cm³ - soil) - 0.16