Appendix I

Calibration of Mass-Balance Model for Existing LTVSMC Tailings Basin Seepage Rate in the Embarrass River Watershed

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Calcium: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	1.90	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	13	(mg/l)
	concentration of surface water into PM-13	C_s13 =	13	(mg/l)
	concentration of WWTP discharge	C_sBab =	13	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	95.4	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	59.78	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	19	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	19	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.51	(cfs)
	flow in river at PM-13	Q_r13 =	7.30	(cfs)
	flow check	Q_ck =	7.30	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	121	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	3214	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2264	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	584	(mg/s)
	mass flux in river at PM-13	M_r13 =	6062	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	13.68	(mg/l)
	concentration in river at PM-13	C_r13 =	29.34	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	18.80	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	29.60	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Calcium: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	1.40	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	13	(mg/l)
	concentration of surface water into PM-13	C_s13 =	13	(mg/l)
	concentration of WWTP discharge	C_sBab =	13	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	95.4	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	59.78	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	19	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	19	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.47	(cfs)
	flow in river at PM-13	Q_r13 =	7.06	(cfs)
	flow check	Q_ck =	7.06	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	121	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	702	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	2368	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2264	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	584	(mg/s)
	mass flux in river at PM-13	M_r13 =	5918	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	14.06	(mg/l)
	concentration in river at PM-13	C_r13 =	29.62	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	18.80	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	29.60	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Calcium: Flows at PM-13 = 10 - 20 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.22	(cfs)
	surface water flow into PM-13	Q_s13 =	5.98	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	3.90	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	13	(mg/l)
	concentration of surface water into PM-13	C_s13 =	13	(mg/l)
	concentration of WWTP discharge	C_sBab =	13	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	95.4	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	59.78	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	19	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	19	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	450	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	2199	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	121	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	6598	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2264	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	1034	(mg/s)
	mass flux in river at PM-13	M_r13 =	12094	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	11.93	(mg/l)
	concentration in river at PM-13	C_r13 =	25.90	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	15.65	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	24.03	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Calcium: Flows at PM-13 = 10 - 20 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.26	(cfs)
	surface water flow into PM-13	Q_s13 =	6.18	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	3.40	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	13	(mg/l)
	concentration of surface water into PM-13	C_s13 =	13	(mg/l)
	concentration of WWTP discharge	C_sBab =	13	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	95.4	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	59.78	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	19	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	19	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	465	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	2272	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	121	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	702	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	5752	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2264	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	1049	(mg/s)
	mass flux in river at PM-13	M_r13 =	12039	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	12.10	(mg/l)
	concentration in river at PM-13	C_r13 =	25.78	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	15.65	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	24.03	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Chloride: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	10	(mg/l)
	concentration of surface water into PM-13	C_s13 =	10	(mg/l)
	concentration of WWTP discharge	C_sBab =	10	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	5.95	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	21.54	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	1.8	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	1.8	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.86	(cfs)
	flow in river at PM-13	Q_r13 =	9.40	(cfs)
	flow check	Q_ck =	9.40	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	93	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	2438	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	44	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	214	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	137	(mg/s)
	mass flux in river at PM-13	M_r13 =	2790	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	2.60	(mg/l)
	concentration in river at PM-13	C_r13 =	10.49	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	5.33	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	10.30	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Chloride: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	3.90	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	10	(mg/l)
	concentration of surface water into PM-13	C_s13 =	10	(mg/l)
	concentration of WWTP discharge	C_sBab =	10	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	5.95	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	21.54	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	1.8	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	1.8	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.89	(cfs)
	flow in river at PM-13	Q_r13 =	9.56	(cfs)
	flow check	Q_ck =	9.56	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	93	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	44	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	2377	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	44	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	214	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	137	(mg/s)
	mass flux in river at PM-13	M_r13 =	2773	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	2.57	(mg/l)
	concentration in river at PM-13	C_r13 =	10.25	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	5.33	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	10.30	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Chloride: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.63	(cfs)
	surface water flow into PM-13	Q_s13 =	7.97	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	1.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	10	(mg/l)
	concentration of surface water into PM-13	C_s13 =	10	(mg/l)
	concentration of WWTP discharge	C_sBab =	10	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	5.95	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	21.54	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	1.8	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	1.8	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	2.98	(cfs)
	flow in river at PM-13	Q_r13 =	16.00	(cfs)
	flow check	Q_ck =	16.00	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	462	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	2255	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	93	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	610	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	44	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	214	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	599	(mg/s)
	mass flux in river at PM-13	M_r13 =	3678	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	7.11	(mg/l)
	concentration in river at PM-13	C_r13 =	8.12	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	5.23	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	5.27	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Chloride: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.59	(cfs)
	surface water flow into PM-13	Q_s13 =	7.75	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	1.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	10	(mg/l)
	concentration of surface water into PM-13	C_s13 =	10	(mg/l)
	concentration of WWTP discharge	C_sBab =	10	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	5.95	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	21.54	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	1.8	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	1.8	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	2.98	(cfs)
	flow in river at PM-13	Q_r13 =	16.00	(cfs)
	flow check	Q_ck =	16.00	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	449	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	2194	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	93	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	44	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	610	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	44	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	214	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	587	(mg/s)
	mass flux in river at PM-13	M_r13 =	3648	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	6.96	(mg/l)
	concentration in river at PM-13	C_r13 =	8.06	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	5.23	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	5.27	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Copper: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	0.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	1.5	(µg/l)
	concentration of surface water into PM-13	C_s13 =	1.5	(µg/l)
	concentration of WWTP discharge	C_sBab =	1.5	(µg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	3.5	(µg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	4.55	(µg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	4	(µg/l)
	concentration of ground water flow into PM-13	C_g13 =	4	(µg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.19	(cfs)
	flow in river at PM-13	Q_r13 =	5.40	(cfs)
	flow check	Q_ck =	5.40	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	14	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	0	(µg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(µg/s)
	mass flux of ground water into PM-12	M_g12 =	97	(µg/s)
	mass flux of ground water into PM-13	M_g13 =	477	(µg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	111	(µg/s)
	mass flux in river at PM-13	M_r13 =	588	(µg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	3.32	(µg/l)
	concentration in river at PM-13	C_r13 =	3.85	(µg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	1.19	(µg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	1.30	(µg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Copper: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	0.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	1.5	(µg/l)
	concentration of surface water into PM-13	C_s13 =	1.5	(µg/l)
	concentration of WWTP discharge	C_sBab =	1.5	(µg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	3.5	(µg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	4.55	(µg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	4	(µg/l)
	concentration of ground water flow into PM-13	C_g13 =	4	(µg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.23	(cfs)
	flow in river at PM-13	Q_r13 =	5.66	(cfs)
	flow check	Q_ck =	5.66	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	14	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	26	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	0	(µg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(µg/s)
	mass flux of ground water into PM-12	M_g12 =	97	(µg/s)
	mass flux of ground water into PM-13	M_g13 =	477	(µg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	111	(µg/s)
	mass flux in river at PM-13	M_r13 =	614	(µg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	3.20	(µg/l)
	concentration in river at PM-13	C_r13 =	3.83	(µg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	1.19	(µg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	1.30	(µg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Copper: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.89	(cfs)
	surface water flow into PM-13	Q_s13 =	9.21	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	0.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	1.5	(µg/l)
	concentration of surface water into PM-13	C_s13 =	1.5	(µg/l)
	concentration of WWTP discharge	C_sBab =	1.5	(µg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	3.5	(µg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	4.55	(µg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	4	(µg/l)
	concentration of ground water flow into PM-13	C_g13 =	4	(µg/l)

Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	80	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	391	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	14	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	0	(µg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(µg/s)
	mass flux of ground water into PM-12	M_g12 =	97	(µg/s)
	mass flux of ground water into PM-13	M_g13 =	477	(µg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	191	(µg/s)
	mass flux in river at PM-13	M_r13 =	1059	(µg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	2.21	(µg/l)
	concentration in river at PM-13	C_r13 =	2.27	(µg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	2.06	(µg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	1.88	(µg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Copper: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.84	(cfs)
	surface water flow into PM-13	Q_s13 =	9.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	0.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	1.5	(µg/l)
	concentration of surface water into PM-13	C_s13 =	1.5	(µg/l)
	concentration of WWTP discharge	C_sBab =	1.5	(µg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	3.5	(µg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	4.55	(µg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	4	(µg/l)
	concentration of ground water flow into PM-13	C_g13 =	4	(µg/l)

Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	78	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	382	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	14	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	26	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	0	(µg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(µg/s)
	mass flux of ground water into PM-12	M_g12 =	97	(µg/s)
	mass flux of ground water into PM-13	M_g13 =	477	(µg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	190	(µg/s)
	mass flux in river at PM-13	M_r13 =	1074	(µg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	2.19	(µg/l)
	concentration in river at PM-13	C_r13 =	2.30	(µg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	2.06	(µg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	1.88	(µg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Fluoride: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	1.70	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/l)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/l)
	concentration of WWTP discharge	C_sBab =	0.2	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.125	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	1.55	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	0.385	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.385	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.47	(cfs)
	flow in river at PM-13	Q_r13 =	7.10	(cfs)
	flow check	Q_ck =	7.10	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	2	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	75	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	46	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	11	(mg/s)
	mass flux in river at PM-13	M_r13 =	132	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	0.27	(mg/l)
	concentration in river at PM-13	C_r13 =	0.66	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	0.17	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	0.63	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Fluoride: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	1.70	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/l)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/l)
	concentration of WWTP discharge	C_sBab =	0.2	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.125	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	1.55	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	0.385	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.385	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.52	(cfs)
	flow in river at PM-13	Q_r13 =	7.36	(cfs)
	flow check	Q_ck =	7.36	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	2	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	1	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	75	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	46	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	11	(mg/s)
	mass flux in river at PM-13	M_r13 =	133	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	0.26	(mg/l)
	concentration in river at PM-13	C_r13 =	0.64	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	0.17	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	0.63	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Fluoride: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.87	(cfs)
	surface water flow into PM-13	Q_s13 =	4.23	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	6.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/l)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/l)
	concentration of WWTP discharge	C_sBab =	0.2	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.125	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	1.55	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	0.385	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.385	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	5	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	24	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	2	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	263	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	46	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	16	(mg/s)
	mass flux in river at PM-13	M_r13 =	349	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	0.19	(mg/l)
	concentration in river at PM-13	C_r13 =	0.75	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	0.11	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	0.76	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Fluoride: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.82	(cfs)
	surface water flow into PM-13	Q_s13 =	4.02	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	6.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/l)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/l)
	concentration of WWTP discharge	C_sBab =	0.2	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.125	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	1.55	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	0.385	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.385	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	5	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	23	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	2	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	1	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	263	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	46	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	16	(mg/s)
	mass flux in river at PM-13	M_r13 =	349	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	0.18	(mg/l)
	concentration in river at PM-13	C_r13 =	0.75	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	0.11	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	0.76	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Iron: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	2.80	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/l)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/l)
	concentration of WWTP discharge	C_sBab =	2.9	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.038	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	4.594	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	0.035	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.035	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.66	(cfs)
	flow in river at PM-13	Q_r13 =	8.20	(cfs)
	flow check	Q_ck =	8.20	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	27	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	364	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	4	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	28	(mg/s)
	mass flux in river at PM-13	M_r13 =	396	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	0.59	(mg/l)
	concentration in river at PM-13	C_r13 =	1.71	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	2.41	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	1.52	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Iron: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	2.90	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/l)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/l)
	concentration of WWTP discharge	C_sBab =	2.9	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.038	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	4.594	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	0.035	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.035	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.72	(cfs)
	flow in river at PM-13	Q_r13 =	8.56	(cfs)
	flow check	Q_ck =	8.56	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	27	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	377	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	4	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	28	(mg/s)
	mass flux in river at PM-13	M_r13 =	409	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	0.57	(mg/l)
	concentration in river at PM-13	C_r13 =	1.69	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	2.41	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	1.52	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Iron: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.89	(cfs)
	surface water flow into PM-13	Q_s13 =	9.21	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	0.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/l)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/l)
	concentration of WWTP discharge	C_sBab =	2.9	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.038	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	4.594	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	0.035	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.035	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	155	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	756	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	27	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	0	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	4	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	183	(mg/s)
	mass flux in river at PM-13	M_r13 =	943	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	2.11	(mg/l)
	concentration in river at PM-13	C_r13 =	2.02	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	3.43	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	1.75	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Iron: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.84	(cfs)
	surface water flow into PM-13	Q_s13 =	9.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	0.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/l)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/l)
	concentration of WWTP discharge	C_sBab =	2.9	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.038	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	4.594	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	0.035	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.035	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	151	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	738	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	27	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	0	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	4	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	179	(mg/s)
	mass flux in river at PM-13	M_r13 =	922	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	2.07	(mg/l)
	concentration in river at PM-13	C_r13 =	1.97	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	3.43	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	1.75	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Magnesium: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	1.80	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	6	(mg/l)
	concentration of surface water into PM-13	C_s13 =	6	(mg/l)
	concentration of WWTP discharge	C_sBab =	6	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	271	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	69.97	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	10.65	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	10.65	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.49	(cfs)
	flow in river at PM-13	Q_r13 =	7.20	(cfs)
	flow check	Q_ck =	7.20	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	56	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	3564	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1269	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	315	(mg/s)
	mass flux in river at PM-13	M_r13 =	5148	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	7.47	(mg/l)
	concentration in river at PM-13	C_r13 =	25.27	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	6.90	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	24.53	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Magnesium: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	0.30	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	6	(mg/l)
	concentration of surface water into PM-13	C_s13 =	6	(mg/l)
	concentration of WWTP discharge	C_sBab =	6	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	271	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	69.97	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	10.65	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	10.65	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.28	(cfs)
	flow in river at PM-13	Q_r13 =	5.96	(cfs)
	flow check	Q_ck =	5.96	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	56	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	1994	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	594	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1269	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	315	(mg/s)
	mass flux in river at PM-13	M_r13 =	4172	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	8.69	(mg/l)
	concentration in river at PM-13	C_r13 =	24.74	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	6.90	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	24.53	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Magnesium: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.33	(cfs)
	surface water flow into PM-13	Q_s13 =	6.47	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	3.30	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	6	(mg/l)
	concentration of surface water into PM-13	C_s13 =	6	(mg/l)
	concentration of WWTP discharge	C_sBab =	6	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	271	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	69.97	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	10.65	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	10.65	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	225	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	1099	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	56	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	6534	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1269	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	540	(mg/s)
	mass flux in river at PM-13	M_r13 =	9443	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	6.23	(mg/l)
	concentration in river at PM-13	C_r13 =	20.22	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	6.06	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	20.33	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Magnesium: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.47	(cfs)
	surface water flow into PM-13	Q_s13 =	7.17	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	2.20	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	6	(mg/l)
	concentration of surface water into PM-13	C_s13 =	6	(mg/l)
	concentration of WWTP discharge	C_sBab =	6	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	271	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	69.97	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	10.65	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	10.65	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	249	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	1218	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	56	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	1994	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	4356	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1269	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	565	(mg/s)
	mass flux in river at PM-13	M_r13 =	9402	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	6.51	(mg/l)
	concentration in river at PM-13	C_r13 =	20.13	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	6.06	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	20.33	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Sodium: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.20	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	3.5	(mg/l)
	concentration of surface water into PM-13	C_s13 =	3.5	(mg/l)
	concentration of WWTP discharge	C_sBab =	3.5	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	120	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	44.31	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	4.9	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	4.9	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.90	(cfs)
	flow in river at PM-13	Q_r13 =	9.60	(cfs)
	flow check	Q_ck =	9.60	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	33	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	5267	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	584	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	152	(mg/s)
	mass flux in river at PM-13	M_r13 =	6002	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	2.83	(mg/l)
	concentration in river at PM-13	C_r13 =	22.09	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	3.20	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	22.20	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Sodium: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	3.10	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	3.5	(mg/l)
	concentration of surface water into PM-13	C_s13 =	3.5	(mg/l)
	concentration of WWTP discharge	C_sBab =	3.5	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	120	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	44.31	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	4.9	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	4.9	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.75	(cfs)
	flow in river at PM-13	Q_r13 =	8.76	(cfs)
	flow check	Q_ck =	8.76	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	33	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	883	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	3887	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	584	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	152	(mg/s)
	mass flux in river at PM-13	M_r13 =	5506	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	3.06	(mg/l)
	concentration in river at PM-13	C_r13 =	22.21	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	3.20	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	22.20	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Sodium: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.46	(cfs)
	surface water flow into PM-13	Q_s13 =	7.14	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	2.50	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	3.5	(mg/l)
	concentration of surface water into PM-13	C_s13 =	3.5	(mg/l)
	concentration of WWTP discharge	C_sBab =	3.5	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	120	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	44.31	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	4.9	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	4.9	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	145	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	707	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	33	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	3135	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	584	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	297	(mg/s)
	mass flux in river at PM-13	M_r13 =	4723	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	3.42	(mg/l)
	concentration in river at PM-13	C_r13 =	10.11	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	2.70	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	9.90	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Sodium: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.54	(cfs)
	surface water flow into PM-13	Q_s13 =	7.50	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	1.80	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	3.5	(mg/l)
	concentration of surface water into PM-13	C_s13 =	3.5	(mg/l)
	concentration of WWTP discharge	C_sBab =	3.5	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	120	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	44.31	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	4.9	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	4.9	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	152	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	743	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	33	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	883	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	2257	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	584	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	304	(mg/s)
	mass flux in river at PM-13	M_r13 =	4771	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	3.51	(mg/l)
	concentration in river at PM-13	C_r13 =	10.22	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	2.70	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	9.90	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Sulfate: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	1.60	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	4	(mg/l)
	concentration of surface water into PM-13	C_s13 =	4	(mg/l)
	concentration of WWTP discharge	C_sBab =	4	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	1046	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	152.4	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	8.5	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	8.5	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.46	(cfs)
	flow in river at PM-13	Q_r13 =	7.00	(cfs)
	flow check	Q_ck =	7.00	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	37	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	6901	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	207	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1013	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	244	(mg/s)
	mass flux in river at PM-13	M_r13 =	8158	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	5.92	(mg/l)
	concentration in river at PM-13	C_r13 =	41.18	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	3.06	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	41.30	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Sulfate: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	0.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	4	(mg/l)
	concentration of surface water into PM-13	C_s13 =	4	(mg/l)
	concentration of WWTP discharge	C_sBab =	4	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	1046	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	152.4	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	8.5	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	8.5	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.23	(cfs)
	flow in river at PM-13	Q_r13 =	5.66	(cfs)
	flow check	Q_ck =	5.66	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	37	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	7696	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	0	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	207	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1013	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	244	(mg/s)
	mass flux in river at PM-13	M_r13 =	8953	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	7.01	(mg/l)
	concentration in river at PM-13	C_r13 =	55.90	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	3.06	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	41.30	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Sulfate: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.12	(cfs)
	surface water flow into PM-13	Q_s13 =	5.49	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	4	(mg/l)
	concentration of surface water into PM-13	C_s13 =	4	(mg/l)
	concentration of WWTP discharge	C_sBab =	4	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	1046	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	152.4	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	8.5	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	8.5	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	2.98	(cfs)
	flow in river at PM-13	Q_r13 =	16.01	(cfs)
	flow check	Q_ck =	16.01	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	127	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	621	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	37	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	17252	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	207	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1013	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	371	(mg/s)
	mass flux in river at PM-13	M_r13 =	19257	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	4.40	(mg/l)
	concentration in river at PM-13	C_r13 =	42.50	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	5.03	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	45.33	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Sulfate: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.35	(cfs)
	surface water flow into PM-13	Q_s13 =	6.60	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	2.40	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	4	(mg/l)
	concentration of surface water into PM-13	C_s13 =	4	(mg/l)
	concentration of WWTP discharge	C_sBab =	4	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	1046	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	152.4	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	8.5	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	8.5	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	2.98	(cfs)
	flow in river at PM-13	Q_r13 =	16.01	(cfs)
	flow check	Q_ck =	16.01	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	153	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	747	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	37	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	7696	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	10351	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	207	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1013	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	397	(mg/s)
	mass flux in river at PM-13	M_r13 =	20204	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	4.71	(mg/l)
	concentration in river at PM-13	C_r13 =	44.59	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	5.03	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	45.33	(mg/l)